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EU Ecolabel Criteria for growing media and soil improvers

Technical Report

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CONTENT

ABSTRACT

The objective of the present project is to revise the existing EU Ecolabel criteria for growing media, soil improvers and mulch (Commission Decision (EU) 2015/2099).

This Technical Report addresses the requirements of the Ecolabel Regulation No 66/2010 to inform about the technical evidence that supports the revision of EU Ecolabel criteria for growing media, soil improvers, and mulch.

This revised technical report provides an update on the criteria revision process. The proposed revised criteria are the result of a broad public consultation that took place between 20 of July and 19 of September 2021, and incorporate dialogue with specialised stakeholders within the technical subgroup meetings that took place in June 2021, as well with Commission services and the EU Ecolabelling Board (EUEB) Members. Changes and further analysis added after the EUEB meeting held in March 2022 are displayed *"in blue"*.

This Technical Report sets the scene for the final presentation of the criteria to the Regulatory Committee meeting. The document only briefly displays and summarises these comments that triggered further revision of the proposed criteria. **For the further comprehension of stakeholders' opinion, this document should be read in conjunction with information contained in the Table of comments that is available on the project website**.

This report consists of the following key sections:

- Introduction, outlining the purpose of the report and a brief summary of the market analysis, and technical analysis linking the environmental hotspots of the criteria proposed in this document.
- Product group specifications, including product group name, definition and scope, and other general indications related to these EU Ecolabel criteria, such as application specification, general assessment and verification terms.
- Proposal of revised EU Ecolabel criteria for growing media and soil improvers with the supporting rationale.
- Main changes proposed to the revised criteria compared to currently valid requirements.

The proposed EU Ecolabel criteria for growing media and soil improvers are split into the following main areas:

- Components of the final product.
- Extraction, manufacturing and use and after use of mineral growing media and its components.
- Hazardous substances restrictions (horizontal restrictions for substances of very high concern (SVHCs) and substances with certain classification, labelling, and packaging (CLP) classifications plus specific restrictions in defined circumstances for heavy metals and persistent organic pollutants). Product biological safety.
- Fitness for use (stability, physical contaminants, organic matter and dry matter, viable weed seeds and plant propagules, plant response), and growing media features.
- Provision of information.

More information about the project is available at the project website.

The work has been carried out by the Joint Research Centre, Directorate B- Growth and Innovation, Circular Economy and Industrial Leadership Unit in Seville (Spain) and has been developed in the context of the Administrative Arrangement between DG Environment and the Joint Research Centre.

ACKNOWLEDGEMENTS

This report has been developed in the context of the Administrative Arrangement "Development of implementation measures for SCP instruments (SUSTIM)" between Directorate-General for Environment and Directorate-General Joint Research Centre.

NOTE
Changes introduced to the latest draft criteria proposal presented at the March 2022 EU Ecolabelling Board meeting are marked in **blue**.

EXECUTIVE SUMMARY

This Technical Report presents the draft proposal for the revision of EU Ecolabel criteria for growing media, soil improvers and mulch as established by Commission Decision (EU) 2015/2099. The document provides supporting rationale and background research for each criterion and has served as an aid during public consultation of the proposed revised criteria for growing media, soil improvers and mulch, as specified in Part C of Annex I to EU Ecolabel Regulation (EC) No 66/2010.

One of the objectives of the on-going revision is to ensure consistency with Regulation (EU) 2019/1009 and to establish a revised set of criteria which ambition level is aimed at the products with the best environmental performance on the market and in line with the principles of circular economy. On that account, in order to better reflect best practice in the market for the product group, to take account of policy developments, potential future windows of opportunity for increased uptake and market's demand on sustainable products, it is considered appropriate to propose a revised set of criteria for growing media and soil improvers.

Policy context

This document addresses the requirements of the EU Ecolabel Regulation (EC) No 66/2010.

Key conclusions

The EU Ecolabel criteria target the best growing media and soil improvers on the market, in terms of environmental performance. The criteria focus on the main environmental impacts associated with the life cycle of these products and promote circular economy aspects. Chapter 6 summaries the MAIN CHANGES proposed for THE REVISED CRITERIA COMPARED TO currently valid REQUIREMENTS.

Main findings

The proposed EU Ecolabel criteria aim to promote the use of recycled or organic materials as components of growing media and soil improvers, and they allow a more resource-efficient general use of nutrients. To ensure the product safety and reduce the possible risk to human, animal or plant health, or to the environment, the content of contaminants such as heavy metals is limited. Furthermore, the content of impurities in EU Ecolabel growing media and soil improvers derived from bio-waste, in particular polymers but also metal and glass, is proposed to be limited to the technically feasible extent. Additionally, the criteria promotes mineral growing media produced with lower energy consumption and lower CO_2 emissions compared to the common practice.

To this end the proposed criteria target to:

- incentivize the circularity of the nutrients by incorporation of the secondary raw materials into the EU Ecolabel soil improvers and growing media;
- set requirements on the admitted components of the final product;
- set requirements on energy consumption and CO_2 emission for manufacturing of mineral growing media;
- set rules for recycling/recovery of materials used in the growing media;
- set requirement on the final product chemical safety;
- set requirements on the quality of the final product.

1. INTRODUCTION

The EU Ecolabel is a voluntary labelling policy that promotes the production and consumption of products with a reduced environmental impact over their life cycle, and is aimed at products with a high level of environmental performance. Established in 1992, it has become a key policy instrument within the European Commission's Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan (see COM(2008) 397) and the Roadmap for a Resource-Efficient Europe (see COM/2011/0571). The Roadmap was designed to move the economy of Europe onto a more resource-efficient path by 2020 in order to become more competitive and to create growth and employment.

Today the EU Ecolabel scheme contributes to the European Green Deal priority "Mobilising industry for a clean and circular economy" and is referred to in the new Circular Economy Action Plan under the "Sustainable Product Policy Framework" area of actions, and will undoubtedly play an important role in the upcoming related initiatives.

It is also important to mention its links with other voluntary policy tools for sustainability, such as Green Public Procurement (GPP, see COM(2008) 400), and the Eco-Management and Audit Scheme (EMAS) (see Regulation (EC) No 1221/2009 and Regulation (EU) No 2018/2026).

1.1. Methodology and sources of information

This Technical Report addresses the requirements of the Regulation (EC) No 66/2010 (EC, 2010a) for technical evidence to underpin the criteria revision, and set the scene for the public stakeholders consultation.

The revision process took the existing documents (Commission Decision (EU) 2015/2099, Rodriguez Quintero et al 2015) as the starting point and seeked to analyse their validity and update, if necessary, taking into account technological and economic changes in the European market, relevant legislative changes and improved scientific knowledge.

Bringing together the information from the revision of the scope, assessment of criteria validity, market analysis and life cycle assessment (LCA) evidence[1] put forward a set of proposed EU Ecolabel criteria that were further consulted. The entire life cycle of the product was considered, from the extraction of raw material through to production, use and disposal phase. The EU Ecolabel may define criteria that target environmental impacts from any of these life cycle phases, with the aim being to encompass the areas of greatest impact (life cycle hot spots). Since the life cycle of each product and service is different, the criteria were tailored to address the unique characteristics of each product or service type.

The development and revision processes of EU Ecolabel criteria for growing media, soil improvers and mulch have been carried out in accordance with the EU Ecolabel Regulation (EC) No 66/2010 (EC, 2010a), following the shortened procedure as laid down in Art. 7(3) and specified in Part C of Annex I to that Regulation.

An important part of the process for developing or revising EU Ecolabel criteria is the involvement of stakeholders through: collecting feedback via preliminary questionnaire, collecting comments on draft criteria proposals, technical report and subsequent consultation exercises. This was supported by interactions with stakeholders such as technical sub-group meetings, conference calls, email exchanges, forum discussions and written comments submitted via an online platform. The criteria development process involved technical experts, non-governmental organisations (NGOs), Member State representatives and industry stakeholders.

Stakeholders were first involved via a questionnaire available on line for six weeks between September and October 2020 (see section 2.2). The results of the survey were presented to the EU Ecolabelling Board (EUEB) meeting in

[1] For the detailed LCA analysis and hotspots identification please see: Rodriguez Quintero et al, 2015

November 2020, and further updates were provided during the EUEB meeting in April 2021. Subgroup technical consultations took place in June 2021. For two months, from July to September 2021, a first proposal of the criteria was available on the *project website* for public consultation. The DRAFT Technical Report shared in July 2021 compared criteria set by Commission Decision (EU) 2015/2099 and revised criteria proposed for the public consultation. The current version of the same document keeps this comparison and additionally reports implementations and changes occurred after the public consultation, after the EUEB meeting held on 17 November 2021 and after the EUEB meeting held on 9 March 2022.

The most recent rationales introduced after the March 2022 EUEB meeting are marked in **blue**.

For transparency reasons, tracking of different criteria proposals requires cross comparison with DRAFT Technical Report[2].

The work was carried out by the Joint Research Centre, Directorate B- Growth and Innovation, Circular Economy and Industrial Leadership Unit in Seville (Spain).

2. JUSTIFICATION FOR THE SHORTENED PROCEDURE

In line with Art 7 (3) of the EU Ecolabel Regulation (EC) No 66/2010 the shortened criteria development procedure may apply for the existent criteria as long as it is provided that the criteria set does not require a substantial revision. The shortened revision procedure shall meet requirements laid down in Part C of Annex I to EU Ecolabel Regulation (EC, 2010a). In the following paragraphs, reasoning justifying the choice of the shortened procedure for the revision of this product group are presented.

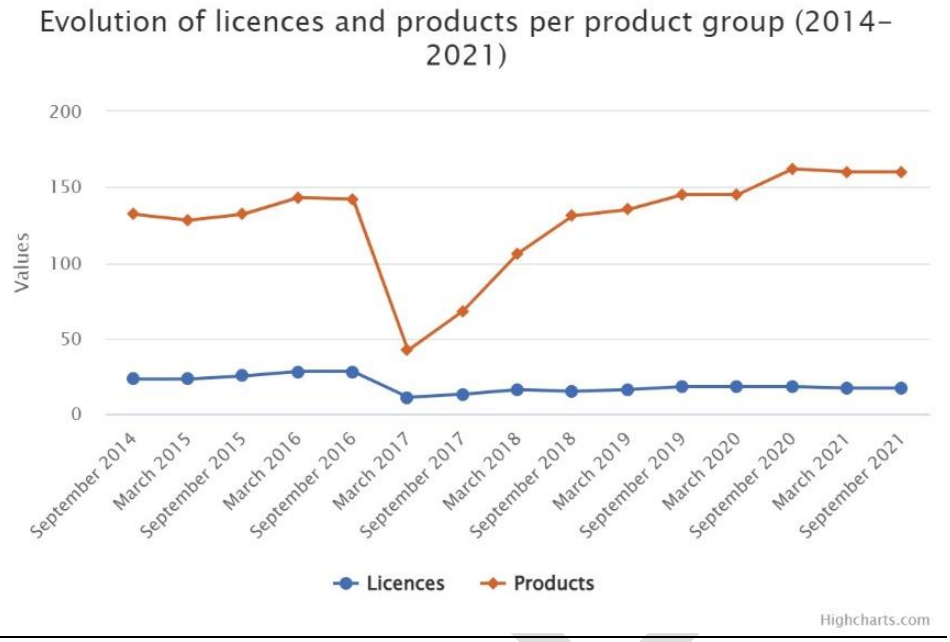
2.1. Background and uptake

Original criteria were developed and adopted in the early 2000s under Commission Decision 2001/688/EC establishing ecological criteria for the award of the Community eco-label to soil improvers and growing media. The original criteria were revised and product group was split into soil improvers product group and growing media product group. Consequently, the separated sets of criteria for the two were adopted as Commission Decision 2006/799/EC establishing EU Ecolabel criteria for soil improvers and Commission Decision 2007/64/EC establishing EU Ecolabel criteria for growing media.

The currently valid criteria as laid down in the Commission Decision (EU) 2015/2099 (EC, 2015a) again merged both product groups maintaining, where necessary, the distinction between the technical characteristics of products addressed by the scope. Last but not least, the former revision broadened the scope to "mulch" product, as it was identified as a separate product type. 'Mulch' means a type of soil improver used as protective covering placed around plants on the topsoil whose specific functions are to prevent the loss of moisture, control weed growth, and reduce soil erosion.

[2] t: Kowalska M., Delre A., and Wolf O. 2021. EU Ecolabel Criteria for growing media and soil improvers. Technical Report. Work in progress. JRC126068

Figure 1 Evolution of growing media, soil improvers, and mulch products and licenses from 2014 to 2021



Source: DG ENV, 2021

Overall, since 2014, a quite stable evolution of the number of EU Ecolabel licenses and products has been registered for this product group, (as of March 2021: 17 licenses are awarded for 160 products). Member States with awarded products are: France (112), The Netherlands (32), Denmark (8), Spain (4), Belgium (3), Greece (1). Between 2016 and 2017, some EU Ecolabel licenses, awarded by Italy and Hungary, were not renewed, as the new criteria were considered too stringent to be met by former license holders. These numbers could increase by improving the current criteria through the revision process.

At the time of the voting of the current EU Ecolabel criteria for soil improvers, growing media and mulch the representatives of the EU Member States gave a positive opinion, in accordance with the regulatory procedure with scrutiny. The following points listed below were requested to be further investigated in the occasion of the next revision processes:

I. *To lower the limits for heavy metals.*
II. *To make use of the guidelines established under the Bern Convention in relation to extraction of minerals from non-EU Member States parties to the Convention.*
III. *To include responsible produced peat in the scope as organic constituent, taking into account the limitations of ex-ante verification of restoration plans.*

2.2. Analysis of the criteria validity

In order to assess the validity of the criteria for growing media, soil improvers and mulch (EC, 2015a), and to get an overview of the EU Ecolabel position on the market, contact via specific survey was made with stakeholders, (Competent Bodies, EU Ecolabel license holders, other manufacturers of products addressed by the scope but without licences, industry associations, consumer associations and NGOs). Over 150 stakeholders were contacted and informed about the online questionnaire that was available and accessible under: https://ec.europa.eu/eusurvey/runner/dc055c67-1287-9dd8-a70c-fc60f0a2ec54

The survey period ran for 6 weeks between September and October 2020. The results of the survey were presented to the EU Ecolabelling Board meeting in November 2020.

All the data inquired via survey was divided into sections, as follows:

- Opinion about each criterion.
- General environmental concerns related to the product group;
- Opinion about the validity of the scope and definition;
- Opinion about the validity of existing EU Ecolabel criteria for growing media, soil improvers and mulch.
- Opinion about assessment and verification in the preamble.

In total, 40 responses were received, with more than 77% (31 respondents) representing industry. Around 20% of all respondents (8 respondents) were EU Ecolabel license holders for the product group, whereas 27% (11 respondents) potentially considered applying for an EU Ecolabel license for the product group, and 5% (2 responses) was in the process of applying for an EU Ecolabel license for this product group. Possible methodological limitations include a small sample size of responses that are focused on a specific stakeholder profile.

To alleviate possible erroneous generalisations, the results of the questionnaire were contrasted with the opinion of the EU Ecolabelling Board (EUEB) during the EUEB Meeting in November 2020.

The vast representation of industry stakeholders proved the existence of interest in the EU Ecolabel certification for soil improvers, growing media, and mulch among the targeted business group. Stakeholders indicated that the key reason for having/applying for the EU Ecolabel license is to increase product visibility, stimulate product sale, demonstrate to customers the environmental excellence of the company, as well as boost the public procurement contracts.

Table 1 indicates the key changes that have occurred to the sector during the last 5 years. According to inquired stakeholders these focus mainly on the legal and policy changes that alter/influence the currently valid criteria. Indeed, the upcoming revision should consider strategic objectives and targets and be aligned with legal requirements i.e. (Fertilising Products Regulation (EU) 2019/1009). Stakeholders also mentioned circular economy aspects, targeting incorporation of appropriate constituents and increment the use of bio-waste. The market and technology changes that have occurred after the implementation of the currently valid criteria derive mainly from the increase of the environmental awareness of consumers and therefore the growing interest in purchasing "greener" products. This is likely to further stimulate the uptake of the product certification.

In the past five years, there has been no observable change in growing media and soil improvers production techniques. Accordingly, the hotspots identified within the former revision process are assumed to remain valid and being addressed by the currently valid criteria (Table 2).

Table 1 Information collected via stakeholders questionnaires in 2020 on the main changes on the environmental front that have occurred in the past 5 years.

Indicated area of changes	The major changes on the environmental front that have occurred in the past 5 years
Market changes:	Customers are looking for and ask for greener products, Initiatives on reducing the use of peat, Using peat-free growing media in hobby gardening and landscaping, Offering recycling solutions, Lower the transport distance (local sourcing), Growing media with more renewable & sustainable constituents; mineral mulches, Internal philosophy shifts,
Policy and Legal changes	Fertilising Product Regulation The EU Green Deal with a role for horticulture and growing media Climate targets, Climate change and objectives 2030/2050 Circular Economy Action Plan Responsible sourcing of all constituents, Biodiversity Strategy 2030 Zero Pollution Ambition for a toxic free environment Sustainability requirements (*)

Source: Questionnaire, JRC 2020

(*) Among the above mentioned policy developments it should now also be mentioned the EU Soil Strategy for 2030 adopted on 17.11.2021

Table 2. Summary of stakeholders' opinion on the key environmental aspects that need to be considered for the environmental labelling of growing media, soil improvers, and mulch, compared with the existing EU Ecolabel criteria

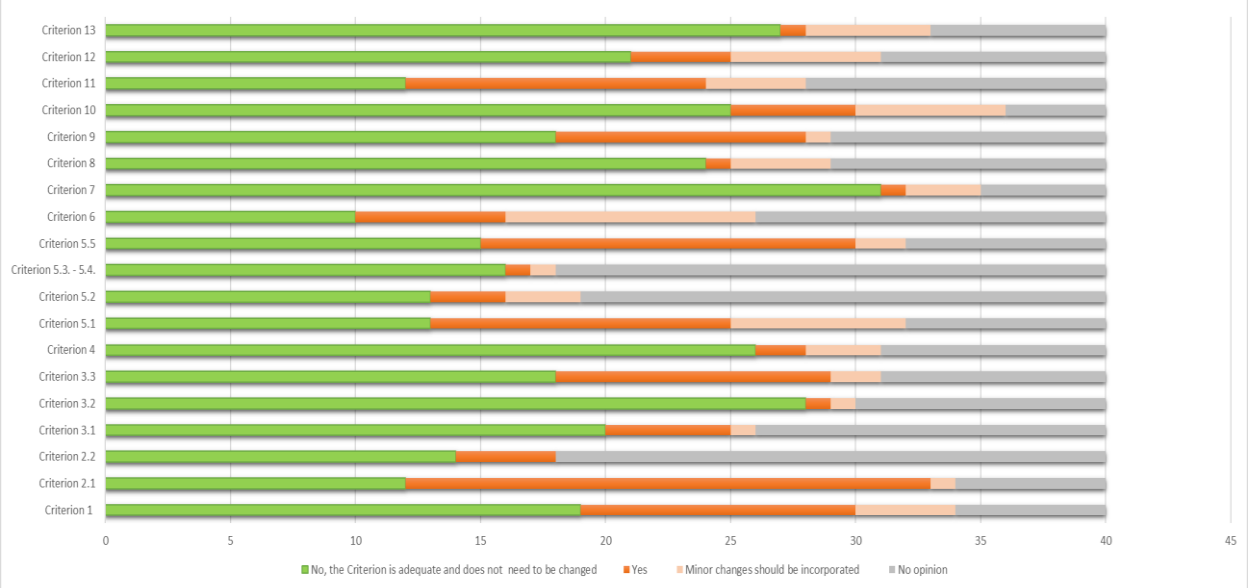
Key environmental issues and claims related to the product group	*Corresponding EU Ecolabel criterion (Commission Decision (EU) 2015/2099)*
- Constituents (i.e., peat-free, or compost-based growing media or soil improver). - Sustainable constituents i.e. min 50%. - Origin of all materials used and associated impact. - Safe constituent which have positive properties for good growth. - Cleanliness of growing media constituents. - Non-synthetic product, such as rock wool. - No (or less) chemical fertilizers. - Using organic wastes to make new products, while protecting soils.	*Criterion 1 – Constituents* *Criterion 2 – Organic Constituents* *Criterion 3 - Mineral growing media and mineral constituents*
- Energy consumption. - Lower carbon emission (i.e. lower CO2 emission by protecting peatlands). - Carbon footprint LCA/net impact of growing media, soil improvers and mulch.	*Criterion 3.1 — Energy consumption and CO2 emissions*
- Biodiversity and land use	*Criterion 3.2 — Sources of mineral extraction*
- Renewability; - Product circularity and use of circular materials,	*Criterion 3.3 — Mineral growing media use and after use* *Criterion 4 — Recycled/recovered and organic materials in growing media*
- Toxicology of the product; - Risk free products i.e. contaminants - Free of harmful organisms - Food safety - Safe use of "waste products" materials due to strict chemicals requirements.	*Criterion 5 — Limitation of hazardous substances* *Criterion 5.1 — Heavy metals* *Criterion 5.2 — Polycyclic Aromatic Hydrocarbons* *Criterion 5.3 — Hazardous substances and mixtures* *Criterion 5.4 — Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (1)* *Criterion 5.5 — Limits for E. coli and Salmonella spp.*
- Fit for purpose. - Appropriate quality products to prevent bad growth and failures.	*Criterion 6 — Stability* *Criterion 7 — Physical contaminants* *Criterion 8 — Organic matter and dry matter* *Criterion 9 — Viable weed seeds and plant propagules* *Criterion 10 — Plant response* *Criterion 11 — Growing media features*
- Pollution of water.	*Criterion 11 — Growing media features* *Criterion 5.1 - Heavy metals*
- Organic labelling,	*The EU Ecolabel criteria should attempt to target the top 10% to 20% of the most environmentally friendly products currently on the overall market of growing media and soil improvers*
- Locally produced	*1) EU Ecolabel is neutral when it refers to technology or place of manufacturing*

[1)]Out of the scope of the EU Ecolabel criteria

Simplified summary of feedback on the soundness of EU Ecolabel criteria for growing media, soil improvers and mulch collected via survey, is presented on Figure 2. **In general, stakeholders acknowledged the technical soundness of the currently valid criteria set**. The key exceptions that were mentioned by stakeholders are: Criterion 2 (*Organic constituents*), Criterion 3.3 (*Mineral growing media and mineral constituents*: *Mineral growing media use and after use*), Criterion 5 (*Limitation of hazardous substances*), Criterion 6 (*Stability*), Criterion 9 (*Viable weed seeds and plant propagules*), and Criterion 11 (*Growing media featur*es). **The key suggestions for the revision refer mainly to the need to harmonise the ambition level or technical specification of EU Ecolabel criteria with the Fertilising Product Regulation (EU) 2019/1009 (FPR) Regulation and related EN Standards**. The preparation of EN Standards that are harmonised with the FPR is an on-going work of CEN Technical

Committee. As to Criterion 2, the majority of comments were referring to peat exclusion (both "*in-favour*" or "*against*" comments).

Figure 2. Summary of stakeholders' opinion on the validity of the current EU Ecolabel criteria for growing media, soil improvers and mulch



Source: (Questionnaire, JRC 2020)

Having in mind the output of the survey, the position of the EU Ecolabel on the market, the interest from industry in the EU Ecolabel certification and considering the discussion between DG JRC, DG ENV and Member States representatives during the EUEB Meeting in November 2020, the following conclusions and options were proposed for the revision of the EU Ecolabel for the product group:

I. Since the vast majority of survey participants were representing industry stakeholders, among them license holders and companies potentially interested in EU Ecolabel certification, this proves the **existence of a potential interest and demand for the certification of soil improvers, growing media, and mulch** among the target business group. Stakeholders indicated that the **key reason for having/applying for the EU Ecolabel license is to increase product visibility** given that a consumer is more and more targeting "green" products.

II. The majority of stakeholders **agreed with the currently valid scope** of the product group. Those respondents that requested the revision were referring mostly to the **need to harmonise the definitions with the FPR Regulation.**

III. The current criteria set was voted in 2015, **the validity of environmental aspects addressed by the criteria was confirmed by survey's participants**. This also demonstrates that the currently valid set of criteria meet the market expectation. The product group has not faced major technical changes for 5 years on. Consequently, it seems appropriate not to re-revise life cycle analysis for the product group, concluding the validity of the environmental hotspots identified[3]. **The market data, the reference values and verification test methods,** as applicable, in some cases might be dated and therefore **need to be**

[3] For more information, please check: Revision of European Ecolabel Criteria for Soil Improvers and Growing Media. Preliminary report.

revised and contrasted with the market and environmental data as well as updates of EN standards. The **need to harmonise the criteria with the requirements of the FPR** was emphasised by the survey's participants.

IV. For some criteria, certain **simplification measures** where proposed, e.g. a threshold for the pH value.

V. **The shortened criteria development procedure may apply** provided that the proposed criteria have been developed in line with the procedure established by Part C of Annex I to EU Ecolabel Regulation, as well as in line with Art 7(4) where a non-substantial revision of the criteria is necessary.

All in all, **the application of shortened procedure was assumed as appropriate when considering that the major focus of the criteria revision should be harmonisation with legal and policy changes, cross check of the reference values, definitions and applicable test methods.** This also responds to the communication between DG ENV and JRC that targets, whenever possible, criteria simplification and reduction of time required for the revision.

3. SUMMARY OF THE BACKGROUND ANALYSIS AND LINK TO THE EU ECOLABEL CRITERIA

3.1.Fertilising Product Regulation (FPR)

As announced in the Circular Economy Action Plan, in March 2016 the Commission put forward a legislative proposal on fertilising products. The new Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 lays down rules on the making available on the market of EU fertilising products (EC, 2019a).

One of the objectives of the FPR is to incentivize the circularity (closure of the loop) of the nutrients by incorporation of the secondary raw materials into the EU fertilisers market and so to save on the primary raw materials and non-renewable resources while reducing dependence on imported nutrients. This approach stimulates the EU internal market access of composts and digestate products so that they can compete on an equal level with mineral fertilisers. Classification of compost and digestate as a component of EU fertilising product accommodates the overall principle of Article 6(1) and (2) of the Waste Framework Directive (EC, 2008a), according to which certain specified waste ceases to be waste when it has undergone a recovery operation (including recycling) and complies with specific criteria.

The concept of zero production of waste in 2030 (EC, 2020a)[4] can lead to an increased re-use in agriculture of various product groups, and applying or recycling of waste materials will thus become increasingly important.

The alignment with Fertilising Products Regulation (EU) 2019/1009 that comes into force as of 16/07/2022, including ongoing amendments, is one of the key intentions of this EU Ecolabel criteria revision.

The FPR introduces harmonised requirements for the CE marked fertilising products by modernising the conformity assessment and market surveillance in line with the 'new legislative framework' for product legislation. The conditions for making fertilisers available on the internal market have been partially harmonised through Regulation

[4] A new Circular Economy Action Plan For a cleaner and more competitive Europe - 4. LESS WASTE, MORE VALUE, 4.1.Enhanced waste policy in support of waste prevention and circularity (EC 2020)*,: "In addition, the Commission will put forward waste reduction targets for specific streams as part of a broader set of measures on waste prevention in the context of a review of Directive 2008/98/EC(…) All this shall serve the objective to significantly reduce total waste generation and halve the amount of residual (non-recycled) municipal waste by 2030.*

(EC) No 2003/2003 of the European Parliament and of the Council, which almost exclusively covers fertilisers from mined or chemically produced, inorganic materials. The updated EU rules on fertilising products will apply from 16 July 2022.

The Article 2(1) of the FPR defines '**fertilising product**' as '*a substance, mixture, micro- organism or any other material, applied or intended to be applied on plants or their rhizosphere or on mushrooms or their mycosphere, or intended to constitute the rhizosphere or mycosphere, either on its own or mixed with another material, for the purpose of providing the plants or mushrooms with nutrient or improving their nutrition efficiency*' (EC, 2019a).

The **Product Function Categories (PFCs)** set in Annex I of FPR for EU fertilising products accommodate a broad range of products that belong to corresponding product function category (PFC) by virtue of their **claimed function** (mode of action). The FPR has so far established seven functional categories that include sub-categories. The claim that a product complies with the function for the relevant PFC needs to be supported by the product's mode of action, the relative content of its various components, or any other relevant parameter, as indicated in Table below.

Table 3. Product function categories (PFCs) of EU fertilising products as reported in Annex I to FPR

DESIGNATION OF PFCs / *Fertilising Product Function*
PFC 1. Fertiliser / ***A fertiliser shall be an EU fertilising product the function of which is to provide nutrients to plants or mushrooms.*** PFC 1(A). Organic fertiliser *PFC 1(A)(I). Solid organic fertiliser* *PFC 1(A)(II). Liquid organic fertiliser* PFC 1(B). Organo-mineral fertiliser *PFC 1(B)(I). Solid organo-mineral fertiliser* *PFC 1(B)(II). Liquid organo-mineral fertiliser* PFC 1(C). Inorganic fertiliser *PFC 1(C)(I).Inorganic macronutrient fertiliser* PFC 1(C)(I)(a) Solid inorganic macronutrient fertiliser PFC 1(C)(I)(a)(i) Straight solid inorganic macronutrient fertiliser PFC 1(C)(I)(a)(ii) Compound solid inorganic macronutrient fertiliser PFC 1(C)(I)(a)(i-ii)(A) Straight or compound solid inorganic macronutrient ammonium nitrate fertiliser of high nitrogen content PFC 1(C)(I)(b) Liquid inorganic macronutrient fertiliser PFC 1(C)(I)(b)(i) Straight liquid inorganic macronutrient fertiliser PFC 1(C)(I)(b)(ii) Compound liquid inorganic macronutrient fertiliser *PFC 1(C)(II) Inorganic micronutrient fertiliser* PFC 1(C)(II)(a)Straight inorganic micronutrient fertiliser PFC 1(C)(II)(b):Compound inorganic micronutrient fertiliser
PFC 2. Liming material / ***A liming material shall be an EU fertilising product the function of which is to correct soil acidity. A liming material shall contain oxides, hydroxides, carbonates or silicates of the nutrients calcium (Ca) or magnesium (Mg).***
PFC 3. Soil improver */ A soil improver shall be an EU fertilising product the function of which is to maintain, improve or protect the physical or chemical properties, the structure or the biological activity of the soil to which it is added. An organic soil improver may contain peat, leonardite and lignite, but no other material which is fossilized or embedded in geological formations. An inorganic soil improver shall be a soil improver other than an organic soil improver. An organic soil improver shall consist of material 95% of which is of solely biological origin.* PFC 3(A). Organic soil improver PFC 3(B). Inorganic soil improver
PFC 4. Growing medium */ A growing medium shall be an EU fertilising product other than soil in situ, the function of which is for plants or mushrooms to grow in. For the purpose of this point, plants include algae.*

DESIGNATION OF PFCs / *Fertilising Product Function*
PFC 5. Inhibitor / *An inhibitor shall be an EU fertilising product the function of which is to improve the nutrient release patterns of a product providing plants with nutrients by delaying or stopping the activity of specific groups of micro-organisms or enzymes.* PFC 5(A). Nitrification inhibitor PFC 5(B). Denitrification inhibitor PFC 5(C). Urease inhibitor
PFC 6. Plant biostimulant / *A microbial plant biostimulant shall consist of a micro-organism or a consortium of micro-organisms as specified under Component Material Category 7 in Part II of Annex II to FPR* PFC 6(A). Microbial plant biostimulant PFC 6(B). Non-microbial plant biostimulant
PFC 7. Fertilising product blend / *A fertilising product blend shall be an EU fertilising product composed of two or more EU fertilising products of PFC 1 to PFC 6. The blending shall not change the nature of each component EU fertilising product and shall not have an adverse effect on human, animal or plant health, on safety, or on the environment, under reasonably foreseeable conditions of storage or use of the fertilising product blend.*

Source: EC, 2019a

By the means of Annex II to the Regulation, the FPR introduces the concept of **component material categories (CMCs)** (for more details please see: Criterion 1- page 31, and Table 31). For each of the fertilising products (and their subcategories) as well as for each of the component materials, the FPR introduces specific harmonised requirements regarding quality, safety, and labelling. The fundamental elements of the new rules are:

- Opening the Single Market for bio-waste based fertilisers.
- Unified rules on safety, quality and labelling requirements for all fertilisers to be traded freely across the EU market. Producers that wish to enter the single market will need to demonstrate that their products meet those requirements before affixing the CE mark.
- Categorisation of EU fertilising products into different product function categories (PFC) according to Annex I to FPR, which should each be subject to specific safety and quality requirements adapted to their different intended uses.
- Categorisation of component materials for EU fertilising products (CMCs), according to Annex II to FPR, which should each be subject to specific process requirements and control mechanisms.
- Introducing new limit values for contaminants in fertilisers.

3.2.Product group name, scope and definitions

This chapter provides rationales behind the revised proposal for the product group scope and definitions. It also justifies modification of the product group's name. Last but not least, for the clarity of the legal text, the vast part of definitions have been moved to the preamble of Annex to the revised Commission Decision.

Current Scope and Definitions (Commission Decision (EU) 2015/2099)
Article 1. The product group 'growing media, soil improvers and mulch' shall comprise growing media, organic soil improvers and organic mulch. Article 2 For the purpose of this Decision, the following definitions shall apply: (1) 'Growing medium' means a material used as a substrate for root development, in which plants are grown; (2) 'Mineral growing medium' means a growing medium totally composed by mineral constituents; (3) 'Soil improver' means a material added to soil in situ whose main function is to maintain or improve its physical and/or chemical and/or biological properties, with the exception of liming materials;

(4) 'Organic soil improver' means a soil improver containing carbonaceous materials whose main function is to increase soil organic matter content;
(5) 'Mulch' means a type of soil improver used as protective covering placed around plants on the topsoil whose specific functions are to prevent the loss of moisture, control weed growth, and reduce soil erosion;
(6) 'Organic mulch' means mulch containing carbonaceous materials derived from biomass;
(7) 'Constituent' means any input material that can be used as an ingredient of the product;
(8) 'Organic constituent' means a constituent composed by carbonaceous materials;
(9) 'Product family' means the range of products composed by the same constituents;
(10) 'Annual output' means annual production of a product family;
(11) 'Annual input' means the annual amount of materials treated in a waste or animal by-product treatment plant;
(12) 'Batch' means quantity of goods manufactured by the same process under the same conditions and labelled in the same manner and is assumed to have the same characteristics;
(13) 'Bio-waste' means biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants;
(14) 'Biomass' means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste.

Proposed and revised Scope and Definitions

Article 1

The product group 'growing media and soil improvers' shall comprise growing media and soil improvers.

Article 2

For the purpose of this Decision, the following definitions shall apply:

(1) 'growing medium' means a product other than soil in situ, the function of which is for plants, including algae, or mushrooms to grow in;

(2) 'soil improver' means a product, including mulch, the function of which is to maintain, improve or protect the physical or chemical properties, the structure or the biological activity of the soil to which it is added;

(3) 'mulch' means a type of soil improver used as protective covering placed around plants on the topsoil whose specific functions are to prevent the loss of moisture, control weed growth, help moderate soil temperature and reduce soil erosion;

Preserving the current scope of the product group was supported by the vast majority of stakeholders (75%)[5] that agreed on the validity of the current scope and definition. Nevertheless, the EU Ecolabel revision needs to ensure consistency among different European product policies e.g. Fertilising Products Regulation (FPR) (EC, 2019a).

After the EUEB meeting held in November 2021, the definition of 'soil improver' was aligned with the definition reported in the FPR. Additionally, a specification about the features of mulches was added.

The currently valid EU Ecolabel definitions of soil improver and growing medium closely match the definitions used by CEN/TC 223 *Soil improvers and Growing media*[6]. Overall, **the scope of EU Ecolabel chiefly corresponds to PFC 3 (soil improvers) and PFC 4 (growing media)** listed under the FPR (see: Table 3)**.**

During the previous criteria revision, it was concluded that soil coverings with stone chips or pebbles might have the same function as a semi-permanent covering and, although this would suppress weeds and retain moisture, it is not mulch, as it has a decorative function. For this reason, an inorganic material and especially extracted minerals are not permitted to be present in the EU Ecolabel mulch (Rodrigues-Quintero et al, 2015). The incorporation of mulches

[5] Based on the results of stakeholders survey that served for the assessment of criteria validity.
[6] 'CEN/TC 223 Soil improvers and growing media' is the European Committee for standardization (CEN) Technical Committee (TC) number 223 with title "Soil improvers and growing media". All standards produced by this technical committee are available at this link.

into soil improvers categories clearly specifies that the function of the product is to maintain or improve its physical and/or chemical and/or biological properties, with the exception of liming materials.

Based on stakeholders feedback and request to incorporate PFC1 into the scope of the product group, it needs to be clarified that this category is not considered to be incorporated into the scheme. The function of the two products is different. Soil improvers affect plant growth indirectly by improving the physical and biological properties of the soil, such as water retention, aeration and microbial activity and diversity; whereas fertilisers are a source of readily available nutrients and have a direct, short term effect on plant growth (Veeken et al. 2017).

3.2.1. Analysis of the "mulch" sub-category

The former revision classified mulches as a separated product category. This was largely based on the product function (to prevent the loss of moisture, control weed growth, and reduce the erosion and the evaporation), and application (as a layer on top of the soil.). However, **FPR and CEN/TC 223 understand mulches as sub-category of soil improvers**; therefore, no comprehensive standardized definition can be provided. Constituents of mulches are typically the organic ingredients of soil improvers and growing media (peat, compost, bark, shredded wood, leaves, hay, straw), but some gardening applications use mineral constituents as stones and gravel. There are currently several EU Ecolabel licenses awarded to mulch products.

On the other hand, according to Art. 50 of FPR: *"By 16 July 2024, the Commission shall carry out a review in order to assess the possibility of determining biodegradability criteria of mulch films, and the possibility of incorporating them into component material category 9 in Part II of Annex II"* (EC, 2019a). "**Mulch film" is a different product type** than mulch, it is made of plastics, textiles and other fibers and used in agriculture and horticulture as soil covering layer. Accordingly, this product, falls out of the scope of EU Ecolabel for growing media soil improvers and mulch product group. Therefore, if a new component material category for mulch films will be established under the FPR, this, due to similar terminology used for different products (*mulch films vs mulch*) might create confusion when defining the scope of the EU Ecolabel product group. This represents an additional reason to remove "mulch" from the revised EU Ecolabel product group name.

3.2.2. Conclusions on draft proposal for the revised scope and definitions

The draft proposal for the scope and definitions outlines the following recommendations:

1. To sustain the current scope of the product group in line with the results of stakeholders survey: Soil improvers and growing media.

2. To incorporate mulches into soil improvers category, providing additional clarification in the user manual. The scope is proposed as follows: *The product group 'growing media and soil improvers' shall comprise growing media and soil improvers.*

3. To harmonise the definitions of soil improvers and growing media with the FPR, including the terminology used in product function categories PFC 3 (soil improvers) and PFC 4 (growing media).

4. The FPR and CEN/TC 223 comprehend mulches as sub-category of soil improvers (FPC 3). Mulch films will however form an autonomous product function category under the FPR in the future. The similar terminology might confuse potential end-users.

5. Following the recommendation of the Legal Service of the Commission the definitions section has been spread over Act and Annex to better reflect the terminology used.

3.3.Summary of the key market aspects

Aim

The market analysis aims to outline the European market for growing media, soil improvers and mulches. This analysis attempted to outline the overall size of the market, its share among Member States, alongside with intra and extra EU-27 market trade.

Methodology and data sourcing

Data were collected from EUROSTAT[7], which aggregates the components of growing media, soil improvers, and mulches under products for which different terminology has been used. For this reason, the methodology applied for the data analysis was harmonised with that applied in the Preliminary Report related to the currently valid criteria (Rodriguez Quintero et al., 2013). The market analysis focussed on the years from 2017 to 2019, mainly to remark changes that might have affected the market's performance.

Results

Based on data subtracted from PRODCOM, in EU-27 from 2017 to 2019, the production of mulch (41.85 Mt) was about one order of magnitude higher than the production of growing media (4.36 Mt) and soil improvers (5.29 Mt). Whereas, in terms of value in billions of euro, the production of mulch (72.15 billion euro) was about two orders of magnitude higher than the production of growing media (0.63 billion euro), and about one order of magnitude higher than the production of soil improvers (1.15 billion euro).

The apparent consumption in EU-27 of mulches, growing media and soil improvers was calculated in terms of mass, on average the apparent consumption of mulches (14.91 Mt) in EU-27 was one order of magnitude higher than the average consumption of growing media (1.05 Mt) and soil improvers (1.28 Mt). In terms of value in euro, the apparent consumption of mulches (2.59 billion of euro) in EU-27 was two orders of magnitude higher than the average consumption of growing media (0.04 billion of euro) and soil improvers (0.09 billion of euro).

The analysis of product trading confirms that growing media and soil improvers have a strong internal EU-27 market.

For more detail information about market analysis, please see Annex I. Market Analysis.

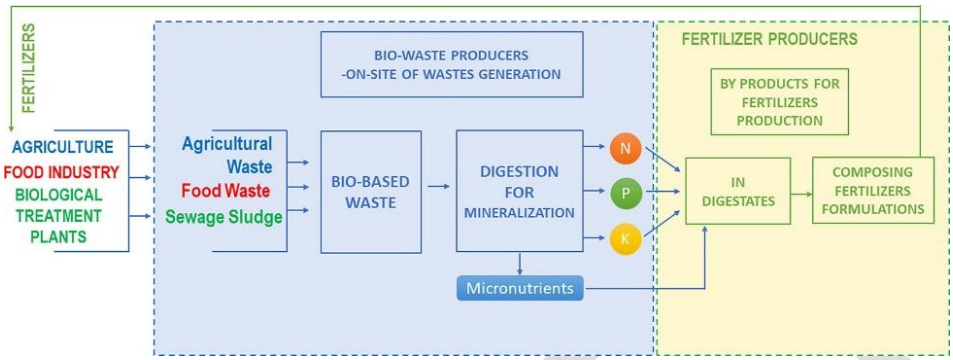
Use of the bio-waste for fertilising purposes

Due to the rapid urbanization and growing populations, global annual waste generation is expected to jump to 3.4 billion tonnes over the next 30 years, up from 2.01 billion tonnes in 2016 (Kaza et al, 2018). Bio-waste includes biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants (EC, 2008a). Across the European Union, the annual potential of total bio-waste is estimated as 118-138 million tonnes with 10% of annual increase prediction (EC, 2010b). With a share of 34%, bio-waste is the largest single component of municipal waste in the EU. (EEA, 2020). Nevertheless, a high proportion of bio-waste ends up in the mixed waste stream that is landfilled or incinerated. Recycling of bio-waste is fundamental for meeting the EU target to recycle 65% of municipal waste by 2035 (Siebert et al, 2020). Bio-waste has a high potential for delivering valuable soil-improving material and fertiliser as well as renewable energy (biogas). According to the survey conducted by the European Compost Network (ECN) in total 47.5

[7] EUROSTAT: https://ec.europa.eu/eurostat

million tonnes of bio-waste is treated in 4 274 plants. More than 3 400 composting plants treat 30.5 million tons of bio-waste, 12.4 million tons of bio-waste are an-aerobically digested, and 4.6 million tons of bio-waste are treated in combined composting and anaerobic digestion plants[8]. The predominant bio-waste treatment process in Europe is still composting. Bio-waste recovery for the use as fertiliser components.

Figure 3. Bio-waste recovery for the use as fertilizer components.



Source: Chojnacka et al. (2020)

Altogether, the recovery of nutrients from waste streams is necessary for the transition from a fossil-based to a bio-based economy. In this respect, one of the objectives of the FPR is to incentivise the circularity (closure of the loop) by transforming waste into nutrients for crops, while reducing dependence on imported nutrients and the use of non-renewable resources.

3.4. Key environmental aspects and relation to the proposed criteria

The key environmental aspects that have been analysed within the current revision are those identified by Rodriguez Quintero et al. (2013, 2015) within the revision process of currently valid criteria for growing media, soil improvers, and mulch.

Table 4 provides an overview about how the proposed criteria face the key environmental aspects of this product group. Overall, the targeted environmental performances of the revised criteria and environmental savings were achieved.

[8] Available at: https://www.compostnetwork.info/policy/biowaste-in-europe/treatment-bio-waste-europe/

Table 4. Link between the key environmental aspects and the proposed new EU Ecolabel criteria for growing media and soil improvers.

Environmental aspects	EU Ecolabel criteria	Explanation about addressed environmental aspects
Circularity of resources*	Criterion 1.1: Organic components of the product	It includes specific bio-waste and by-products from other industries to increase the material circularity. Nutrients coming from these sources can be incorporated into the EU fertilisers market as secondary raw materials. This incorporation saves on the use of primary raw materials, and it reduces the dependence on the imported nutrients. This approach aims to stimulate the EU internal market, so that products based on compost and digestate can compete with conventional fertilising products, i.e. organo-mineral fertilisers based on virgin raw material.
	Criterion 2.3: Mineral growing media use and after use	It sets a minimum of 70% of recycling of used mineral growing media, which increases the material circularity.
	Criterion 3: Organic components and recycled/recovered materials in growing media	It sets a minimum of 30% of used recycled/recovered material for mineral growing media production. This limit promotes material circularity while ensuring the quality of a final product. (see section 5.3).
Climate change	Criterion 1: Components	It excludes intentionally added peat as component of a final product, to prevent the release of sequestered carbon into the active carbon cycle (Cleary et al., 2005; Dunn and Freeman, 2011). In this respect, the European Commission set specific targets in the 2030 Climate Target Plan[9], which sets the way for the EU to achieve climate neutrality by 2050.
	Criterion 2.1: Energy consumption and CO_2 emissions during the manufacture of mineral growing media	It refers to the manufacture of mineral growing media (mineral wool). The definition of the limit value equal to 11 GJ/tonne of finished product is 20% smaller than the value defined in the best practice of the mineral wool production (Table 4.43 in BREF Glass, 2013). Additionally, the limit value for the CO_2 emissions is set to 0.7 t CO_2/t finished product. This is a value reachable by about the 25% of plants analysed in Europe during the last investigation (EC, 2021).
Acidification **Photochemical ozone formation**	Criterion 2.1: Energy consumption and CO_2 emissions during the manufacture of mineral growing media	It refers only to mineral growing media. The definition of the limit value equal to 11 GJ/tonne of finished product is 20% smaller than the value defined in the best practice of the mineral wool production (Table 4.43 in BREF Glass, 2013). The use of less energy decreases the emissions of NOx, SOx, and VOCs due to the production of energy from fossil fuels. This aspect is relevant because the electricity mix in Europe is still based on fossil fuel for about 30% (IEA, 2020), and because plants producing mineral wool combust on site fossil fuels (BREF, 2013).

[9] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people. COM(2020) 562 final

Particular matter formation		
Ecotoxicity **Human toxicity**	Criterion 4: Restricted substances Criterion 4.1: Limits for heavy metals Criterion 4.2: Limits for polycyclic aromatic hydrocarbons (PAHs) Criterion 4.3: Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008 of the European Parliament and of the Council([10]) Criterion 4.4: Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) No 1907/2006 of the European Parliament and of the Council Criterion 4.5. Microbiological criteria *	Criterion 4.1 sets limit values for heavy metals that are from about 13 to 75% more ambitious than those specified under the FPR (Table 5). The criterion effectively limits the presence of hazardous substances and mixtures that might have been added during the production process. This constitutes a safeguard in avoidance of environmental and health risks for employees and end-users. In order to demonstrate compliance with the CLP restriction criteria (Regulation (EC) No 1272/2008), the EU Ecolabel applicant has to be aware of all of the chemical substances or mixtures that were used during processing (based on safety data sheets). The SVHCs are restricted to 0.10% at the level of ingoing materials and substances, and not at the level of the final product. This more stringent approach is possible without any major increase in assessment and verification difficulties thanks to the communication requirements set out by REACH Regulation (EC) No 1907/2006[11]. For PAHs and microbiological criteria, the criteria are harmonised with the FPR, which defines the characteristics of the products in the European market.
Land use **Abiotic resources use**	Criterion 1: Components	It excludes intentionally added peat as component of the final product to protect peatlands and prevent the depletion of specific biodiversity hosted in such environments, e.g. pollinators (EU biodiversity strategy for 2030[12]).
	Criterion 2.2: Sources of mineral extraction	It sets stringent requirements for the sourcing of the minerals used in the production of growing media and soil improvers. All extractions must respect stringent rules to minimise the impacts on the land use, biodiversity, and the abiotic resource exploitation. The criterion applies the guidelines established under the Bern Convention[13] in relation to extraction of minerals from non-EU Member States parties to that Convention.
	Criterion 2.3: Mineral growing media use and after use	It sets a minimum of 70% of recycling of used mineral growing media to decrease the exploitation of abiotic resources and prevents damages to biodiversity.

[10] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. OJ L 353, 31.12.2008, p. 1.

[11] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC relevance. OJ L 396 30.12.2006, p. 1.

[12] EU biodiversity strategy for 2030 and protection of peatlands in EU

[13] Council of Europe, 1979. Convention on the Conservation of European Wildlife and Natural Heritage. Bern, Switzerland. Available at this link.

	Criterion 3: Organic components and recycled/recovered materials in growing media	It sets a minimum of 30% of used recycled/recovered material for mineral growing media production to decrease the exploitation of abiotic resources and prevent damages to biodiversity. A higher percentage would compromise the quality of the product (see section 5.3).
Waste prevention *	Criterion 5: Fitness for use Criterion 6: Growing media features Criterion 7: Provision of information Criterion 8: Information appearing on the EU Ecolabel	These criteria make sure that the product is handled properly and it is suitable for its purpose. The incorrect handling and application of the growing media and soil improvers would generate more waste and resources, resulting in environmental burdens. A correct communication about the features of the product ensures its correct application and prevents the generation of avoidable waste.

* Non-LCA impact.

Table 5 analyses the ambition level of proposed revised criterion on heavy metals content in soil improvers and growing media, when contrasted with the requirements of the FPR.

Table 5. Limit values expressed as mg/kg dry matter(DM) for heavy metals in growing media (GM) and soil improvers (SI), according to the Fertilising Product Regulation (FPR) (EU) 2019/1009 and proposed revised EU Ecolabel criteria (EUEL)

Heavy metal	Growing media			Soil improvers				
	FPR	EUEL	Difference as to FPR –GM (%)	FPR (organic SI)	FPR (inorganic SI)	EUEL	Difference as to FPR - organic SI (%)	Difference with FPR - inorganic SI (%)
Cadmium (Cd)	1.5	1.3	13	2	1.5	1	50	33
Chromium VI (Cr VI) (*)	2	2	0	2	2			
Copper (Cu)	200	200	0	300	300	200	33	33
Mercury (Hg)	1	0.45	55	1	1	0.45	55	55
Nickel (Ni)	50	50	0	50	100	40	20	60
Lead (Pb)	120	100	17	120	120	100	17	17
Zinc (Zn)	500	300	40	800	800	300	63	63
Arsenic (As)	40	10	75	40	40	10	75	75

Note: The difference was calculated as follows: $Differnece = \frac{FPR-EUEL}{FPR} * 100$

(*) For EUEL to be measured in mineral growing media only. For EUEL soil improvers only Chromium (total) to be measured – limit 200

4. ASSESSMENT AND VERIFICATION REQUIREMENTS

Current Assessment and verification
The specific assessment and verification requirements are indicated within each criterion. *Where the applicant is required to provide declarations, documentation, analyses, test reports, or other evidence to show compliance with the criteria, these may originate from the applicant and/or their supplier(s) as appropriate.* *Competent Bodies shall preferentially recognise attestations which are issued by bodies accredited according to the relevant harmonised standard for testing and calibration laboratories and verifications by bodies that are accredited according to the relevant harmonised standard for bodies certifying products, processes and services.* *Where appropriate, test methods other than those indicated for each criterion may be used if the Competent Body assessing the application accepts their equivalence.* *Where appropriate, Competent Bodies may require supporting documentation and may carry out independent verifications.* *As pre-requisite, the product must meet all respective legal requirements of the country (countries) in which the product is intended to be placed on the market. The applicant shall declare the product's compliance with this requirement.*
Proposed and revised Assessment and verification – proposed and revised (post public consultation and EUEB meeting)
For the EU Ecolabel to be awarded to a specific product, applicants must comply with each requirement. *Specific assessment and verification requirements are indicated under each criterion.* *Where the applicant is required to provide declarations, documentation, analyses, test reports, or other evidence to show compliance with the criteria, these may originate from the applicant and/or their supplier(s) as appropriate.* *Competent bodies shall preferentially recognise attestations that are issued by bodies accredited in accordance with the relevant harmonised standard for testing and calibration laboratories, and verifications by bodies that are accredited in accordance with the relevant harmonised standard for bodies certifying products, processes and services.* *Where appropriate, test and sampling methods other than those indicated for each criterion may be used if the competent body assessing the application accepts their equivalence.* *Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications.* *Changes in suppliers and production sites pertaining to products to which the EU Ecolabel has been granted shall be notified to competent bodies, together with supporting information to enable verification of continued compliance with the criteria.* *As a pre-requisite, the product must meet the relevant requirements in Regulation (EU) 2019/1009 or the legal requirements of the Member State in which the product is intended to be placed on the market. In the latter case, the applicant shall declare the product's compliance with this requirement.*

Rationale behind the General Assessment and Verification

Only few specifications were added after the EUEB held in November 2021.

The assessment and verification text appearing at the beginning of the Annex generally refers to the different types of evidence (e.g. declarations, test reports) that are considered relevant proof of compliance with the criteria. This text establishes the framework and general rules for verification procedures so that they do not need to be repeated in every individual assessment and verification text.

Each EU Ecolabel criterion text is followed by specific assessment and verification requirements stating which type of evidence should be provided to the Competent Body that is assessing the application. It is important to clarify here that, when evidence is required from the supply chain, it is possible for the evidence to be submitted directly by the supplier to the Competent Body (this may be important when the proof requires information that may be commercially sensitive).

When evidence is required from tests or analyses, these should preferentially be carried out by laboratories that are accredited in accordance with relevant harmonised (ISO or EN) standards. However, this may not always be possible and in some cases it may be satisfactory to accept evidence from in-house testing or testing by third parties that are only accredited with relevant national standards. The same situation applies to test reports.

When a test method is specified in the assessment and verification text for a particular EU Ecolabel criterion, this method should be followed unless the applicant can demonstrate to the Competent Body that they have used another method that produces equivalent results. In such cases, the justification for equivalence must be clearly demonstrated and the Competent Body should share this knowledge with other Competent Bodies.

Even in cases where evidence is provided exactly in accordance with the specific assessment and verification text for a particular EU Ecolabel criterion, it must be understood that the Competent Body reserves the right to request further information, to visit the site and even to consider independent means of testing and verification. If the applicant objects to such actions, this could potentially jeopardise the award of the EU Ecolabel.

For any criteria that relate to supplied chemicals or materials, it is understood that suppliers can change with time, that one supplier can supply multiple different types and grades of chemical/material and that, even for a given supplier and given chemical/material, variations in time are possible depending on the upstream supply chain and other factors. Consequently, any significant changes in the supplied chemicals/materials must be communicated to the Competent Body and supported by any relevant evidence (e.g. supplier declarations) to demonstrate ongoing compliance with EU Ecolabel criteria.

The final paragraph in the general assessment and verification text has been inserted in order to make it clear that non-compliance of the EU Ecolabel product with all applicable legal requirements of the country or countries in which the product is placed on the market may result in the full or partial revocation of the EU Ecolabel licence.

4.1. Requirements on sampling and testing

No specific changes are proposed to current formulation of the sampling and testing requirements.

The European Standard EN 12579 specifies methods for sampling soil improvers and growing media (excluding liming materials) for subsequent determination of quality and quantity. It outlines the principles to be taken into consideration when taking the sample and ensuring an adequate quantity is available for testing. This standard only applies to material in solid form, including pre-shaped media. The standard is intended to be used by manufacturers, buyers and enforcement agencies in verifying claims made for these products. For the rules specified for sampling and testing frequency for the application year as well as for the following years (please see: Annex II. SAMPLING AND TESTING FREQUENCY). The technical dossier should be kept up-to-date showing continuing compliance with the criteria. A written confirmation from the applicant that all the criteria are fulfilled shall also be required for the application assessment.

The Competent Body may recognize the sampling and testing frequencies within the national or regional legislation and standards as valid to ensure the compliance with the EU Ecolabel criteria of the suppliers of waste or animal by-products derived materials.

Additional clarification on sampling and testing frequency that should serve as an aid in the application procedure will be introduced in the User manual.

Few sentences were changed after the EUEB held in November 2021.

- One sentence was added regarding harmonized standards. As soon as harmonized standards of test and sampling methods will be published on the Official Journal of the European Union, applicants must carry out sampling and tests in accordance with them.
- Reference to Regulation (EU) No 142/2011 was removed because this Regulation applies in any case to the material used.

- In case of EU fertilizing product, the list of documents to be submitted was added to the section in accordance to the FPR. This documentation does not involve additional work for the applicant, because this documentation is the same documentation produced when a product is CE marked.

Currently valid - Sampling and testing requirements **Sampling and testing requirements- proposed and revised (post public consultation and EUEB meeting)**
The sampling shall be carried out in accordance with EN 12579 (Soil improvers and growing media. Sampling). Samples are be prepared in accordance with EN 13040 (Soil improvers and growing media. Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory compacted bulk density). *Once available, test and sampling methods shall be conducted in accordance with the corresponding harmonised standards, the references of which have been published in the Official Journal of the European Union in accordance with Article 13 of Regulation (EU) 2019/1009.* *For the application year, the sampling and test frequency shall fulfil the requirements set down in Appendix 1. For the following years, the sampling and test frequency of products shall fulfil the requirements set down in Appendix 2. Different sampling and testing frequencies are set for the following types of plants:* — *Type 1: Treatment plants for waste or for animal by-products* — *Type 2: Product manufacture plants using materials from Type 1 plants.* — *Type 3: Product manufacture plants not using materials from Type 1 plants.* *For Type 2 plants, the sampling and test frequencies for the application year and the following years will be the same as the frequencies set for Type 3, if the supplied materials derived from waste/animal by-products comply with the EU Ecolabel criteria for growing media and soil improvers. The applicant shall provide the Competent Body with the test reports from the suppliers, together with the documentation to ensure the compliance of the supplied materials with the EU Ecolabel criteria. The competent body may recognise the sampling and testing frequencies under national legislation and standards as valid to ensure the compliance with the EU Ecolabel criteria of the supplied materials derived from waste or animal by-products.* *A written confirmation from the applicant that all the criteria are fulfilled shall also be required for the assessment.* *An EU fertilising product is a fertilising product that is CE marked when made available on the market. If the product is an EU fertilising product, the following documentation shall be delivered to the competent body: the EU declaration of conformity; the technical documentation; and, where applicable, the documents issued by a notified body involved in the conformity assessment procedure of the product.*

4.2. Overview of applicable criteria according to the specific product

Table 6. Overview of applicable criteria according to the specific product

Criterion	Growing media	Soil improvers
1 – Components	x	x
1.1 - Organic components of the product	x	x
2 - Mineral components	x	x
2.1. - Energy consumption and CO_2 emissions during the manufacture of mineral growing media	x	
2.2 - Sources of mineral extraction	x	x
2.3 - Mineral growing media use and after use	x	
3 – Organic components and recycled/recovered materials for growing media	x	

Criterion	Growing media	Soil improvers
4 - ~~Excluded and r~~Restricted substances	x	x
4.1 – Limits for heavy metals	x	x
4.2 – Limits for polycyclic aromatic hydrocarbons (PAHs)	x	x
4.3 - Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008 of the European Parliament and of the Council([14])	x	x
Criterion 4.4 - Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) No 1907/2006 of the European Parliament and of the Council ([15])	x	x
4.5 – Microbiological criteria	x	x
5 – Fitness for use	x	x
5.1 – Stability	x	x
5.2 - Macroscopic impurities	x	x
5.3 - Organic matter and dry matter in soil improvers		x
5.4 - Viable weed seeds and plant propagules	x	x
5.5 - Plant response	x	x
6 - Growing media features	x	
6.1 - Electrical conductivity	x	
6.2 - Sodium content	x	
6.3 - Chloride content	x	
7 - Provision of information	x	x
7.1 - Soil improvers		x
7.2 - Growing media	x	
8 - Information appearing on the EU Ecolabel	x	x

After the EUEB meeting held in November 2021, few changes were applied to the titles of the criteria.

- In the whole text, the expression the adjective 'final' was removed from the expression 'final product' because no intermediate phase of the product manufacture is ever mentioned or referred to.

[14] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (OJ L 353, 31.12.2008, p. 1).
[15] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396 30.12.2006, p. 1).

- The title of criterion 2, 2.1, and 5.3 were changed to avoid confusion about applicability of the criteria to growing media and/or soil improvers. The title of criterion 2 was simplified to 'mineral components', because it refers to both growing media and soil improvers. The title of criteria 2.1 and 5.3 were implemented with a specification referring to mineral growing media and soil improvers, respectively.
- A soft reformulation of the title of criterion 3 was clarified the content of the criterion: organic components [in growing media and soil improvers] and recycled/recovered materials [only] in mineral growing media.
- Some specifications were added to criteria 4.3, 4.4.
- The title of criterion 5.2 was changed from 'physical contaminants 'to 'macroscopic impurities' to align the wording with the FPR.

After the EUEB meeting held in March 2022, only the words "excluded and" were removed from the title of criterion 4.

The following definitions shall apply:

(1) 'annual input' means the annual quantity of materials treated in a waste or animal by-product treatment plant;

(2) 'annual output' means the annual quantity of a products composed of the same components;

(3) 'batch' means a quantity of goods manufactured by the same process under the same conditions and labelled in the same manner and is assumed to have the same characteristics;

(4) 'bio-waste' means biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants, including similar waste from households collected together with bio-waste;

(5) 'component' means the material that is used as an ingredient of the product;

(6) 'recovered material' means any material that underwent any recovery operation, including preparing for re-use, recycling and backfilling, but excluding energy recovery and the reprocessing into materials, that are to be used as fuels or other means to generate energy;

(7) 'mineral growing medium' means a growing medium totally composed of mineral components, which is only offered for use for professional horticultural applications, as green walls and/or green roofs.

(8) 'organic component'' components composed primarily of carbon and ~~other~~ molecules derived from living organisms, other than fossil fuels and materials derived from fossil-fuels

(9) 'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials that would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy;

(10) 'Recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes, including the reprocessing of organic material but excluding energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

(11) 'Total organic carbon (TOC)' means quantity of carbon that is converted into carbon dioxide by combustion and which is not liberated as carbon dioxide by acid treatment.

Main outcomes from stakeholders' consultations

The definition of 'bio-waste'' is now aligned with that established by Waste Framework Directive 2008/98/EC, and it complies with latest legal service directions. As suggested by stakeholders, it is considered appropriate to include

waste that can be assimilated to bio-waste, thus the definition is proposed to be expanded to "*including similar waste from households collected together with bio-waste*".

Stakeholders notified the need to introduce more specific definition of "organic component". The proposed new definition of organic components is meant to clarify the scope of criterion 1.1. The definition is developed for the purpose of this revision. The proposed definition was consulted with technical sub-group Members in October 2021, receiving an overall positive feedback.

Stakeholders also noted that technical sub-group meeting agreed on no - introduction of the specific definition for *organic soil improvers* thus addressing soil improvers altogether. Soil improvers need to meet requirement 5.3 on minimum content of organic matter. It is therefore straightforward that criteria target organic soil improvers.

In reference to the definition of "fiberisation", in line with the Commission Delegated Regulation (C(2021) 4250 final)[16] "among the exhaustive lists of processes in Component Material Category (CMC) 2, many concerns were expressed concerning the requirements limiting the maximum temperature and the additives to be used. It has been shown that various fiberisation processes of wood would be excluded from CMC 2. The conditions concerning the maximum temperature and the use only of water as additive are however necessary to ensure that the plants or plant parts are not chemically modified. This is essential in CMC 2, where no REACH registration is required and there are no other safety requirements. Materials obtained through fiberisation at higher temperature could be covered by CMC 1, where their safety would be assessed in a REACH registration if they were chemically modified substances". As requested by stakeholders, the specification for the maximum temperature of fiberaisation is specified under Criteiron 1.1 and is now harmonised with the above mentioned Regulation. Accordingly, adding definition of fiberisaiton was considered superfluous and therefore is proposed to be removed. It is also important to mention that a stakeholder informed JRC that the threshold temperature of 100C[17] is not technically adequate and does not meet the draft definition of TC 223 WG3. This discussion however refers to the formulation of CMC 2 under FPR and therefore lies out of the scope of the criteria revision.

After the EUEB meeting held in November 2021, the definition of 'product family' was removed and used in the definition of 'annual output', because it was never mentioned again in the whole text. Other small changes occurred for consistency reasons.

After the EUEB meeting held in March 2022, the title of criterion 4 was simplified removing the words "excluded and". This choice was made because none of the listed substances is excluded.

[16] https://ec.europa.eu/transparency/documents-register/detail?ref=C(2021)4250&lang=en

[17] DRAFT definition of Fiberisation: by TC 223 WG 3: "'mechanical-thermal extrusion or steam treatment of wood chips the purpose of which is to generate high pressure and high temperatures up to 150 °C or higher, breaking the wood chips into wood fibers which are used as a growing media component
Note 1 to entry: The same function can be obtained by applying hot steam to the wood chips" Note 1 to entry: The same function can be obtained by applying hot steam to the wood chips. (based on stakeholders consultation).

5. CRITERIA PROPOSAL

5.1. Criterion 1 - Components

Current Criterion 1 — Constituents

This criterion applies to growing media, soil improvers and mulch.
The constituents admitted shall be organic and/or mineral constituents.

Assessment and verification: The applicant shall provide the Competent Body with a list of constituents of the product.

Current Criterion 2 — Organic constituents

This criterion applies to growing media, soil improvers and mulch.

Current Criterion 2.1.

A final product shall not contain peat.

Current Criterion 2.2.

(1)The following materials are allowed as organic constituents of a final product.
- —Materials derived from the recycling of bio-waste from separate collection, as defined in Article 3 of Directive 2008/98/EC of the European Parliament and of the Council (3).
- —Materials derived from category 2 and 3 animal by-products as laid down in Article 32 of Regulation (EC) No 1069/2009 of the European Parliament and of the Council (4) and technical standards which are laid down by implementing Regulation (EU) 142/2011.
- —Materials derived from faecal matter, straw and other natural non-hazardous agricultural or forestry material as defined in Article 2(1)(f) of Directive 2008/98/EC.
- —Materials derived from any other biomass by-products, as defined in Article 5 of Directive 2008/98/EC, that are not mentioned above, subject to the provisions of (2) and sub-criterion 2.3.
- —Materials derived from recycling or recovery of any other biomass waste not mentioned above, subject to the provisions of (2) and sub-criterion 2.3.

(2)The following materials are not allowed as organic constituents of a final product.
- —Materials totally or partially derived from the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment.
- —Materials totally or partially derived from sludges derived from municipal sewage water treatment and from sludges derived from the paper industry.
- —Materials totally or partially derived from sludges other than those allowed in Criterion 2.3.
- —Materials totally or partially derived from category 1 animal by-products according to Regulation (EC) No 1069/2009.

Current Criterion 2.3

Materials derived from recycling or recovery of sludges are only allowed if the sludges comply with the following requirements:

(a)they are identified as one of the following types of waste according to the European List of Wastes, as defined by Commission Decision 2000/532/EC (5) presented in Table 2:

Table 2 Sludges allowed and their codes according to the European List of Wastes

0203 05	sludges from on-site effluent treatment in the preparation and processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco, conserve production, yeast and yeast extract production, molasses preparation and fermentation;
0204 03	sludges from on-site effluent treatment in sugar processing;
0205 02	sludges from on-site effluent treatment in the dairy products industry;
0206 03	sludges from on-site effluent treatment in the baking and confectionery industry;
0207 05	sludges from on-site effluent treatment in the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa).

(b)they are single-source separated, meaning that there has been no mixing with effluents or sludges outside a specific production process.

Assessment and verification: The applicant shall provide the Competent Body with the information about the origin of each organic constituent of the product and a declaration of compliance with the above requirement.

Proposed revised criterion on Components (post public consultation and after EUEB meeting)

Criterion 1 – Components

This criterion applies to growing media and soil improvers.

The components admitted shall be organic and/or mineral components.

A product shall not contain intentionally added peat.

Criterion 1.1. – Organic components of the product

The product may contain one or more of the following organic components:

(a) plants, plant parts or plant extracts, derived from agricultural or forestry activities, having undergone no other processing than cutting, grinding, milling, sieving, sifting, centrifugation, pressing, drying, frost treatment, freeze-drying, extraction with water, supercritical CO_2 extraction, or fiberisation at a temperature not higher than 100°C and without any additives except water. For the purpose of this point, plants include mushrooms and algae and exclude blue-green algae (cyanobacteria);

(b) food industry factory lime, i.e. a material from the food processing industry obtained by carbonation of organic matter, using exclusively burnt lime from natural sources;

(c) molasses, i.e. a viscous by-product of the refining of sugar cane or sugar beets into sugar;

(d) vinasse, i.e. a viscous by-product of the fermentation process of molasses into ethanol, ascorbic acid or other products;

(e) distillers grains, i.e. by-products resulting from the production of alcoholic beverages;

(f) lime from drinking water production, i.e. residue that is released by production of drinking water from groundwater or surface water and consists, mainly, of calcium carbonate;

(g) digestate obtained through anaerobic digestion or compost obtained through aerobic composting of one or more of the materials listed below from 1 to ~~65, and.~~

~~(h) compost obtained through aerobic composting of one or more of the materials listed below from 1 to 5.~~

Organic components (g) ~~and (h)~~ can be obtained by processing one or more of the following input materials:

1) bio-waste from separate collection at source, as defined in Directive 2008/98/EC[18];

2) living or dead organisms or parts thereof that are unprocessed or processed only by manual, mechanical or gravitational means, by dissolution in water, by flotation, by extraction with water, by steam distillation or by heating solely to remove water, or which are extracted from air by any means, except:

   a. materials originating from mixed municipal waste;

   b. sewage sludge, industrial sludge or dredging sludge;

   c. animal by-products or derived products falling within the scope of Regulation (EC) No 1069/2009 of the European Parliament and of the Council[19] for which no end point in the manufacturing chain has been determined in accordance with Article 5(2), third subparagraph, of that Regulation;

3) category 2 or category 3 materials or derived products thereof, in accordance with the conditions set out in Article 32(1) and (2) and in the measures referred to in Article 32(3) of Regulation (EC) No 1069/2009, provided that the end point in the manufacturing chain has been determined, in accordance with Article 5(2), third subparagraph, of that Regulation, and reached before placing the product on the market;

   ~~4) compost obtained through aerobic composting of any of the materials indicated in points 1, 2 and 3 of this list;~~

   ~~5) digestate obtained through anaerobic digestion of any of the materials indicated in points 1, 2, 3 and 6 of this list;~~

4) sludges that comply with both of the following two conditions:

   I. they are identified as one of the following types of waste[20]:

[18] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3).

[19] Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) (OJ L 300, 14.11.2009, p. 1).

[20] Types of wastes and reference codes as identified in Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (OJ L 226, 6.9.2000, p. 3).

5.1.2. 0203 05 sludges from on-site effluent treatment in the preparation and processing of fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco, conserve production, yeast and yeast extract production, molasses preparation and fermentation;

5.1.3. 0204 03 sludges from on-site effluent treatment in sugar processing;

5.1.4. 0205 02 sludges from on-site effluent treatment in the dairy products industry;

5.1.5. 0206 03 sludges from on-site effluent treatment in the baking and confectionery industry;

5.1.6. 0207 05 sludges from on-site effluent treatment in the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa);

II. they are single-source separated, meaning that there has been no mixing with effluents or sludges outside a specific production process.

5) digestate obtained through anaerobic digestion or compost obtained through aerobic composting of any of the materials indicated in points 1, 2, 3 and 4 of this list.

Assessment and verification

The applicant shall provide the competent body with the list of all components of the product.

The applicant shall provide the competent body with the information about the origin of each organic component of the product and a declaration of compliance with the above requirement.

Rationales behind the proposed criterion

Aim

This chapter analyses the validity of the current Criterion 1 and 2 and provides rationales behind the revised proposal for components admitted to form part of the EU Ecolabel growing media and soil improvers.

The quality requirements for compost and digestate products established by the FPR are largely based on the End of Waste Criteria for Biodegradable Waste Subjected to Biological Treatment (Saveyn and Eder 2013). As clarified by Rodriguez –Quintero et al (2015) in the Technical report that provides rationales behind the currently valid criteria 1 and 2, these are also built based on the findings from the abovementioned report.

The precise formulation of admitted/excluded input materials was agreed with stakeholders during the consultation conducted within the previous revision. To avoid the excessive restriction on organic constituents, particularly those that are used in growing media (coir pith from the coco fibre production), the criterion was aligned with the End of Waste (EoW) criteria for biodegradable waste, using the terminology described in the Waste Framework Directive (EC, 2008a) and considering waste categories defined by Commission Decision 2000/532/EC (EC, 2000). This is due the fact that EoW requires specific time of degradation (6 months) for the assessment of biodegradability, and this is not the case of EU Ecolabel criteria.

Main outcomes from stakeholders' consultations

The survey conducted in October 2020 on the criteria validity revealed that 47% of stakeholders consider that the criterion 1 (Constituents) is adequate and does not need any change, whereas 28% and 10% indicated the need for deep or light revision, respectively.

It was emphasised that the exclusion of some constituents is not an adequate approach. This refers mainly to Criterion 2.1. that excludes peat from the scope of this product group. According to some stakeholders the inclusion of peat may be beneficial as providing the quality for the growing media that might be difficult to achieve with

other materials. Stakeholders that supported peat exclusion emphasised that the constituent is not sustainable and therefore should not be considered under EU Ecolabel, mainly due to environmental damage and greenhouse gas production. Indeed, peat extraction that destroys peatlands should not be allowed as it impacts biodiversity including pollinator populations. In this respect, the position of the Commission is stated in:

(a) the Green Deal Communication;

(b) the Biodiversity Strategy for 2030, which aim to protect and restore carbon-rich ecosystems and peatlands;

(c) the 2030 Climate Target Plan, which sets the way for the EU to achieve climate neutrality by 2050 and the need for a growing sink;

(d) the EU Soil Strategy, which promotes the restoration of drained organic soils.

Compost, coir, bark, and wood fiber are some organic materials that are already being used in a commercial way as an alternative to peat (Gruda, 2012). Accordingly, and in line with the roadmap towards resources restoration, the re-evaluation of peat inclusion is not an intention of the on-going revision. The technical consultation revealed that *"many composts are processed by using input material that consists – at least in part – of spent growing media. Most growing media consist fully or partially of peat. Peat does not fully decompose during the composting process due to its biological nature. So, it is most likely that EU Ecolabel soil improvers and growing media containing such composted material (and containing peat) will be placed on the market"*[21]. For this reason, the peat exclusion should refer to intentionally added peat.

During the technical subgroup meetings in June 2021 stakeholders also noticed that wood fibres processed at temperature above 100°C are very common use in this product group, but their definition in the FPR is not clear yet. It was therefore posteriorly proposed to include *Fiberisation* processing for components category of *Plants, plant parts or plant extracts*, which is currently limited to wood fibres. Other organic fibrous components might enter the market in future.

Stakeholders also proposed to harmonise the requirement for sludges with the prescription of the FPR as to CMC 6 (by-products of the food industry).

During the public consultation process, various stakeholders notified the lack of clarity of Criterion 1.1. especially in terms of *"what is considered an organic component"*. Several stakeholders also stressed the need to enumerate sludges that are admitted under the scheme. The criterion was accordingly revised.

Various stakeholders also stressed the need to clarify if biochar[22] is considered an eligible component of a final product.

After the EUEB meeting, concerns were expressed about point (l), which gave the possibility to include any other organic material accepted by the FPR in the future. Also concerns were expressed regarding point (k), which included pyrolysis and gasification materials (biochar) in accordance with the specification of CMC 14 of the FPR. Finally, a lack of clarity was underlined regarding materials used untreated as organic components, and materials that must undergo aerobic composting or anaerobic digestion before being used as organic components.

Brief explanation of technical aspects

[21] Communication with stakeholders.

[22] Biochar is a porous, carbonaceous material that is produced by pyrolysis of plant biomasses and is applied in such a way that the contained carbon remains stored as a long-term C sink or replaces fossil carbon in industrial manufacturing. It is not made to be burnt for energy generation. (EBC, 2021)

The chemo-physical properties of soil varies across different areas. This is why the type of fertilising product used needs to respond to the specific soil' insufficiencies improving its quality or productivity. In this sense, the functionality of components that "make" soil improvers and growing media can be summarised as follows:

- Soil improvers (or "soil conditioners") are not designed to be used as a "soil" for plants growing but as an additive to existing soil mostly to correct its physical and chemical properties i.e. to enhance structure or increase the nutrients level. Components of soil improvers are mostly derived from composted biowaste and are used to correct soil organic matter content. Hence, the origin of compost will determine its final nutrient content (from worm cast to sewage sludge). The addition of a mineral, such as sand to soil of very poor quality with high clay content might also be considered as soil improving, by increasing soil drainage.

- Mulch is usually composed of large particles of materials such as wood chips and bark applied on the surface of soil. Soil coverings with stone chips or pebbles may occur as a semi-permanent covering and, although this would suppress weeds and retain moisture, it is not in our view mulch, as it has a decorative function. For this reason, an inorganic materials and especially extracted minerals are not permitted to be present in the EU Ecolabel mulch (Rodrigues-Quintero et al, 2015).

- Growing media (GM) are products generated to meet specific demand of applications and therefore often consist of a blend derived from different raw materials. Growing media provide a reservoir for water holding, a nutrient holding and exchange system, a zone for gaseous exchange for the plant root system and anchorage for plant roots. The physical characteristic (and so functionality) of a blend is adapted to achieve the correct balance of air and water holding capacity for the plants to be grown, and is determined by the components used and the proportions in which they are blended[23].

Organic components of growing media include, but are not limited to: peat, bark, coconut coir, rice hulls, wood fibre, etc., whereas inorganic components include, but are not limited to: perlite, pumice, vermiculite, sand, hydrogel, etc. Some of the most important growing media components, according to Growing Media Europe are[24]:

- BARK: The tough protective outer sheath of the trunk, branches, and twigs of a tree or woody shrub. Bark is used as the sole constituent in orchid cultivation or as a constituent in potting mixes for tree nurseries and floriculture. Only certain barks are suited as growing media constituents. Bark is also used as a mulching material.

- CLAY: This material is often added in the form of dried granules or as a powder. Clay has a high ability to bind water as well some nutrients. It therefore influences the water characteristics of the growing medium. It can also partly act as a nutrient buffer, making it possible to add more fertilizer without reaching to high salinity levels.

- COIR PITH: Coir is obtained by mechanical processing of the husk of coconuts. It is primarily imported from the Far East (Sri-Lanka, India, Philippines). This material has good wettability characteristics and is often mixed with other constituents in mixes for sowing, propagating and potting. Sometimes also used as the sole constituent of grow bag mixes in vegetable and flower cultures.

- GREEN COMPOST: A material produced from organic waste materials such as tree branches, leaves, grass clippings and plant residues. These residual materials are decomposed by microorganisms under controlled conditions. Plants do not grow in 100 % compost, and the material must be diluted with e.g. peat. Good quality composts for the growing media industry are becoming rare in some EU member states due to the increasing use of woody input material for energy production instead of composting.

- BLACK PEAT: Peat is formed when plants such as peat mosses are submerged in water and only partly decomposed due to a lack of oxygen. In some areas peat accumulated over the years in small lakes, growing from the bottom to

[23] https://www.pthorticulture.com/en/training-center/fundamentals-of-growing-media/
[24] https://www.growing-media.eu/news-1

the top. The lower layers of peat are called "black peat". They are the oldest and most decomposed, characterised by hardly to non-recognizable plant structures and a dark brown to almost black colour. This peat is used in all horticultural segments and is the second most important constituent of growing media throughout Europe.

- WHITE PEAT: This peat is weakly to moderately decomposed and taken from the upper and younger layers of a peatland. It has visible plant structure and a yellowish brown to dark brown colour. White peat is used in all horticultural segments and is the main constituent of growing media throughout Europe.

- PERLITE: A material that is manufactured from naturally occurring hydrated volcanic rock (perlite), expanded by heat to form a cellular structure. Usually mixed into growing media in order to improve the flow-ability of a growing media mix, increase the air content and improve the water uptake.

- RICE HULLS: Are the hard protecting coverings of grains of rice and are obtained in the rice manufacturing industry. Rice hulls can be added to mixes to improve air capacity. It is a constituent of lower importance.

- SAND and GRIT: Are used in growing media to improve the flowability of the mix as well as to add weight where needed. These materials can also improve the water movement in the growing medium to some extent.

- WOOD FIBRES: Fibres that have been obtained by mechanically or mechanically-thermally fraying of un-treated wood and/or wood wastes. Wood fibres are used in mixes for pot plants, trees, shrubs, etc. and used in combination with peat and other constituents.

For some applications such as in commercial horticulture, growing plants in hydroponics involves the use of a wholly mineral growing medium. Given the uncontrolled nature of the risk from dusts from handling growing media by amateur gardeners, the use of mineral wool is restricted to its use in commercial horticultural applications (closed-cycle recirculating hydroponic systems) as 100% mineral wool growing media. Under these conditions, the risks from inhalation of fibre may be controlled and the spent growing media may be recycled or properly disposed of.

5.1.1. Component material categories (CMCs) established by Regulation (EU) 2019/1009

The final EU fertilising product can be composed of several component materials from various CMCs (specified in Part 1 of Annex II to FPR) as long as each component material and the input materials used to produce them comply with safety requirements specified in Annex I and II to FPR (EC, 2019a). Applying distinct requirements for each CMCs is necessary due the differences in the component materials that constitutes each category. This allows warranting different process requirements and control mechanisms adapted to the different potential hazardousness, variability, and quality of the input materials, production process conditions, among others (Huygens and Saveyn, 2020). Accordingly, the CMC requirements (Part II of Annex II to FPR) mostly define input materials for specific production processes, process conditions, and (to a limited extent) limits for specific contaminants/impurities that could be present in some materials or produced during certain manufacturing processes. To this end, the EU fertilising product shall consist solely of component materials complying with the requirements for one or more of the CMCs listed in Annex III - Table 31 (EC, 2019a).

It is possible to put on the market an EU fertilising product that is composed of several component materials from various CMCs, where each material complies with the requirements of a certain category. A condition is, however, that no intentional chemical reaction or transformation takes place between the different CMCs that are contained in the EU fertiliser (Huygens et al. 2019; EC 2019), and each component used in a final product does not pose unacceptable risk for human health and the environment.

For the EU Ecolabel certified product, it seems relevant to ensure the consistency with requirements regulated under the FPR.

Compost and digestate

For 'compost' and 'digestate' (CMC 3 and CMC 5) the FPR defines input materials and process requirements for composting and anaerobic digestion. Sewage sludge and mixed municipal waste are excluded as input materials for these categories. Sewage sludge and sewage sludge ashes can be a good source of fertilizer phosphorus in composing fertilizer formulations (Chojnacka et al, 2020). However, the use of sewage sludge in biomass valorisation brings the risk of an increased concentration of non-biodegradable organic substances and heavy metals in the soil. Their presence may cause phytotoxic effect (Ma et al., 2018). In line with the exclusion specification of CMC 3 and CMC 5, it is proposed to maintain the currently valid exclusion for organic materials that should not form part of the final product, such as industrial sludges and mixed municipal waste.

Animal by-products

Last but not least, FPR amends the Animal by-products Regulation (EC) No 1069/2009 to enable derived products no longer posing significant risks to animal health to move freely on the EU market as fertilising products. An EU fertilising product may contain derived products within the meaning of Regulation (EC) No 1069/2009 having reached the end point in the manufacturing chain as determined in accordance with that Regulation (EC, 2019a). The exact list of admitted input materials for this category will be established by delegated acts referred to in Article 42(5) of the FPR.

Dynamic approach for CMCs under the FPR

The scope of each CMC entry is much broader than the list of input materials admitted to be present in the EU Ecolabel product, which may correspond or include different CMCs (see: Annex III-Table 31). In principle, this difference does not indicate inconsistency between the two legal documents, but rather higher selectivity of EU Ecolabel input materials. This is in line with the principle of the voluntary EU Ecolabel scheme to target 10-20% of the best performing product on the market (EC, 2010a).

It is important to notice that whereas EU Ecolabel refers to the fixed list of admitted components, the Annex II to FPR has a substantial degree of flexibility to be further modified. This means that the FPR-compliant component materials (CMCs) represent a dynamic approach that will be further expanded (for instance, a future Delegated Regulation will add pyrolysis and gasification materials ('biochar') to CMCs (CMC 14)[25]. In addition, there is also an on-going work on CMC 11 – by-products that may possibly list some organic constituents (Huygens and Saveyn, 2020). Such materials could potentially be of interest of the next revision as admitted components of the licensed growing media and soil improvers.

This criterion is also aligned with the EU Soil Strategy ([26]) because:

- it avoids the exploitation of peat;
- it includes many recycled/recovered materials that can promote the circular economy.
- ~~it promotes the use of biochar, complying with the CMC 14 of the FPR, to promote soil as carbon sink.~~

[25] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12136-Fertilising-products-pyrolysis-and-gasification-materials
[26] EU Soil Strategy COM(2021) 699 final

5.1.2. Summary of technical/legal adjustments under the revised criterion

The admitted list of organic components mainly corresponds with CMC 2 (Plants, plant parts or plant extracts), CMC 3 (Compost), CMC 4 (Fresh crop digestate), CMC 5 (Digestate other than fresh crop digestate, and CMC 6 (Food industry by-products).

All in all, and considering the feedback collected several adjustments are proposed to be introduced under revised criterion 1 (former Criterion 1 and 2).

- The term constituent does not appear in the FPR, as has been replaced by the term "component material" Therefore, the appropriate change in the criterion heading is proposed.
- It is proposed to simplify the criterion by merging Criterion 1 and 2 under the common denominator: Components
- Sludges that are admitted under current requirement generally fall under the scope of the CMC 6 (Food industry by-products), and therefore they are proposed to be incorporated into the positive list of admitted components (vinasse, molasses, etc...)
- The 3 exclusion criteria in the criterion 1.1(2) are fully harmonise with the FPR.
- Removal of "Materials derived from any other biomass by-products that are not mentioned above, as defined in Article 5 of Directive 2008/98/EC, "due to the lack of clarity on the inclusion / exclusion criteria.
- Removal of reference to manure. Manure that will be placed on the market needs to comply with the conditions outlined in Regulation 142/2011, Annex XI, section 2. Hence, the manure that we include is likely to fall under Category 2 or Category 3 materials or derived products that have reached an end point in the manufacturing chain".
- If a manufacturer uses separately collected green waste or bio-waste to produce compost, which is then used to manufacture a growing medium or soil improver, they will not be able to guarantee the end product to be peat free, because such separately collected input material will practically always contain root balls containing peat. The exclusion of peat can only be guaranteed if the manufacturer uses single input material or a mix of single input materials such as bark, wood, paludiculture crops, etc. but not input material i.e. green waste or bio-waste. Therefore, the EUEL criterion on peat exclusion is proposed to be changed as follows: 'A final product shall not contain intentionally added peat.'

Based on stakeholders feedback, revising criterion 1.1 seemed necessary. To add more clarity to proposed revised Criterion 1.1., a new definition of "organic component" is now being introduced.

The proposed specification on sludges is now harmonised with the currently valid criterion 2.3. The wording of requirement 1.1.(a) is now harmonised with the Commission Delegated Regulation C(2021) 4250. It also needs to be stressed that CMC 6 (food by-products) contains some liming materials. Liming material according to FPR (PFC 2), is an EU fertilising product the function of which is to correct soil acidity. This product type is specifically excluded from soil improvers category (Art 2. (b)).

~~Biochar manufactured e.g. from plant materials will primarily contain (transformed) organic carbon and other molecular molecules from living organisms, and will therefore fall under the proposed definition of organic component.~~

After the EUEB meeting held in March 2022, the criterion was slightly changed:

- Pyrolysis and gasification materials were removed from the list of accepted materials because there are still aspects that need a deeper investigation to be carried out with more resources than currently available.

- ~~These are new materials, manufactured with novel industrial processes that are not included yet in the Waste Framework Directive (Directive 2008/98/EC). According to current EU legal framework, biochar is not considered a product that promotes recycling of biowaste.~~
  ~~This revision of the EUEL criteria follows the shortened procedure, which has specific objectives like the promotions of biowaste recycling. The inclusion of any material differing from this definition, should be faced within a standard procedure.~~
- In general, the scientific literature offers many evidences about the good performances of pyrolysis and gasification materials when used as soil improver. They contribute to carbon sequestration, retain water and nutrients, just like it is done by organic matter in compost and digestate. However, these performances vary according to the location, the application and the combination with other materials. Additionally, the environmental performances of the biochar change according to the raw material or the recovered material used for its production. A deeper scientific analysis is needed to investigate this matter (Agegnehu et al., 2017; Matustík et al., 2020; Tenic et al., 2020; Vijay et al., 2021).

- The point reporting "any other organic component materials complying with" the FPR was removed to avoid the acceptance of materials the features of which have not been analysed in the context of the EU Ecolabel objectives.

- The entire list of materials was reorganised to clearly report which materials can be used untreated as organic component, and which materials must undergo aerobic composting or anaerobic digestion before being used as organic components. The criterion 1.1 now reports a main list that contains all the accepted organic components (from point (a) to point (~~h~~g). This list includes digestate and compost, which can be produced using one or more of the materials reported in a further list (from point 1 to ~~6~~5). ~~The criterion 1.1 now states that digestate proceeding from sludges can be used as organic component, whereas it is not possible to use a compost obtained through aerobic composting of sludges.~~ The criterion 1.1 now gives the possibility to use as input material for the production of compost and digestate other compost and digestate obtained through the processing of ~~specific~~ materials at points 1, 2, 3 and ~~4(see points (g) and (h), and points 4 and 5).~~ This is in line with what is reported in CMC 3 (Compost), CMC 4 (Fresh crop digestate), and CMC 5 (Digestate other than fresh crop digestate) of the FPR.

Potential future organic materials will be addressed in the next revision.

After the EUEB meeting held in March 2022, two changes occurred:

- The expression "derived from agricultural or forestry activities" limits the material sources. In this way, the use of plants directly taken from nature is not allowed. For example moss directly taken from forest cannot be used. Although this is a deviation from FPR, EUEL promotes for this product group only recovered materials. This measure is already in place with currently valid criteria (Commission Decision 2015/2099 – criterion 2.2), and it is also one of the main objectives of the criteria revision.

- The latest proposal of criterion 1.1 includes also compost from the listed sludges. Initially, these sludges were allowed only after being digested because FPR does not allow composting of sludges. A deeper investigation showed that these sludges are usually not composted due to high costs and dilution issues in the process, but in some Member States they are even applied untreated on agricultural land. Due to this use of such sludges, the possibility to compost them is now also provided.

5.2. Criterion 2. Mineral components

Environmental aspects were last assessed in the report 'Comparative life cycle assessment of horticultural growing media based on peat and other growing media constituents' (Quantis, 2012). The literature does not offer updated reliable studies about Life Cycle Assessment of mineral growing media. Due to lack of updated reliable analysis, the relevant environmental aspects underlined in the current criterion are still valid. The topics addressed refer to:

— Energy consumption and CO_2 emissions,

— Sources of mineral extraction,

— Use and after use.

5.2.1. Criterion 2.1. Energy consumption and CO_2 emissions during the manufacture of mineral growing media

Current Criterion on energy consumption and CO_2 emissions

This criterion applies to mineral growing media only.

The manufacture of expanded minerals and mineral wool shall fulfil the following energy consumption and CO_2 emissions thresholds:
Energy consumption / product ≤ 11 GJ/t product
CO_2 emissions / product ≤ 0.8 t CO_2/t product

The ratio energy consumption/product shall be calculated as an annual average as follows:

$$\text{ratio}\,\frac{\text{Energy}}{\text{Product}} = \frac{1}{\sum_{i=1}^{n}\text{Production}_i}\cdot\sum_{i=1}^{n}\left(\text{F} + 2.5\cdot\text{El}_{\text{grid}} + \left(\frac{\text{H}_{\text{cog}}}{\text{Ref H}\eta} + \frac{\text{El}_{\text{cog}}}{\text{Ref E}\eta}\right)\cdot\left(1 - \text{PES}_{\text{cog}}\right)\right)_i$$

Where:
n is the number of years of the period used to calculate the average
i is each year of the period used to calculate the average
Production is the production of mineral wool or expanded minerals in tonnes in the year i
F is the annual consumption of fuels in the production process in the year i
Elgrid is the annual electricity consumption from the grid in the year i
Hcog is the annual consumption of useful heat from cogeneration in the year i
Elcog is the annual consumption of electricity from cogeneration in the year i
Ref Hn and Ref En are the reference efficiencies for the separate production of heat and electricity as defined in the Directive 2012/27/EU[27] of the European Parliament and of the Council and calculated according to the Commission Implementing Decision 2011/877/EU[28]
PEScog is the primary energy saving of the cogeneration plant as defined in the Directive 2012/27/EU, in the year i

The ratio CO_2 emissions/product shall be calculated as an annual average as follows:

$$\text{ratio}\,\frac{\text{CO}_2\text{ emissions}}{\text{Product}} = \frac{1}{\sum_{i=1}^{n}\text{Production}_i}\cdot\sum_{i=1}^{n}\left(\text{Direct CO}_2 + \text{Indirect CO}_2\right)_i$$

Where:
n is the number of years of the period used to calculate the average
i is each year of the period used to calculate the average
Production is the mineral wool production in tonnes in the year i
Direct CO_2 is the CO_2 emissions as defined in Commission Regulation (EU) No 601/2012[29], in the year i

Indirect CO_2 is the indirect CO_2 emissions due to final energy consumption in the year i, and shall be calculated as:

$$\text{Indirect CO}_2\text{ emission} = \text{FE}_{\text{grid}}\cdot\text{El}_{\text{grid}} + \text{FE}_{\text{fuel cog}}\cdot\left(\frac{\text{H}_{\text{cog}}}{\text{Ref H}\eta} + \frac{\text{El}_{\text{cog}}}{\text{Ref E}\eta}\right)\cdot\left(1 - \text{PES}_{\text{cog}}\right)$$

Where:

[27] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).
[28] Commission Implementing Decision 2011/877/EU of 19 December 2011 establishing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2004/8/EC of the European Parliament and of the Council and repealing Commission Decision 2007/74/EC (OJ L 343, 23.12.2011, p. 91).
[29] Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 181, 12. 7.2012, p. 30)

FEgrid is the EU average carbon intensity of the electricity grid, according to MEErP[30] methodology (0.384 tCO_2/MWhe = 0.107 tCO_2/GJe)
FEfuel cog is the CO_2 emission factor of the fuel consumed in the cogeneration plant
The direct CO_2 emissions shall be monitored according to Commission Regulation (EU) No 601/2012.

The period to calculate the ratios energy consumption/product and CO_2 emissions/product shall be the last 5 years before the application. If the operation period of the plant is less than 5 years at the date of application, the ratio shall be calculated as an annual average of that operation period, which shall be at least one year.

Assessment and verification:
The applicant shall provide the Competent Body with a declaration which includes the following information:

- Ratio energy consumption (GJ)/product (tonne).
- Ratio CO_2 emissions (tonne)/product (tonne).
- Direct CO_2 emissions (tonnes) for each year of the period to calculate the average.
- Indirect CO_2 emissions (tonnes) for each year of the period to calculate the average.
- Fuels consumed, consumption of each fuel (GJ), sub-process/es of the manufacture process where they are consumed for each year of the period to calculate the average.
- Electricity consumption from the grid (GJ final energy) for each year of the period to calculate the average.
- Useful heat consumption from cogeneration (GJ final energy) for each year of the period to calculate the average.
- Electricity consumption from cogeneration (GJ final energy) for each year of the period to calculate the average.
- Reference efficiencies for separate production of heat and electricity.
- Primary energy saving (PES) (%) of the cogeneration for each year of the period to calculate the average.
- Identification of fuels used in cogeneration and their share in the fuel mix, for each year of the period to calculate the average.

The following documents shall be provided together with the declarations:

- Annual emissions report according to Commission Regulation (EU) No 601/2012, for each year of the period to calculate the average.
- Verification report finding the annual emissions report satisfactory according to Commission Regulation (EU) No 600/2012[31], for each year of the period to calculate the average.
- Records of electricity consumption from the grid provided by the supplier, for each year of the period to calculate the average.
- Records of the useful heat and electricity consumption from cogeneration, both on-site and purchased, for each year of the period to calculate the average.

Proposed revised criterion on energy consumption and CO_2 emissions (post public consultation and EUEB meeting)

Criterion 2.1 Energy consumption and CO_2 emissions during the manufacture of mineral growing media

This criterion applies to mineral growing media only.

The manufacture of expanded minerals and mineral wool shall fulfil the following energy consumption and CO_2 emissions thresholds:

- energy consumption / product ≤ 11 GJ/t product, in primary energy; and
- CO_2 emissions / product ≤ 0.7 t CO_2/t product.

"Product" refers to the mineral wool in any of the forms placed on the market (e.g. slabs, cubes, plugs).

The ratio energy consumption/product shall be calculated as an annual average as follows:

$$\text{ratio}\,\frac{\text{Energy}}{\text{Product}} = \frac{1}{\sum_{i=1}^{n}\text{Production}_i}\cdot\sum_{i=1}^{n}\left(\text{F} + 2.1\cdot\text{El}_{\text{grid}} + \left(\frac{\text{H}_{\text{cog}}}{Ref\ H\eta} + \frac{\text{El}_{\text{cog}}}{Ref\ E\eta}\right)\cdot\left(1 - \text{PES}_{\text{cog}}\right)\right)_i$$

Where:

- *n* is the number of years of the period used to calculate the average;
- *i* is each year of the period used to calculate the average;
- *Production* is the production of the mineral wool or expanded minerals in tonnes in the year *i;*

[30] Methodology for the Ecodesign of Energy-related Products (http://www.meerp.eu/)
[31] Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 181, 12. 7.2012, p. 1)

- *F* is the annual consumption of fuels in the production process in the year *i;*
- El_{grid} is the annual electricity consumption from the grid in the year *i;*
- H_{cog} is the annual consumption of useful heat from cogeneration in the year *i*
- El_{cog} is the annual consumption of electricity from cogeneration in the year *i*
- *Ref Hη* and *Ref Eη* are the reference efficiencies for the separate production of heat and electricity as defined in the Directive 2012/27/EU([32]) of the European Parliament and of the Council and calculated according to the Commission Delegated Regulation (EU) 2015/2402([33]); and
- PES_{cog} is the primary energy saving of the cogeneration plant as defined in the Directive 2012/27/EU, in the year *i*

The ratio CO_2 emissions/production shall be calculated as an annual average as follows:

$$\text{ratio}\frac{\text{CO2 emissions}}{\text{Product}} = \frac{1}{\sum_{i=1}^{n}\text{Production}_i} \cdot \sum_{i=1}^{n}(\text{Direct CO}_2 + \text{Indirect CO}_2)_i$$

Where:

- *n* is the number of years of the period used to calculate the average
- *i* is each year of the period used to calculate the average
- *Production* is the mineral wool production in tonnes in the year *i*
- *Direct* CO_2 is the CO_2 emissions according to the Commission Implementing Regulation (EU) 2018/2066([34]), in the year *i; and*
- *Indirect* CO_2 is the indirect CO_2 emissions due to final energy consumption in the year *i*, and shall be calculated in accordance with Commission Delegated Regulation (EU) 2019/331[35]:

The direct CO_2 emissions shall be monitored according to Commission Implementing Regulation (EU) 2018/2066.

The indirect CO_2 emissions shall be monitored in accordance with Article 6 of Delegated Regulation (EU) 2019/331 on free allocation rules.

The period to calculate the ratios energy consumption/product and CO_2 emissions/product shall be the last five years before the submission of the application. If the operation period of the plant is less than five years at the date of the submission of the application, the ratio shall be calculated as an annual average of that operation period, which shall be at least one year.

Assessment and verification:

The applicant shall provide the competent body with a declaration that includes the following information:

- *ratio energy consumption (GJ)/product (tonne);*
- *ratio* CO_2 *emissions (tonne)/product (tonne);*
- *direct* CO_2 *emissions (tonnes) for each year of the period to calculate the average;*
- *indirect* CO_2 *emissions (tonnes) for each year of the period to calculate the average;*
- *fuels consumed, consumption of each fuel (GJ), sub-process/es of the manufacture process where they are consumed for each year of the period to calculate the average;*
- *electricity consumption from the grid (GJ final energy) for each year of the period to calculate the average;*

[32] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).

[33] Commission Delegated Regulation (EU) 2015/2402 of 12 October 2015 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU.

[34] Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012.

[35] Commission Delegated Regulation (EU) 2019/331 of 19 December 2018 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council (OJ L 59, 27.2.2019, p. 8).

- *useful heat consumption from cogeneration (GJ final energy) for each year of the period to calculate the average;*
- *electricity consumption from cogeneration (GJ final energy) for each year of the period to calculate the average;*
- *reference efficiencies for separate production of heat and electricity;*
- *primary energy saving (PES) (%) of the cogeneration for each year of the period to calculate the average; and*
- *identification of fuels used in cogeneration and their share in the fuel mix, for each year of the period to calculate the average.*

The following documents shall be provided together with the declarations:

- *annual emissions report according to Commission Implementing Regulation (EU) 2018/2066, for each year of the period to calculate the average;*
- *verification report finding the annual emissions report satisfactory according to Commission Implementing Regulation (EU) 2018/2067([36]), for each year of the period to calculate the average;*
- *records of electricity consumption from the grid provided by the supplier, for each year of the period to calculate the average; and*
- *records of the useful heat and electricity consumption from cogeneration, both on-site and purchased, for each year of the period to calculate the average.*

Rationales behind the proposed criterion

Aim

The criterion sets the limit values to energy consumption and CO_2 emissions per tonne of produced mineral wool. The revision mainly assessed the appropriateness of the requirements, including references to the current legislation.

Main outcomes from stakeholders' consultations

Based on the survey responses (October 2020), 50% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 12% and 3% of stakeholders indicated the need for deep or light revision, respectively. Accordingly, the proposed changes in the criteria mainly verify the appropriateness of the requirements, including validity of the referred legislation

Changes after the public consultation

After the public consultation, the following changes occurred:

- The definition of "finished product" was better given as the mineral wool in any of the form placed on the market (e.g. slabs, cubes, plugs). Before, only mineral wool in sheet was mentioned.

Changes after the EUEB meeting held in November 2021

After the EUEB meeting held in November 2021, two main changes were applied:

- The publication of a new benchmark analysis performed by the European Commission (EC, 2021) allowed to set a CO2 emission limit value based on updated information.

[36] Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 334, 31.12.2018, p. 94–134).

- The calculation of the indirect CO_2 emissions could directly refer to Commission Delegated Regulation (EU) 2019/331.

Brief analysis of technical and legal aspect

The calculation of the energy consumption is based on the 'Best Available Techniques (BAT) Reference Document for the Manufacture of Glass' (BREF Glass, 2013), which complements the Commission Implementing Decision 2012/134/EU (EC, 2012) in force. The Technical Report states that *"The energy consumption ratio is proposed to select those plants that operate with electrical furnaces, performing lower CO2 emissions. According to BREF Glass (2013), the electricity consumption is in the range of 2.7 to 5.5 GJ/tonne, in final energy, (6.75 – 13.75 GJ/tonne in primary energy, 2.5 transformation factor). A threshold of 11 GJ/tonne in primary energy would be in the middle of the range."* The current limit value for energy consumption is based only on the energy used in the furnace for melting the material, which includes, only from 20 to 80% of the total energy used (Table 7).

Table 7. Energy use in mineral wool production

Stage of the mineral wool production	Glass wool (% of total energy)	Stone wool (% of total energy)
Melting	20-45	60-80
Fiberising	25-35	2-10
Curing	25-35	15-30
Other	6-10	5-10

Source: Table 3.47 in BREF Glass (2013)

The formula about the energy-to-product ratio contains the factor of 2.5, which refers to Annex IV of Directive 2012/27/EU on energy efficiency. Directive (EU) 2018/2002 on energy efficiency amended the Annex IV of Directive 2012/27/EU, and updated the factor 2.5 because nowadays more energy is produced from renewable sources and is available in the current electricity grid.

The calculation of the indirect CO_2 emissions considers the EU average carbon intensity of the electricity grid (FE_{grid}) according to the MEErP methodology (0.384 tCO_2/MWhe = 0.107 tCO_2/GJe) published in 2011. However, the most updated value published by the EC is contained in Article 22, point 3 of the Commission Delegated Regulation (EU) 2019/331 on free allocation rules.

The current limit value of the CO_2 emissions is based on the 'Methodology for the free allocation of emission allowances in the EU ETS post 2012 - Sector report for the mineral wool industry' (Ecofys, 2009. The Technical Report states that *"The ratio of CO_2 emissions, direct and indirect, per production of mineral wool is proposed to select the best 20 plants out of the 73 plants/lines analysed by Ecofys report (87 plants identified), which emit less than 0.85 ton CO_2/ ton product. This would represent the 27% of plants analysed in Europe and 22% of the plants identified."* The reported benchmark was based on an old EU average value of carbon intensity, which is equal to 0.465 tCO_2/MWh (Ecofys, 2009).

Three legal references are no longer in force:

- Commission implementing Decision 2011/877/EU (end of validity: 19/12/2015);
- Commission Regulation (EU) No 601/2012 (end of validity: 31/12/2020);
- Commission Regulation (EU) No 600/2012 (end of validity: 31/12/2018).

5.2.1.1. Additional justification for the proposed revision

In the mineral wool production, the total energy consumption per finished product is lower than 14 GJ/tonne finished product (sheet of mineral wool), expressed as primary energy (Table 4.43 in BREF Glass, 2013). This value is achieved

by applying available techniques/measures for minimising the use of energy. 80% of this value, which corresponds to 11 GJ/tonne finished product in primary energy, is suggested as limit value in the revised version of the criterion. Despite the proposed limit value does not change compared to the current version of the criterion, it refers to a more comprehensive approach for the calculation of the energy consumption. This change will be specified in the User Manual.

The factor 2.5 in the formula about the energy-to-product ratio is suggested to be decreased to 2.1, in accordance with the Annex IV to Directive (EU) 2018/2002 on energy efficiency.

The current third party verification process is proposed also for the new version of the criterion. The direct CO_2 emissions are accounted by the EU Emission Trading System (ETS) report that the companies must submit every year, whereas the indirect emissions due to electricity and heat consumptions from the network are verified with bills and records.

The update of the legal references is proposed as follows:

- Commission implementing Decision 2011/877/EU was repealed by COMMISSION DELEGATED REGULATION (EU) 2015/2402 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU.

- Commission Regulation (EU) No 601/2012 was repealed by COMMISSION IMPLEMENTING REGULATION (EU) 2018/2066 on the monitoring and reporting of greenhouse gas emissions.

- Commission Regulation (EU) No 600/2012 was repealed by COMMISSION IMPLEMENTING REGULATION (EU) 2018/2067 on the verification of data and on the accreditation of verifiers.

After the EUEB meeting held in November 2021, two main changes were applied:

- The limit value of CO_2 emissions per product was decreased from 0.8 to 0.7 CO_2/t of product, thanks to a new benchmark analysis performed by the European Commission (EC, 2021). According to this study, the value of 0.7 CO_2/t of product can be met by about 25% of the plants in EU.
- The expression about the calculation of the indirect CO_2 emissions was simplified and set to be performed in accordance with the Commission Delegated Regulation (EU) 2019/331. This does not involve any further burden to the applicants, which have to produce the same documents within the EU Emission Trade System.

5.2.2. Criterion 2.2 Sources of mineral extraction

Current Criterion on sources of mineral extraction
This criterion applies to growing media, soil improvers and mulch. Extracted minerals can be used as constituents of the final product provided that: 1) (Within the EU): If they are extracted from Natura 2000 network areas, composed of Special Protection Areas under Directive 2009/147/EC on the conservation of wild birds, and Special Areas of Conservation under Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora, extraction activities have been assessed and authorised in

accordance with the provisions of Article 6 of Directive 92/43/EEC and taking into account the EC Guidance document on non-energy mineral extraction and Natura 2000[37].

2) (Outside the EU): If they are extracted from protected areas designated as such under the national legislation of the sourcing / exporting countries, the extraction activities have been assessed and authorised in accordance with provisions that provide assurances equivalent to those under (1).

Assessment and verification

In case mineral extraction activities have been carried out in Natura 2000 network areas (in the EU) or protected areas designated as such under the national legislation of the sourcing / exporting countries (outside the EU), the applicant shall provide a declaration of compliance with this requirement issued by the competent authorities or a copy of their authorisation issued by the competent authorities.

Proposed revised criterion on sources of mineral extraction (post public consultation and EUEB meeting)

Criterion 2.2 – Sources of mineral extraction

This criterion applies to growing media and soil improvers.

The extraction of minerals to be used as a component of an EU Ecolabel growing medium and soil improvers shall only take place on sites that are covered by the following documentation:

- an environmental impact assessment and, where relevant, a report in accordance with Directive 2014/52/EU[38];
- a valid authorisation for the extraction activity issued by the relevant regional or national authority;
- a rehabilitation management plan associated with the authorisation for the extraction activity;
- a map indicating the location of the quarry;
- a declaration of conformity with Regulation (EU) No 1143/2014[39];
- a declaration of conformity with Council Directive 92/43/EEC[40] (habitats) and Directive 2009/147/[41] (birds).

Regarding the last point above, in cases where extraction sites are located in Natura 2000 network areas, composed of special areas of conservation referred to in Article 3 of Directive 92/43/EEC and special protection areas as defined in Article 4 of Directive 2009/147/EC, extraction activities shall have been assessed and authorised in accordance with the provisions laid down in Article 6 of Directive 92/43/EEC and have taken into account the relevant European Commission guidance document[42].

Also regarding the last point above, in cases where extraction sites are located outside the EU, if materials are extracted from areas officially nominated as candidates for or adopted as areas of special conservation interest; part of the Emerald network pursuant to Recommendation No 16 (1989) and Resolution No 3 (1996) of the Convention on the Conservation of European Wildlife and Natural Habitats[43]; or protected areas designated as such under the national legislation of the sourcing / exporting countries, the extraction activities shall have been assessed and authorised in accordance with provisions that provide assurances equivalent to Directives 92/43/EEC and 2009/147/EC.

Assessment and verification:

The applicant shall provide a declaration of compliance with this requirement issued by the competent authorities, or a copy of the authorisations issued by the competent authorities and any other required declarations and documentation.

[37] EC Guidance on undertaking new non-energy extractive activities in accordance with Natura 2000 requirements (http://ec.europa.eu/environment/nature/natura2000/management/docs/neei_n2000_guidance.pdf).
[38] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (OJ L 124, 25.4.2014, p.1).
[39] Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (OJ L 317, 4.11.2014, p. 35).
[40] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).
[41] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).
[42] Guidance document on non-energy mineral extraction and Natura 2000. A summary. ISBN: 978-92-79-99542-2.
[43] Convention on the Conservation of European Wildlife and Natural Habitats. Council of Europe. European Treaty Series – No. 104.

The rehabilitation management plan shall include the objectives for the rehabilitation of the quarry, the conceptual final landform design, including the proposed post quarry land use, details on the implementation of an effective revegetation programme and details of an effective monitoring programme to assess the performance of rehabilitated areas.

If industrial or construction mineral extraction activities have been carried out in Natura 2000 network areas (in the Union), the Emerald network or protected areas designated as such under the national legislation of the sourcing/exporting countries (outside the Union), the applicant shall provide a declaration of compliance with this requirement issued by the competent authorities or a copy of their authorisation issued by the competent authorities.

Rationales behind the proposed criterion

Aim

Criterion 3.2. (for both soil improvers and growing media) requires that minerals extracted from natural resources and used in a final product, are not sourced from the protected areas.

Main outcomes from stakeholders' consultations

Based on the survey responses (October 2020), 70% of stakeholders considered that the criterion is adequate and does not need to be changed. Stakeholders pointed out that the criterion might be complex to read and to explain. Stakeholders also indicated that in Natura 2000[44] sites, the extraction of minerals is mostly prohibited, and that the criterion does not provide sufficient protection. For this reason, at the first stage the revision analyses the formulation of the current criterion and its validity. Additionally, the revision also accommodates the recent policy developments, including the impacts on pollinator habitats, and analyzes the applicability of the guidelines established under the Bern Convention[45] in relation to extraction of minerals from non-EU Member States parties to that Convention. Further stakeholders' feedback on the proposed revised criterion is expected during the consultation process.

Stakeholders noticed that if the mineral materials used in the composition of growing media comes from recycling, the documentation can be hard to obtain.

It was also suggested to specify that the proposed Criterion 2.2 includes chemicals derived from extracted minerals. Nevertheless, the criterion addresses mineral components used in EU Ecolabel growing media and soil improvers, and does not refer to chemicals derived from extracted minerals. The mineral phosphate fertilising products are out of the scope of EU Ecolabel criteria for soil improvers and growing media, representing separated category under FPR i.e. organo-mineral fertilisers – PFC (1B).

5.2.2.1. Brief analysis of the environmental impact on ecosystem

The state of biodiversity in an area can be determined by the condition of the habitat and ability to enable persistence of species. The transformation of land to agriculture, mining and urban area causes modification or loss of habitat, which is the major reason behind the biodiversity losses worldwide. Adverse effects and modification can be observed long after the end of the mining activity (Ntshane and Gambiza, 2016; Huang et al., 2010: Arcadis, 2020). The World Resources Institute was evaluating the environmental impact on the ecosystem of mining activities (WRI, 2003) (see: Table 8). Globally, 75% of active mines and exploration areas were assessed to occur in areas of high conservation value and high water stress basins, and more than 25% of active mines and exploration overlap

[44] Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. It stretches across all 27 EU countries, both on land and at sea. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive. For more information, please see: https://ec.europa.eu/environment/nature/natura2000/index_en.htm

[45] https://www.coe.int/en/web/bern-convention

with/fall within the radius of 10 km from a strictly protected area. About a third of all active mines and exploration sites are located within ecosystems either intact of with a high conservancy value.

The International Union for Conservation of Nature (IUCN) Red List assessments indicate that 16.5% of vertebrate pollinators are threatened with global extinction (increasing to 30% for island species). In the EU alone, around 84% of crop species and 78% of wild flower species depend, at least in part, on animal pollination. Up to almost EUR 15 billion of the EU's annual agricultural output is directly attributed to insect pollinators (EC, 2018).

Table 8. Potential environmental and social impact of mining

Stage	Activities	Potential impact
Exploration	• Geophysical/ airborne surveying • Drilling/trenching • Trench blasting • Exploration camp development • Road construction	• Habitat loss/ fragmentation • Runoff of sediments/ increased suspended sediment load to surfacewater • Disturbance to wildlife and local communities • Increased demand for local water resources • Spills of fuels and other contaminants • Increased colonization due to road development • Species loss due to hunting
Site Preparation/ Mineral Extraction	• Mine construction (vegetation removal, stripping of soils) • Mine infrastructure development (power lines, roads,etc.) • Construction of plants, offices, buildings • Mine camp construction • Creation of waste rock piles • Creation of low- and high-grade ore stockpiles • Blasting to release ores • Transport of ore to crushers for processing	• Habitat loss/ fragmentation • Chemical contamination of surface and ground waters • Declining species populations • Toxicity impacts to organisms (terrestrial and aquatic plants and animals) • Altered landscapes • Increased demand for water resources • Increased demand for electrical power • Increased erosion and siltation • Altered patterns of drainage and runoff • Dust/fumes from explosives • Increased colonization due to road development • Species loss due to huntin
Processing/Smelting	• Milling/grinding ore • Chemical leaching/concentration of ore • Smelting/refining ore	• Discharge of chemicals and other wastes to surface waters • Emissions of sulfur dioxide and heavy metals • Increased demand for electrical power
Transport to final markets	• Packaging/loading of final product • Transport of product	• Noise disturbance • Dust/fumes from stockpiles
Mine closure/ Post-Operation	• Reseeding/ revegetation • Re-contouring waste piles/ pit walls • Fencing dangerous areas • Monitoring seepage	• Persistent contaminants in surface and groundwaters • Expensive, long-term water treatment • Persistent toxicity to organisms • Loss of original vegetation/biodiversity • Abandoned pits/shafts that pose hazards and health risks to humans • Windborne dust

Source: WRI, 2003

Biodiversity protection

The Convention on Biological Diversity (CBD) is an international legal instrument addressing protected areas (CBD 1992). The term "protected area" is defined in Article 2 of the Convention as "a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives".

The International Union for Conservation of Nature defines 'protected area' as *a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values* (IUCN, 2008).

The Bern Convention (Council of Europe, 1979) is a binding international legal instrument in the field of nature conservation, covering most of the natural heritage of the European continent and extending to some States of Africa. The Convention was open for signature on 19 September 1979 and came into force on 1 June 1982. It is the only regional Convention of its kind worldwide, it is particularly concerned about protecting natural habitats and endangered species, including migratory species, as well as to promote European co-operation in this field.

Natura 2000 is the centrepiece of EU nature and biodiversity policy, and so it is the largest coordinated network of protected areas in the world[46] of nearly 26000 sites in the 27 EU countries, established under the 1992 Habitats Directive and covering almost 18% of the EU's land area. The European Commission's Guidance on Non-energy mineral extraction and Natura 2000 (EC, 2011) has the specific purpose of providing guidance on how best to ensure that Non-Energy Extractive Industry (NEEI) developments are compatible with the provisions of the EU Habitats (EC, 1992) and Birds Directives (EC, 2009) Natura 2000 is not a system of strict nature reserves from which all human activities would be excluded. While it includes strictly protected nature reserves, most of the land remains privately owned. The approach to conservation and sustainable use of the Natura 2000 areas is much wider, largely centered on people working with nature rather than against it. However, Member States must ensure that the sites are managed in a sustainable manner, both ecologically and economically. In this respect, the guidance focuses in particular on the procedures to follow under Article 6 of Habitats Directive and provides clarifications on certain key aspects of this approval process. This article does not exclude any industrial or extractive activity, but requires an appropriate assessment prior to make a decision on the permit. Therefore, according to the correct interpretation of Habitats Directive, a no-go criterion on mineral extraction wouldn't be coherent with its provision.

The European Commission EU 2030 Biodiversity Strategy[47] increases the ambition for the conservation of wild pollinators. It specifies specific commitments and actions to be delivered by 2030, as follows:

- Establishing a larger EU-wide network of protected areas on land and at sea through enlargement of existing Natura 2000 areas, with strict protection for areas of very high biodiversity and climate value.
- Launching an EU nature restoration plan[48]
- Introducing measures to enable the necessary transformative change through unlocking funding for biodiversity, and strengthening the governance framework
- Introducing measures to tackle the global biodiversity challenge. In particular, working towards the successful adoption of an ambitious global biodiversity framework under the Convention on Biological Diversity[49].

Specific aspects of pollinators protection

To address the issue of pollinators decline, in 2000, the fifth Conference of the parties of the Convention on biological diversity (CBD) established the international initiative for the Conservation and sustainable use of pollinators (also known as the international pollinator initiative – IPI) (CBD, 2018). The EU Pollinators Initiative was put forward by the Commission in June 2018 (EC, 2018) setting the framework for an integrated approach to address the decline of pollinators in the European Union,

[46] https://ec.europa.eu/environment/nature/natura2000/index_en.htm
[47] https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en
[48] https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030/eu-nature-restoration-targets_en
[49] https://www.cbd.int/convention/

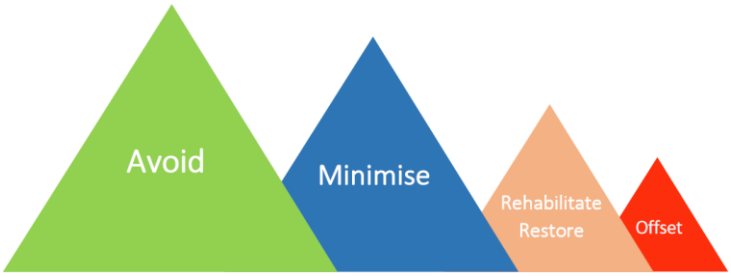
The Action 1 of the EU Pollinators Initiative triggers setting up the EU Pollinator Monitoring Scheme, which targets implementation of a standardized monitoring mechanism for pollinators. The Scheme is currently under development, but it is meant and designed to ensure the provision of robust information on pollinator and pollination trends. Once implemented it will ensure data on the status and trends of pollinator species, as well on pollination ecosystem service (Potts et al, 2021)[50].

5.2.2.2. Mitigation hierarchy as the best practice approach

As the priority, the site needs to meet legal and environmental requirements of Directive 2006/21/EC (EC, 2006), national or local mining legislation and other environmental legislation, such as an environmental impact assessment (EIA) (EC, 2014) according to Nature 2000, and the conservation of Natural Habitats and Wild Flora and Fauna (FFH) according to Directive 92/43/EEC and amendments (EC, 1992). European Commission developed the EU Guidance document on integrating ecosystems and their services in decision-making (Part 1, Part 2, and Part3) (COM(2019) 236). Chapter 2.3 of Part 1 outlines guiding principles for the successful integration of ecosystems services. It establishes the directions for the 'mitigation hierarchy' that ensures no net loss of healthy ecosystems and their services. It must be implemented with full care and transparency to effectively address impacts to nature (EC, 2020b). The guidance reflects EU environmental legislation, including Action 7 of the EU Biodiversity Strategy. The mitigation hierarchy adheres to four types of measures, as follows:

I. **Avoidance:** Identifying and completely avoiding detrimental impacts from the outset of a process. This includes monitoring and planning efforts before measures are implemented.
II. **Minimisation**: Reducing the extent of unavoidable impacts to ecosystems. This includes the duration and intensity of direct, indirect and cumulative impacts.
III. **Rehabilitation/Restoration:** Rehabilitating ecosystems that have been degraded or restoring ecosystems that have been cleared following impacts that could not be avoided or minimised.
IV. **Offsetting:** Compensating for all impacts to ecosystems that could not be avoided, minimised or restored.

Figure 4. Mitigation hierarchy- from most favorable actions to least favorable



Source: EC, 2020b

Raw material extraction should be covered by appropriate mitigation measures that aim at minimising biodiversity losses and guarantee appropriate recovery of the areas where extraction activities take place. Best Available Techniques (BAT) Reference Document for the Management of Waste from Extractive Industries (Garbarino et al, 2018), under BAT 4 emphasises the importance to identify all activities that may have impacts on biodiversity, in **the initial phase of project design and planning.** A baseline study is usually established as part of **the Environmental Risk and Impact Evaluation** (BAT 5) and is also essential as **a benchmark for monitoring**

[50] More information on EU Pollinator Monitoring Scheme can be access at: https://wikis.ec.europa.eu/display/EUPKH/EU+Pollinator+Monitoring+Scheme

programmes carried out during mining operation and after closure. Appropriate assessment is one of the three major steps that need to be undertaken under article 6.3 and 6.4 of the EU Habitats Directive (EC, 1992).

In this respect, the European Commission's Guidance on Non-energy mineral extraction and Natura 2000 (EC 2010) explains which mitigation measures to implement to minimize the environmental impacts on biodiversity. The monitoring is considered one of the guidance principle to ensure the correct application. It is also essential for assessing the performance of the rehabilitated areas. As previously mentioned, the risks that mining operations might pose to biodiversity and wild pollinators should be carefully managed and taken into account before the excavation begins. These can only be verified by providing full documentation of the extraction activity, including the environmental recovery plan and the environmental impact assessment report (Donatello, 2021).

The rehabilitation management plan must state the objectives for the rehabilitation of the quarry. A conceptual final landform design, including the proposed post-quarry land use should be included and specific details on the implementation of an effective revegetation program should be provided. The rehabilitation and regeneration programmes should also take into account the Regulation (EU) No 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (Arcadis, 2020)

Raw materials can also be supplied from outside of the EU. Consequently, some form of equivalence is needed to ensure that raw material extraction for the production of EU Ecolabel products is not disturbing protected areas outside of the EU. Specific reference is made to Emerald sites and general reference is made to nationally protected areas.

5.2.2.3. Adjustments proposed for Criterion on extraction of minerals

The requirement is proposed **to be expanded to all excavation sites**, to ensure implementation of the mitigation hierarchy at all sites. In this line, the proposed revised criterion is fully harmonised with criterion 1.1. laid down by Commission Decision (EU) 2021/476 establishing EU Ecolabel criteria for hard floor covering.

As the priority, the site needs to meet legal and environmental requirements of Directive 2006/21/EC, national or local mining legislation and other environmental legislation, such as EIA (EC, 2014), assessment according to Nature 2000 and the conservation of Natural Habitats and Wild Flora and Fauna (FFH) according to Directive 92/43/EEC and amendments (EC, 1992).

The requirement ensures appropriate recovery of the areas where extraction activities take place. These can only be verified by providing full documentation of the extraction activity including the environmental recovery plan and the environmental impact assessment report. Rehabilitation may be progressive or only at the end of the quarry life. In all quarries some degree of progressive rehabilitation should be possible. Some pre-date the 2011/92/EU EIA Directive and even the 2001/42/EC Directive on Strategic Environmental Assessments. Consequently, not all quarries will have an EIA, and it is possible that the result of an EIA screening procedure will be that an EIA is not needed. In such cases, the results of the screening procedure should be provided (Donatello, 2021).

The proposed criterion is also in line with the EU Soil Strategy ([51]), which sets prevention of soil and land degradation.

Criterion 3 addresses recycled/recovered materials used in growing media.
After the EUEB meeting held in November 2021, only few changes occurred for consistency reasons.

[51] EU Soil Strategy COM(2021) 699 final

5.2.3. Criterion 2.3. Mineral growing media use and after use

Current Criterion on mineral growing media use and after use

This criterion is applicable to mineral growing media only.

The mineral growing media shall only be offered for use for professional horticultural applications.

The applicant shall offer customers a structured collection and recycling service, which may use third party service providers. The collection and recycling service shall cover a minimum of 70 % v/v of the applicant's sales of the product across the European Union.

Assessment and verification:

The applicant shall provide the Competent Body with a declaration that the mineral growing media is only offered for use in professional horticultural applications. A statement about the professional horticultural application of the product shall be included in the information provided to the end-user.

The applicant shall inform the Competent Body about the option(s) on offer of structured collection and recycling service and the results of the option(s) implemented. In particular, the applicant shall provide the following documentation and information.

Contract documentation between the manufacturer and the service providers.

Description of collection, processing and destinations.

Annual overview of the total sales volume of growing media in the European Union Member States and an annual overview of the sales volumes in areas of those Member States where collection and processing are on offer.

In case of new entrants, an estimation of the annual overview of the total sales volume of growing media in the European Union Member States and an estimation of the annual overview of the sales volumes in areas of those Member States where collection and processing are on offer, shall be provided. Real data shall be provided 1 year after the EU Ecolabel license is awarded.

Proposed revised criterion on mineral growing media use and after use (post public consultation and EUEB meting)

This criterion is applicable to mineral growing media only.

The applicant shall offer customers a structured collection and recycling service, which may use third-party service providers. The collection and recycling service shall cover a minimum of 70% of the applicant's sales, expressed in volume, of the product across the Union.

Assessment and verification:

The applicant shall provide the competent body with a declaration that the mineral growing media are only offered for use in professional horticultural applications. A statement about the professional horticultural application of the product shall be included in the information provided to the end-user.

The applicant shall inform the competent body about the option(s) on offer of structured collection and recycling services and the results of the option(s) implemented. In particular, the applicant shall provide the following documentation and information.

- contract documentation between the manufacturer and the service providers.
- description of collection, processing and destinations.
- annual overview of the total sales volume of growing media in the European Union Member States and an annual overview of the sales volumes in areas of those Member States where collection and processing are on offer.

In the case of new entrants, an estimation of the annual overview of the total sales volume of growing media in the EU Member States and an estimation of the annual overview of the sales volumes in areas of those Member States where collection and processing are on offer, shall be provided. Real data shall be provided one year after the EU Ecolabel licence is awarded.

Rationales behind the proposed criterion

Aim

The criterion is specific to mineral growing media and sets its use only for professional horticultural applications. Additionally, the criterion sets the minimum recycling rate of the applicant's sales.

Main outcomes from stakeholders' consultations

45% of inquired stakeholders considered that the criterion is adequate and does not need to be changed, whereas 27% and 5% indicated the need for deep or light revision, respectively.

Changes after the public consultation

After the public consultation, the horticultural application was specified adding "green walls and green roofs", which are mentioned in the amended version of the Fertilising Products Regulation (delegated act amending the provisions for Annex I, Growing Medium). This specification was reported also where mineral growing media are defined.

Brief analysis of technical and legal aspects

The ambition level of the recycling rate cannot be risen due to lack of data about most of the players in the market. However, the formulation of the current criterion needs a small clarification regarding the units used for the recycling rate of the sold mineral growing media. The criterion currently states: "The collection and recycling service shall cover a minimum of 70% v/v of the applicant's sales of the product across the European Union." The use of "v/v" is not correct in this context because the quantity of 70% is not a concentration, but it is a share of the sold amount expressed in volume.

In the last revision of the criteria, the investigation of growing media made of blends of organic and mineral components revealed that the technological development did not allow a proper recycling of the material. After some years, the research is still under development, so that the recycling of growing media made of blends of organic and mineral components is still not feasible.

Proposed revised criterion

Due to the lack of data about recycling performances of most of the market players, the amount of the recycling rate is proposed to remain the same. A specification about the unit of the recycling rate is proposed removing "v/v" and adding "expressed in volume", so that the sentence is structured as follows: "The collection and recycling service shall cover a minimum of 70% of the applicant's sales, expressed in volume, of the product across the European Union.
After the EUEB meeting held in November 2021, the sentence about the professional use of mineral growing media was removed, because this is specified in the definition of mineral growing media.

5.3.Criterion 3 – Organic components and recycled/recovered materials in growing media

Current Criterion on Recycled/recovered and organic materials in growing media
This criterion applies to growing media only. Growing media products shall contain a minimum percentage of recycled/recovered content or organic content, as follows:

(a) The growing medium shall contain a minimum of 30 % of organic constituents (expressed as volume of organic constituent per total volume of the final product); or

(b) The mineral growing medium shall contain mineral constituents manufactured from a process using at least 30 % of recycled materials (expressed as the dry weight of recycled/recovered materials per total dry weight of the input materials).

Assessment and verification:

The applicant shall declare the following information:

for the case (a): volume of organic constituents declared in Criterion 1 per total volume of the final product, or

for the case (b): dry weight of recycled/recovered materials per total dry weight of the input materials.

For the case (b), the applicant shall also declare the following information about the mineral constituents:

identification of raw material inputs, dry weight of the raw material input per total dry weight of the input materials, and origin, for each raw material input, and identification of recycled/recovered material inputs, dry weight of recycled/recovered material input per total dry weight of the input materials and origin, for each recycled/recovered material input.

Proposed revised criterion on Recycled/recovered and organic materials in growing media, (post public consultation and EUEB meeting)

Criterion 3 – Recycled/recovered and organic materials in growing media

This criterion applies to growing media only.

Growing media shall consist of organic or recycled/recovered content, in accordance with either of the following:

(a). the growing medium shall consist of at least 30% of organic components (expressed as volume of organic components per total volume of the final product), or;

(b). the growing medium shall consist of mineral components manufactured from a process using at least 30% of recycled/recovered materials (expressed as the dry weight of recycled/recovered materials per total dry weight of the input materials)

Assessment and verification:

The applicant shall declare the following information:

- *for case (a): volume of organic components declared in Criterion 1 per total volume of the product, or;*
- *for case (b): dry weight of recycled/recovered materials per total dry weight of the input materials.*

For the case (b), the applicant shall also declare the following information about the mineral components:

- *Identification of raw material inputs, reporting amounts as dry weight and origins,*
- *Identification of recycled/recovered material inputs, reporting amount and origin, which is to be supported by invoice or verification document provided by the supplier of the material.*

Rationales behind the proposed criterion

Aim

The criterion sets the minimum requirements for recycled/recovered content or organic content in growing media. The revision mainly assessed the appropriateness of the requirements, including supporting documents for the origin of the recycled material used for the production of mineral growing media.

Main outcomes from stakeholders' consultations

65% of inquired stakeholders considered that the criterion is adequate and does not need to be changed, whereas 5% and 8% indicated the need for deep or light revision, respectively.

Technical and legal aspects

The current criterion still reflects the available technologies in the market. The minimum share of organic component content in growing media was based on common formulations of expanded minerals and organic constituents, which vary from 1:1 v/v to 1:3 v/v. Whereas, the minimum percentage of recycled material used in the production of mineral growing media was set to 30%, because higher percentages would affect the quality of the final product, and would hinder the compliance of the product with the Note Q of the CLP Regulation (EC, 2008b).

When talking about recycled/recovered materials, the reference policy about waste is the Waste Framework Directive 2008/98/EC, which technically defines, among others, the words "recovery" and "recycling".

A documentation about the used recycled/recovered material is currently missing.

Proposed revised criterion

Since the criterion still reflects the current technologies available on the market, no important changes are proposed. However, according to the Directive 2008/98/EC, the definitions of 'recovery', 'material recovery', and 'recycling' are suggested to be incorporated into the Preamble of the Annex to the revised Commission Decision.

- 'recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations;
- 'material recovery' means any recovery operation, other than energy recovery and the reprocessing into materials that are to be used as fuels or other means to generate energy. It includes, inter alia, preparing for re-use, recycling and backfilling;
- 'recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Specific documents are requested about the amount and origin of recycled material used for the production of mineral wool. Finally, the word "constituent" was substituted with the word "component" to harmonise wording in the whole document.

This criterion is also in line with the EU Soil Strategy ([52]), which prevents the soil exploitation and promotes circularity of nutrients and minerals.

After the EUEB meeting held in November 2021, only editorial changes occurred.

5.4. Criterion 4 – ~~Excluded and r~~Restricted substances

All the sub-criteria of criterion 4 are in line with the EU Soil Strategy, which prevents soil pollution.

5.4.1. Criterion 4.1 – Limits for Heavy metals

Current Criterion on Limits for Heavy metals

[52] EU Soil Strategy COM(2021) 699 final

This criterion applies to growing media, soil improvers and mulch.

(a). Soil improvers, mulch and organic constituents of growing media

For soil improvers, mulch and organic constituents of growing media, the content of the following elements in the final product or constituent shall not exceed the values shown in Table, measured in terms of dry weight of product.

Table. Heavy metals limits for Soil improvers, Mulch and organic constituents of growing media

Potentially Toxic Elements (PTE)	Symbol	Maximum content in the product (mg/kg DW)
Cadmium	Cd	1
Chromium (total)	Cr	100
Copper	Cu	100
Mercury	Hg	1
Nickel	Ni	50
Lead	Pb	100
Zinc	Zn	300

(b) Growing media

For growing media, the content of the following elements in the final product shall not exceed the values shown in Table , measured in terms of dry weight of product.

Table . Heavy metals limits for Growing media

PTE	Symbol	Maximum content in the product (mg/kg DW)
Cadmium	Cd	3
Chromium (total)	Cr	150
Copper	Cu	100
Mercury	Hg	1
Nickel	Ni	90
Lead	Pb	150
Zinc	Zn	300

The limit values set on Table and Table are valid unless national legislation is stricter.

Assessment and verification

The applicant shall provide the Competent Body with the test reports conducted in accordance with testing procedure indicated in respective EN standards in Table: In the case of organic constituents of growing media, the test reports may be provided by the suppliers.

Table. Standard methods of extraction and measurement of heavy metals

PTE	Symbol	Method of measurement	Method of extraction
Cadmium	Cd	EN 13650	For soil improvers, mulch, organic constituents of growing media and growing media, except mineral growing media EN 13650 Soil improvers and growing media - Extraction of aqua regia soluble elements For mineral growing media EN 13651 Soil improvers and growing media - Extraction of calcium chloride/DTPA (CAT) soluble nutrients and elements
Chromium (total)	Cr	EN 13650	
Copper	Cu	EN 13650	
Mercury	Hg	EN 16175	
Nickel	Ni	EN 13650	
Lead	Pb	EN 13650	
Zinc	Zn	EN 13650	

Revised criterion on Limits for Heavy metals (post public consultation and EUEB meeting)

Criterion 4.1 Limits for heavy metals

This criterion applies to growing media and soil improvers.

Criterion 4.1(a) Limits for heavy metals in soil improvers

The content of the following elements in the product shall not exceed the values shown in Table 2, measured in terms of dry matter (DM) of the product.

Table 2. Heavy metals limits for soil improvers

Heavy metal	Maximum content in the product (mg/kg DM)
Cadmium (Cd)	1
Chromium total	100
Copper (Cu)	200
Mercury (Hg)	0.45
Nickel (Ni)	40
Lead (Pb)	100
Zinc (Zn)	300
Inorganic Arsenic (As)	10

Criterion 4.1(b). Limits for heavy metals in growing media

The content of the following elements in the product shall be lower than the values shown in Table 3, measured in terms of dry matter (DM) of the product.

Table 3. Heavy metal limits for growing media

Heavy metal	Maximum content in the product (mg/kg DM)	
	Mineral growing media	Growing media other than mineral growing media
Cadmium (Cd)	1.3	1.3
Chromium VI(Cr VI) (*)	2	Not applicable
Chromium total	~~100~~310	100
Copper (Cu)	200	200
Mercury (Hg)	0.45	0.45
Nickel (Ni)	40	40
Lead (Pb)	100	100
Zinc (Zn)	300	300
Inorganic Arsenic (As)	10	10

~~(*)To be measured in mineral growing media only.~~

Assessment and verification

The applicant shall provide the competent body with the ~~results of test~~ reports of tests conducted according to existing EN standards or testing procedures that are performed in a reliable and reproducible manner.

For chromium total content the applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure indicated in EN 13650.

In growing media of solely mineral components, the limit for nickel shall refer to its bioavailable content.

Rationales behind the proposed criterion

Aim

The requirement effectively prevents or minimises a risk of exposure to potentially toxic elements (PTEs) during the normal lifetime of the product. It also prevents possible release of these substances into environment (including food -chain).

The currently valid criterion stands on the limits proposed under the EoW criteria for Biodegradable waste project and the JRC Measurement Campaign (Saveyn and Eder, 2013). The validity of the reference values for each element and required test methods needs to be analysed and tailored to fit the EU fertilising product policy and best practices approach (Farm to Fork Stategy[53], Guyomard et al. 2020, EC 2019). On that account, the intention of the revision is to establish the PTEs' reference values that, to the current state of knowledge, are assumed as being safe for the environmental and human health, and that, as a minimum, meet mandatory legal requirements established by Fertilising Product Regulation.

This chapter identifies and systematises information, which has been collected from different sources, such as specific survey on currently licensed products, legal requirements established by the FPR, several Member States

[53] https://ec.europa.eu/food/farm2fork_en

legal requirements and quality assurance standards (QAS), as well as information identified across available scientific literature. Correlation of the data captured sheds light on the best performance practices as well as clarify the magnitude of the necessary revision.

Main outcomes from stakeholders' consultations

32% of inquired stakeholders considered that the criterion is adequate and does not need to be changed, whereas 30% and 18% indicated the need for deep or light revision, respectively. Stakeholders reiterated the need to harmonise the criterion with the EU Fertilising Product Regulation. The reference test methods should also be revised, and if possible, more than one method ought to be accepted.

The discussion among stakeholders during the technical sub group meetings in June 2021 pointed out following aspects of the revision:

- The preference to maintain reference value for Cr (VI). This is due to the possible spontaneous change of the oxidation stage of Cr(III) to Cr(VI).
- Need to reduce ambition level for the Cu content that is an essential plants' nutrient:
  - If the limit value proposed by JRC is chosen (100 mg/kg DM), a derogation about the test method could be granted to mineral growing media, whose content of Cu should be measured with EN 13651 addressing bioavailable Cu content.
  - If the limit value proposed by FPR is chosen (200 mg/kg DM), the measurement method could be the aqua regia method (EN 13650), which measures the total content of Cu in the product.
- To modify the current scope of the criterion (components of the final product) and refer to the final product. This is in line with the provision of the FPR.
- It was underlined that there are regions with the high natural content of As in soil. Nevertheless, setting a different value for material coming from specific areas would require the verification of the origin of the final product (hence, its components). Stakeholders assumed as highly complicated to establish a specific procedure depending on the origin of the material.
- It was also proposed to align heavy metal limits to the Organic Farming Regulation and establish the same limit values for both soil improvers and growing media.

During the public consultation, stakeholders notified the importance to maintain the requirement for total Cr content. It was assessed that *"for organic materials such as soil improvers, it is meaningless to seek to measure Cr(VI) as it is virtually all "captured" by the organic matter and converted to Cr(III), and the result is nearly always zero. There is simply no point in requiring a test of a non-existent parameter. Due to redox reactions, there is always a balance between the different valences of the chromium. If there are large quantities of chromium III, they may be transformed into Cr(VI) in certain circumstances (such as an acidification of the soil). It is therefore important to limit total chromium (…) but add the limit for Cr(VI) for mineral growing media,".* It was also stated that the organic farming Implementing Act fixes the total chromium limit at 70 mg/kg.

It was also suggested to set the Nickel threshold at 40 ppm so that the value could be aligned with the threshold set by some Member States and institutions (see Table 10).

Shortly before the EUEB meeting held on March 2022, a stakeholder flagged that the limit concentration of Cr (TOT) was not possible to be met by mineral growing media.

5.4.1.1. Link between environmental impacts and the presence of potentially toxic elements (PTEs) in soil

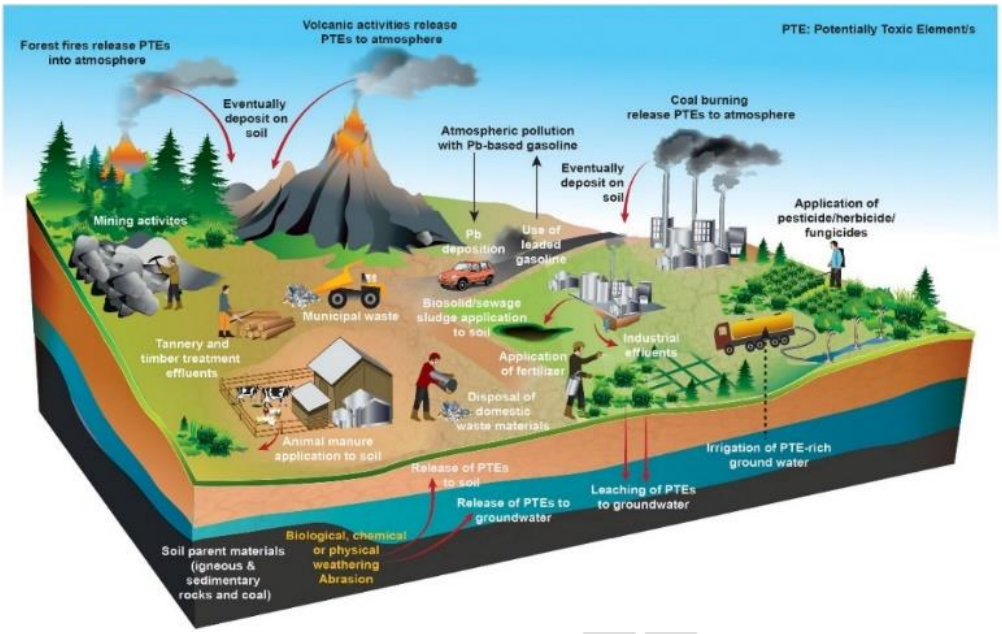
The PTEs occur naturally in different concentrations or can have anthropogenic origin due to accumulation of these elements in soils by the repeated addition of some fertilising products, sludges and waste products, but also animal

manures (due to animal diet or veterinary drugs). The distribution of PTE (PTEs: As, Cd, Co, Cr, Cu, Fe, La, Mn, Ni, Pb, Sc, Th, V) in soils is controlled by parent-rock geochemistry, climatic and geomorphologic conditions, time of weathering exposition, texture of soils, living organisms (bacteria, fungi, vegetation and animals) and several anthropogenic input (Marina et al" 2017). It has been reported that metals such as cobalt (Co), copper (Cu), chromium (Cr), iron (Fe), magnesium (Mg), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se) and zinc (Zn) are essential nutrients that are required for various biochemical and physiological functions (WHO/FAO/IAEA, 1996), and are only harmful in excessive concentrations or cause dysfunctions with their deficiency. Other metals such as i.e. arsenic (As), cadmium (Cd), lead (Pb), mercury (Hg), nickel (Ni) are non-essential, having no established biological functions (Chang et al, 1996).

Some elements such as arsenic, cadmium, chromium, lead, and mercury due to their potential toxicity and carcinogenicity might be toxic even at very low concentrations and therefore, since plant uptake is the pathway through which heavy metals enter the food supply chain, are of the great public health significance (Tchounwou et al, 2014). Accordingly, the concern about the effects of soil pollution arises from potential health risks caused by (1) direct contact with the contaminated soil, (2) contamination of water supplies (surface runoff and infiltration), (3) inhalation of particles, (4) uptake by plants, and finally due to (5) potential toxicity for humans and other animals through food chain transfer or direct ingestion (FAO 2018, Hu et al 2017; Punshon et al 2017). The key factors governing the amendments' efficacy for PTEs immobilization in soils are influenced by physical, chemical, and biological factors, among them: temperature, soil pH, organic matter content, and chemical processes e.g. sorption/desorption and redox processes along with distribution of any element between the different forms and the ease with which one form may change into another, species characteristics, (Rodriguez Quintero et al 2015, Tchounwou et al 2014, Palansooriya et al 2020). Hence, limits for metal contents in soil are typically lower at lower pH values, which reflect their greater bioavailability. Most PTEs become harder for crops to take up as soil pH increases. However, selenium and molybdenum are taken up more easily as pH increases. (Rodriguez Quintero et al, 2015).

Annex I Part 2 to the Fertilising Product Regulation establishes the maximum allowed value for arsenic (As) content in soil improvers (PFC 3) and growing media (PFC 4). Two types of arsenic are found in the environment, being the inorganic form considered as the most harmful. Arsenic can be present in the soil naturally (i.e. bedrock weathering or volcanic) or can be result of anthropogenic activities (i.e. mining wastes, pesticide application, coal fly ash, wastewater sludge, phosphate fertilizers).

Figure 5. Sources of potentially toxic elements (PTEs) in the soil ecosystem



Source: Palansooriya et al, 2020

Consumption of staple foods such as rice, apple juice and vegetables grown in contaminated soil is recognized as a tangible route of human exposure to arsenic (Punshon et al, 2017). The Food and Drug Administration (FDA) assessed that the predicted risk of developing cancer at some point in life after having been exposed to inorganic arsenic in rice from ages 0 to 6 increases with the frequency of weekly servings (FDA, 2016). The World Health Organization (WHO) and Food and Agriculture Organization of the United Nations (FAO) set a maximum contamination level (MCL) for inorganic As in white (polished) rice of 0.2 mg/kg, along with the limit for natural mineral water of 0,01 mg/kg (FAO/WHO, 2017). The European Union set similar standards that included a lower MCL (0.1 mg/kg) for rice-containing baby foods (EC, 2015b).

Quantification of PTEs level in soil

In order to assess the final PTEs level in the soil, the PTEs content prior to application must be known, the application rate, the dry matter/moisture of the product and the usage (i.e. arable or grassland) is also required.

PTEs (mg/l) = Application rate x Concentration of element in SI or GM added / volume of soil

Where SI stands for soil improvers, and GM stands for growing media

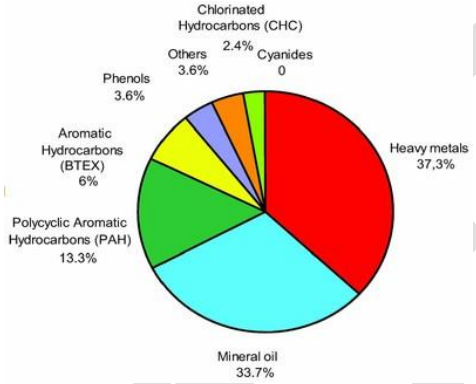
Note: The mass concentration of each PTE (mg/kg) can be obtained dividing the result by the value of soil bulk density.

Nevertheless, it is difficult to quantify the real extent of local soil contamination due to the lack of comprehensive inventories (FAO, 2015). Soil contamination can be diffuse and widespread or intense and localized (contaminated sites) (EEA,2019). At the moment, the most reliable tool for investigating the state and trend of heavy metals content in agriculture topsoil of European Union is that produced by Toth et al (2016a, 2016b). The data mapping is based on the LUCAS Topsoil Survey of the European Union and analyses up-to-date coverage of heavy metals (As, Cd, Cr, Cu, Hg, Pb, Zn, Sb, Co and Ni) in the topsoil of the European Union (ESDAC, 2020)[54], making a spatial prediction of areas where local assessment is suggested to monitor and eventually control the potential threat from

[54] European Soil Data Centre (ESDAC), esdac.jrc.ec.europa.eu, European Commission, Joint Research Centre

heavy metals. The study concluded that one or more of the elements exceeds the applied threshold concentration[55] on the area that corresponds to 28.3% of the total surface area of the EU (1.2 Mkm2). However, the study does not differentiate the origin of the pollutant (natural background or anthropogenic pollution). EEA EIONET NRC Soil Network[56] assessed that mineral oil and heavy metals are the main contaminants contributing to around 60% to soil contamination (EEA, 2019). While the immense majority of European agricultural land can be considered adequately safe for food production, an estimated 6.24% or 137,000 km2 needs local assessment and eventual remediation action (Toth et al, 2016b).

Figure 6. Overview of contaminants affecting soil and groundwater in Europe



Source: EEA, 2020[57]

5.4.1.2. Brief explanation of legal and technical aspects

The level of contaminants in fertilizers must be restricted because accumulation in time may lead to adverse effects including excess uptake by arable crops, leaching to groundwater or impact on the soil ecosystem.

Quality requirements for specific fertilising product, such as the maximum allowed limit values for heavy metals (cadmium, chromium, mercury, nickel, lead and arsenic) for each Product Function Category, among them organic and inorganic soil improvers (PFC 3(A) and PFC3(B)) and growing media (PFC 4) are specified in Annex I Part 2 to the Fertilising Product Regulation. For compost and digestate products, the FPR requirements are, similarly to the criterion under revision, largely based on the End of Waste Criteria for Biodegradable Waste Subjected to Biological Treatment (Saveyn, H. and Eder, 2013). In addition to requirements covering the production process and product quality, only separately collected organic waste is permitted as input materials for composting and anaerobic digestion.

5.4.1.3. Analysis of the ambition level of the currently valid criterion 5.1

Table 9. compares the maximum allowed limits values for heavy metals content in a fertilising product established by FPR and by EU Ecolabel for the given product group[58]. For the analysis of soil improvers category, the EU Ecolabel requirements were contrasted with values settled down under Product Function category PFC 3(A) - Organic Soil Improvers (EC, 2019a). For soil improvers, mulch and organic constituents of growing media the EU Ecolabel ambition level for heavy metals content is on average equal or higher when referring to the FPR limits. For growing media in the most unfavourable cases, the ambitious level of EU Ecolabel for maximum allowed content of cadmium, nickel, and lead is 100, 80, and 25%, respectively, lower than FPR limits, and therefore requires further revision.

[55] Threshold values were established as proposed by the Finnish Ministry of Environment Ministry of the Environment, Finland. Government Decree on the Assessment of Soil Contamination and Remediation Needs. 214/2007 (March 1, 2007)
[56] The European Environment Information and Observation Network (Eionet)
[57] The European Environmental Agency. Contamination from local sources. Available at: https://www.eea.europa.eu/themes/soil/soil-threats
[58] *Note:* the unit established by the FPR is kg per dry mass, and by EU Ecolabel kg per dry weight. The units are considered equivalent

Table 9. Maximum allowed limits for heavy metals content in a fertilising product established by Fertilising Product Regulation (EU) 2019/1009 (FPR) and EU Ecolabel Commission Decision 2015/2099 (EUEL).

Product	Soil Improvers			Growing media	
Contaminant	FPR		EUEL	FPR	EUEL
	PFC 3(A) Organic SI [mg/kg DM]	PFC 3(B) Inorganic SI [mg/kg DM]	Criterion 3.5(a) SI, M and organic constituents of GM [mg/kg DW]	PFC 4: GROWING MEDIUM [mg/kg DM]	Criterion 3.5(b) GM [mg/kg DW]
Cadmium (Cd)	2	1.5	1	1.5	3
Chromium (Cr) *NOT DIRECTLY COMPARABLE*	2 (Cr (VI)	2 (Cr VI)	100 (total Cr):	2 (Cr (VI)	150 (total Cr):
Copper (Cu)	300	300	100	200	100
Mercury (Hg)	1	1	1	1	1
Nickel (Ni)	50	100	50	50	90
Lead (Pb)	120	120	100	120	150
Zinc (Zn)	800	800	300	500	300
Inorganic arsenic (As)	40	40	x	40	x

Legend:

EU Ecolabel reference value is more restrictive than PFC3 or PFC4 threshold value
EU Ecolabel reference value is less restrictive than PFC3 or PFC4 threshold value
EU Ecolabel reference value is equal to PFC3 or PFC4 threshold value.

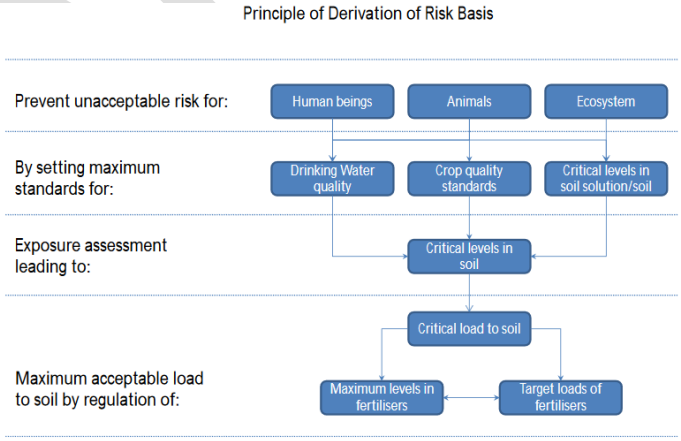
Note: SI: soil improvers; GM: growing media; M: mulches; DM: dry matter; DW: dry weight

Source: EC 2019, and EC 2015

5.4.1.4. Best practice analysis

The statuary risk basis analysis of potentially toxic elements commonly targets human health, (farm) animal health, ecosystem health, good quality crops, and leads to one limit level in soil, which addresses all protection targets, in the case of fertilisers – the maximum permitted levels (Ehlert et al, 2013).

Figure 7. Concept of risk basis to regulate level or loads of contaminants in fertilisers



Source: Ehlert et al, 2013

Besides mandatory requirements established by the FPR, in general, Member States have in place legal framework for soil improvers and growing media that establishes safety requirements for the potential environmental and human health impacts. Independently, quality standards and protocols have been developed to improve control of the composting process and to produce safe, consistent, and better performing material; e.g. the RAL compost

standard in Germany (UBA, 2017), CIC label in Italy (CIC, 2017), European Compost Network Quality Standard (ECN-QAS)[59], PAS100 standard in the UK[60] or AS 4454 standard in Australia[61].

In some countries different soil grades are distinguish e.g. in Austria or Spain. This triggers various sets of reference values for different product categories mainly in function of their final destination. Altogether, the information summarized in Table 10 zooms in on the overall picture of the possible scenario for the revision of maximum allowed content of PTEs. It is important to highlight that, as to the current knowledge and based on information collected, the standards used for quantitative assessment of heavy metals content across countries are still not unified.

[59] ECN-QAS, https://www.compostnetwork.info/ecn-qas/
[60] https://shop.bsigroup.com/ProductDetail?pid=000000000030360308
[61] AS 4454-2012. Composts, soil conditioners and mulches. Available at: https://infostore.saiglobal.com/en-au/standards/as-4454-2012-121773_saig_as_as_267608/

Table 10. Comparison of maximum permitted content of PTEs across several Member States and international Quality Assurance Standards (QAS) for soil improvers and growing media (Note: state as of February 2021)[62]

Member State/QAS	Regulation/Standard od reference	Cd	Crtot	CrVI	Cu	Hg	Ni	Pb	Zn	As
		mg/kg DM								
AT	Compost Ordinance Austria Class A+(organic farming) and Class A (hobby gardening)	0.7	70	x	70	0.4	25	45	200	x
	Compost Ordinance Austria Class A (hobby gardening)	1	70	x	150	0.7	60	120	500	x
FR	Fertilisers Regulation. French Decree n°80-478 (June 1980) specifies rules in term of labelling and declarations All GM are marketed through conformity to a mandatory standard (NF U 44-551, and its amendments).	2	150	x	100	1	50	100	300	x
	Standard NF U 44-051 (Organic soil improvers – descriptions, specifications and marking) and its amendments. *Note: When the compost meets the NF U 44-051 standard it becomes a product and is no longer considered waste.*	3	120		300	2	60	180	600	18
DE	„Düngemittelverordnung vom 5. Dezember 2012 (BGBl. I S. 2482) - Fertilisers	1.5(2.5)			900	1	80	150	5000	40
	Biowaste Ordenance Type I	1.5	100	X	100	1	50	150	400	x
	Biowaste Ordenance Type II	1	70	x	70	0.7	35	100	300	x
DK	Agriculture Ministry	0.8	100	x	1000	0..8	30	120	4000	25
IT	The national Law on Fertilizers (D.Lgs 75/2010 and subsequent amendments). The Decree establishes limits for heavy metals in soil improvers, liming materials, and the raw materials for the preparation of mineral-organic fertilizers CIC Quality Assurance Standard for Compost. Consorzio Italiano Compostatori (focused on composting and anaerobic digestion) of source separated bio waste, green waste and other organic waste feedstock	1.5	x	0.5	230	1.5	100	140	500	x
IRE		1.5	100	x	100	1	50	150	350	x
BE	Royal Decree, 28.012013 with subsequent derogations EM036 (2020). Compost	2	100	x	150	1	50	150	400	20
	Royal Decree, 28.012013 with subsequent derogations EM102 (2019). Digestate	6	500	x	600	5	100	500	2000	150
	Royal Decree, 28.012013 Growing media	1.5	x	x	50	1	20	50	200	x
EE	Environmental Ministry Regulations 31.07.2019 no 29 under Water Act § 172 (Use of sewage sludge in green area creation, cultivation and agriculture) and Environmental Ministry Regulation 08.11.2019 nr 61 under Water Act §128 (7), §129 (5), §130 (2) and (4)	3	100		50	1.5	50	100	300	x
	Fertilisers Act for fertilisers and the handling thereof (11.06.2003) and Ministry of the Agriculture Regulation 17.11.2014 no 101 for the composition of fertilisers by fertiliser type	3	50		600	2	100	100	1500	50
ES	Real Decree 506/2013 on Fertilisers Products and posterior amendments (Real Decree 999/2017),	0.7	70	x	70	0.4	50	45	200	x
	Cat A									
	Cat B	2.0	250	x	300	1.5	90	150	500	x
	Cat. C (used in the agriculture soil is permitted up to 2 tonne DM/ha/year)	3	300	x	400	2.5	100	200	1000	x
HU	Statutory rule 36/2006 (V.18) Statutory rule about licensing, storing, marketing and application of fertiliser products (last update 2017). The scope of the decree includes: -growing medium containing waste , growing medium not containing peat, worm humus, worm humus contain waste, soil improvers (except for limestone, dolomit and peat) , soil improvers containing waste, soil conditioners without and with waste	2	100	x	100	1	50	100	x	10
	-Compost	2	100	x	300	1	50	100	x	10
	-Growing medium contain peat(*)and peat(*)	2	100	x	100	1	50	100	x	30*

[62] *Notice:* Some Member States use national or laboratory methods for the determination of heavy metals in soil improvers and growing media, which increases the complexity of the robust comparison of limits value. For the objective of the criteria revision, the comparative table contains information that aims to serve as an indicative reference.

Member State/QAS	Regulation/Standard od reference	Cd	Crtot	CrVI	Cu	Hg	Ni	Pb	Zn	As
		mg/kg DM								
LU	Statuary system which relies on the German Quality Assurance System based also on the "Bundesgütegemeinschaft Kompost e.V. (BGK).	1.5	100	x	100	1	50	150	400	x
LV	Republic of Latvia Cabinet Regulation No. 506 Regarding the Identification, Quality Conformity Assessment and Sale of Fertilisers and Substrates (date of issue: September 1st 2015). Annex 3 Organic and organomineral fertilizers and liming materials, and plant growth promoters	3	x	x	x	2	100	150	x	50
	Growing media	2	100	x	100	1	50	100	300	20
PL	National Regulation on Fertilising products and fertilising Dz.U. 2007 nr 147 poz. 1033 Dz.U. 2008 nr 119 poz. 765 Organic fertilisers	5	100	x	x	2	60	140	x	x
	Growing medium	50	x	x	x	2	x	140	x	x
	Dz.U.2015.257 on sludges Content in sludges - Agriculture application Content in soil 0-25cm when sludge is used	20 1	500 50	x	1000 25	16 0.8	300 40	750 40	2500 80	x
LT	Decree of Ministry of Environment (D1-57/Jan 2007) /Decree of Ministry of Agriculture	2	100	x	100	1	50	100	300	20
NL	National Fertiliser Act (2008), Values reflected in the National Standard for compost	1	50	x	90	0.3	20	100	290	15
	Sewage sludge	1.25	75	x	75	0.75	30	100	300	15
	Organic fertilizer	0.8	50	x	50	0.5	20	67	200	10
	National organic products standard (mg/kg DM)	0.8	50	x	50	0.5	20	67	200	10
SE	Certifibrad Atervinning. Quality Assurance Standard	1	100	x	100	1	50	50	150	400
ECN - QAS	European Quality assurance scheme for compost and digestate. European Compost Network *Note: Copper and Zinc are also considered as trace elements. Values exceeding 100 mg Zu/kg DM, and 400 mg Zn/kg DM must be declared With the publication of the ECN Quality Manual 'ECN-QAS -European Quality Assurance Scheme for Compost and Digestate' in October2014, the European Compost Network (ECN) laid down harmonised requirements for national certification bodies and quality criteria for recycled materials from organic resources.*	1.3	60	x	300	0.45	40	130	600	x
AS 4454-2012	Australian Standard for Composts, Soil Conditioners and Mulches	1	100	x	150	1	60	150	300	20
RAL GZ -250	RAL-GZ 250. 2018. Substrate für Pflanzen. RAL. Deutsches Institut für Gütesicherung und Kennzeichnung E.V. Mai 2018	1.5	x	x	x	1	80	150	x	40
WRAP	WRAP, 2014: Guidelines for the Specification of Quality Compost for use in Growing Media, February 2014	1.5	x	x	200	1	50	200	400	x

Source: Communication with Member States representatives supported by screening of statuary requirements in several Member States

5.4.1.5. Analysis of the performance of currently licensed products as to the content of heavy metals restricted under the current criterion 4.1.

To evaluate the performance of currently licensed products and cross check the validity and stringency of applicable limit values, data were collected from 26 licensed soil improvers, mulches and organic components of growing media (current Criterion 3.5(a)), and from 5 growing media products, including mineral growing media (2 products) (current Criterion 3.5(b)). Table 11 summarises the information collected, whereas Figure 8 and Figure 9 illustrate the overall performance of licensed products as to heavy metals content. The figures systematise data collected, with each element being visualised separately and allocated to a specific product group, e.g. soil improvers and growing media.

Table 11. Analysis of the PTEs content in the EU Ecolabel product contrasted with the current EU Ecolabel limits (2020)

PTEs	Soil improvers, mulches and organic components of growing media [mg/kg DW]			Growing media [mg/kg DW]		
	Mean	Range *(min-max)*	EU Ecolabel [mg/kg DW]	Mean	Range *(min-max)*	EU Ecolabel [mg/kg DW]
Cadmium (Cd)	0.28	0.04-0.60	1	0.14	0.01 - 0.23	3
Mercury (Hg)	0.09	0.01- 0.50	1	0.013	0.002-0.021	1
Nickel (Ni)	4.93	0.20- 20.50	50	2.81	2.11 - 4.12	90
Lead (Pb)	9.74	0.16 – 46.0	100	3.43	0.4 - 5.51	150
Zinc (Zn)	51.77	4.5 – 202.0	300	33.47	30.7 - 38.1	300

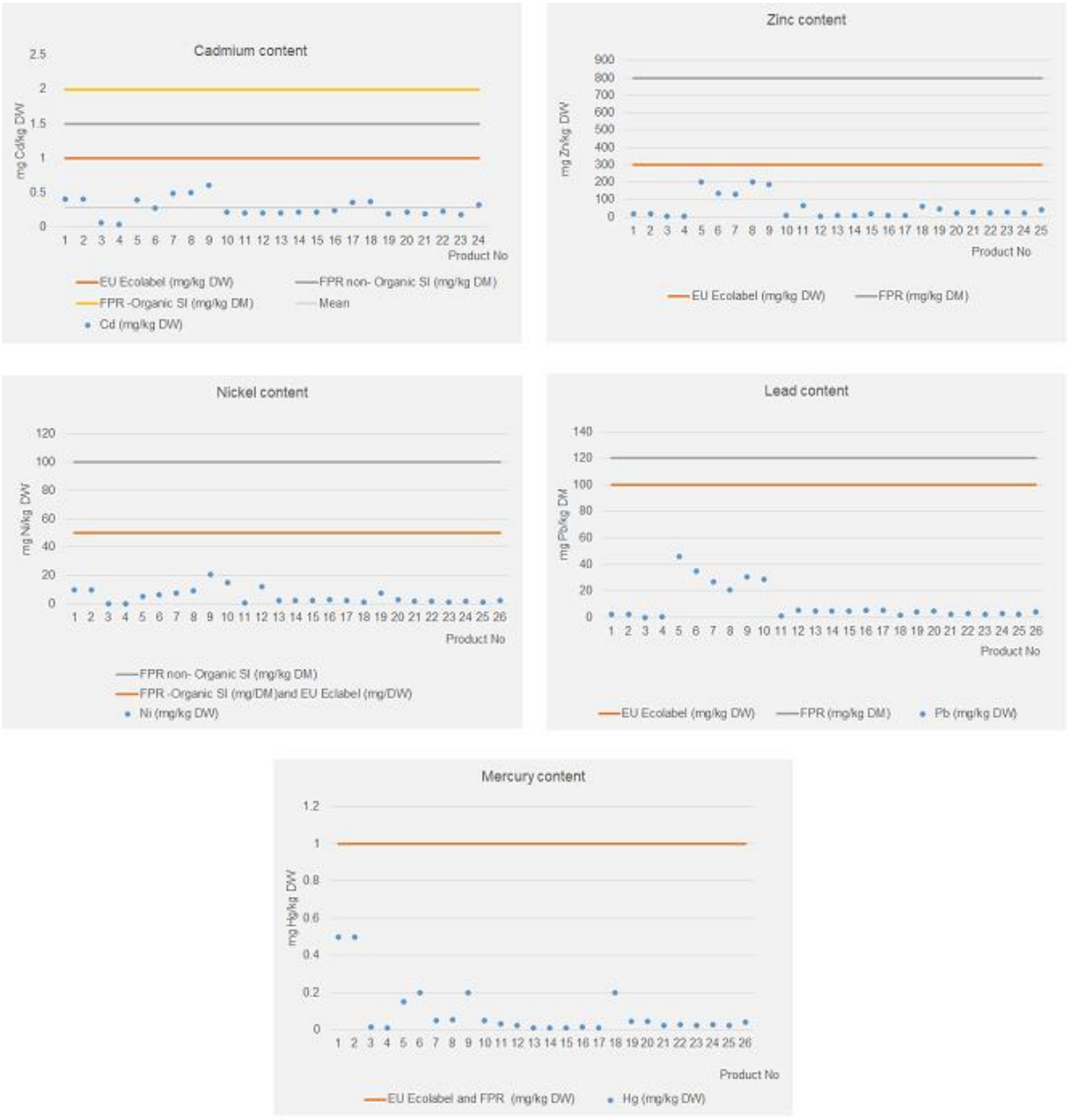
Source: Internal survey

Note: Due to the high level of aggregation of products with different origin (i.e. bio waste derived products with forestry material), broad data distribution and limited number of sample information collected should only be treated indicatively[63]. Similarly, the extrapolation of information on growing media, based on the performance of 5 samples (3 organic growing media, and 2 mineral growing media) should only be used as an additional asset for the criteria evaluation.

It is important to stress that for soil improvers, mulches and organic components of growing media Products No 5 to 9 (Figure 8) represent compost based on bio-waste from a separate collection, whereas other products refer to mulches or organic components of growing media such as i.e. hazelnut shells. The high concentrations of heavy metals in compost depend mainly on the chemical composition of the initial feedstock. It is well ascertained that municipal solid waste composts are rich in heavy metals and, among them, Zn, Pb, and Cu are generally present in the largest amounts (Smith 2009). Ehlert et al (2013) compiled information on the composition of fertilisers most commonly used in the Netherlands, concluding that: (...) *When considering all organic waste materials, animal manure is the main source of copper, zinc, mercury, nickel, chromium and arsenic in the total load to soils. Zinc and copper mainly originate from additives in feed; in addition to this copper in waste from hoof disinfection baths is the second most important source but remains poorly quantified. Compost is the main source of lead but also significantly contributes to the total load of arsenic, chromium, nickel, mercury and zinc. Mineral fertilisers are the main source of cadmium (...).* Considering the growing interest in the use of bio-waste as fertilisers, Castaldi (2004) studied the effects of compost based growing media on the growth, yield, and heavy metals concentrations of tomatoes [lead (Pb), cadmium (Cd), zinc (Zn), chromium (Cr), copper (Cu)], concluding that most metals strongly interacted with the organic matter of compost, limiting the heavy metals uptake by plants. Indeed, abundant number of studies confirm that the higher concentration of heavy metals in compost is not necessarily proportional to their uptake by a plant. The addition of compost to the growing substrate tends to reduce the metal bioavailability through pH increase (Paradelo et al 2020; Ostos et al 2008; Mininni et al 2015; Castaldi 2004). Possibly, high pH is related to the higher content of alkaline elements in compost (Mininni et al., 2015).

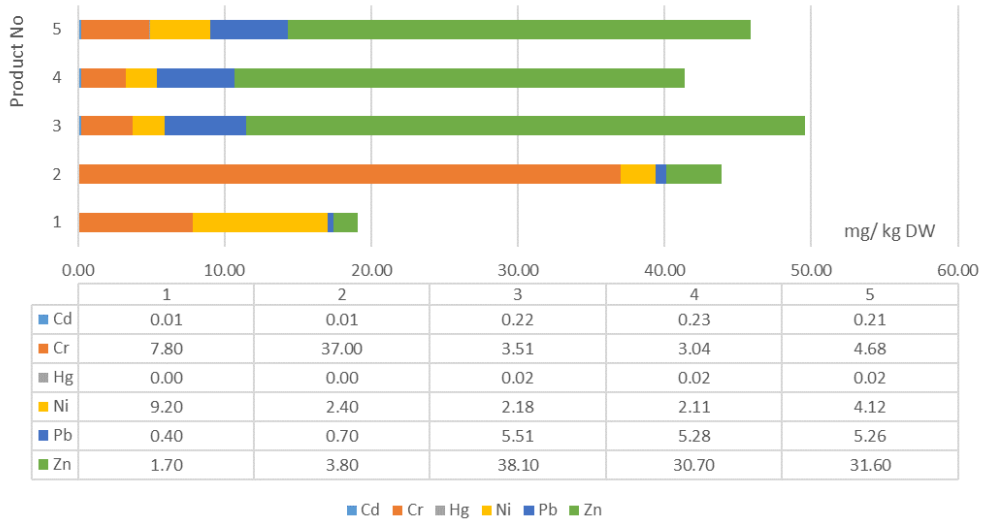
[63] The limited number of samples and the magnitude of differences between products do not allow performing the reliable statistical analysis (i.e. for Hg content in SI the standard deviation indicates the negative confidence interval for the mean). Standard deviation of a sampling distribution is its standard error. It measures variability in a data set informing about to which extent the individual numbers in the set are different from each other.

Figure 8. PTEs content in EU Ecolabel licensed soil improvers, mulches and organic components of growing media, including mineral growing media as to 2020



Source: Internal survey

Figure 9. Analysis of the PTEs content in EU Ecolabel licensed growing media including mineral growing media as to 2020



	1	2	3	4	5
Cd	0.01	0.01	0.22	0.23	0.21
Cr	7.80	37.00	3.51	3.04	4.68
Hg	0.00	0.00	0.02	0.02	0.02
Ni	9.20	2.40	2.18	2.11	4.12
Pb	0.40	0.70	5.51	5.28	5.26
Zn	1.70	3.80	38.10	30.70	31.60

Source: Internal survey

All in all, data collected indicate a very good overall performance of the licensed products.

For the most favourable case, almost 81% of SI products (21 data points) contain mercury in the range of 0,01 – 0.33 mg Hg/kg DW that, when referring to the upper data range, it is 77% beneath the EU Ecolabel limit value, whereas for GM the maximum reported Hg content is of 0.021 mg/kg DW.

The least favourable case has been observed for cadmium content in SI. 38% of products (10 samples) falls in the range of 0.208 – 0.378 mg Cd/kg DW that, when referring to the upper data range, is 62% beneath the EU Ecolabel limit value, whereas 23% of products contain cadmium in the range of 0.378 – 0.718 mg Cd/kg DW. For growing media the least favourable value of Cd content corresponds to 0.23 mg Cd/kg DW.

5.4.1.6. Summary of the best practice analysis and proposal for the revised limit values for the heavy metals content

The proposal for the revised PTEs values is based on the analysis of best practices established by the relevant quality assurance standards (WRAP 2014, ECN, RAL 2018) and legal requirements across several Member States. The information has been contrasted with data collected from the current license holders to check the feasibility of increasing the ambitious level. Table 12 sets the proposed revised limit values, which for some parameters are more stringent than those established by the FPR. The information sources that serve as a reference for the revised proposals are **marked in green**. The revised proposed reference values are **marked in red**. All proposed revised limit values accommodate the performance of the currently licensed products.

Table 12 Comparative analysis of reference values for PTEs established by Member States, FPR, and Quality Assurance Schemes. Proposal for the revised EU Ecolabel (EUEL) reference values.

PTE	EU national best practice* mg/kg DM	FPR SI mg/kg DM	FPR GM mg/kg DM	WRAP mg/kg DM	RAL GZ -250	ECN-QAS	Current value / PROPOSAL EUEL SI mg /kg DM	Current value / PROPOSAL EUEL GM mg/kg DM
Cadmium (Cd)	0.7-1.5	1.5 (2.0)	1.5	Target <0.5 Limit 1.5	1.5	**1.3**	**1/1**	3 / **1.3**
Chromium(VI)	n.a.	**2**	**2**	n.a	n.a.	n.a	x	**2***
Chromium total	50-**100**	200 (notification)		x	x	60	~~150~~100/**100**	150/~~**100**~~**310*** **150/100****
Copper (Cu)	25-200	300	**200**	Target <50 Limit 200	n.a.	300	100/**200**	100/**200**
Mercury (Hg)	0.3-1.0	1	1	Target <0.5 Limit 1.0	1	**0.45**	1 /**0.45**	1 / **0.45**
Nickel (Ni)	20-50	50 (100)	50	<50	80	**40**	50 /**40**	90/**40**
Zinc (Zn)	200-500	800	500	Target:<150 Limit 400	n.a.	600	**300** /**300**	**300**/**300**
Lead (Pb)	45 - 120	120	120	Target <50 Limit 200	150	130	**100** /**100**	150 /**100**
Arsenic (As)	**10**- 40	40	40	n.a.	40	n.a.	n.a. / **10**	n.a. / **10**

* To be measured in mineral growing media only.
** To be measured in growing media other than mineral growing media

Table 5 (page 7) analyses ambition level of the proposed criterion when compared with Fertilising Product Regulation.

Additional consideration that justify proposed revised reference values:

- Cadmium: The currently valid EUEL reference value for GM is higher than the threshold established by the FPR. It is proposed to harmonise the revised reference value with the ECN- QAS for compost and digestate (2018).

- Mercury: The currently valid EUEL reference value is harmonized with the FPR's requirement. It is proposed to further reduce the limit and harmonized reference value with the ECN-QAS for compost and digestate (2018).

- Chromium (VI) - The hexavalent chromium is regarded as genotoxic carcinogen and as the most hazardous form of Cr, which should be maintained as low as reasonably achievable. The former revision refers to total chromium content due to, of the time, lack of the standardized test method for Cr(VI). Most other regulatory standards are also based on total chromium monitoring. Due to the novelty of focusing Cr threshold on the hexavalent form, limited data are still available on the Cr(VI) content in soil improvers and growing media. According to the requirements set by FPR, when following the conformity assessment procedures, the manufacturer needs to provide information in the technical documentation concerning the total chromium content whenever it is above 200 mg/kg.-Technical sub-group experts were additionally consulted on the most appropriate option on how to address chromium content. Analysis of Cr(VI) was assumed as very difficult to be performed in organic soil improvers and growing media, also considering the current lack of reliable analytical methods. All in all, it was agreed to set requirements for Cr(total). The proposed revised

reference value (100 mg /kg DM) is based on national requirements for Cr(total), of which a lower range is 50-100 mg /kg DM (Table 10). Only measurements of Cr(VI) for mineral growing media were kept in the proposed criterion.

- Arsenic – The requirement that establishes a maximum permitted value for arsenic is not addressed under currently valid criterion 5.2(a), and (b). The former EU Ecolabel criteria for Soil improvers (Decision 2006/799/EC) and Growing media (Decision 2007/64/EC) required product to contain no more than 10 mg As/kg DW. The FPR establishes the limit of 40 mg As/kg DM. The maximum permitted content of As in growing media and soil improvers across some Member States varies between 10 and 50 mg/kg DM. Considering arsenic toxicity and its route of exposure (i.e. non-essential metal that occurs in food because it is present in soil and water and is taken up by plants), and also having in mind the permitted maximum arsenic content in soil improvers across several countries (see: Table 10) it is proposed to establish the reference value for As at the level of 10 kg/kg DM.

- During the technical sub-group meeting, considering that copper is a macronutrient for the plants, stakeholders proposed to harmonise the reference values for copper with those established by the FPR for growing media.

- Nickel. The revised reference value is proposed to be harmonised with ECN-QAS.

5.4.1.7. Assessment and verification

The test methods indicated for the assessment and verification are meant to be fully harmonised with the requirements established by the FPR and on-going work of the CEN Technical Committee. Most stakeholders that participated in the assessment of the criteria validity conducted via survey in October 2020 asked for ensuring the high level of consistency, in the criteria assessment and verification, between EU Ecolabel criteria and the Fertilising Products Regulation. This includes harmonising with EN standards developed/being developed by CEN TC 223.

The European Standard EN 13650 (Soil improvers and growing media - Extraction of aqua regia soluble elements) specifies a method for the routine extraction of aqua regia soluble elements from soil improvers or growing media. The Commission Delegated Regulation[64] introduces a specific derogation to the nickel (Ni) monitoring in a growing medium totally composed by mineral constituents and offered for professional use in horticulture, green roofs or green walls. This means that the nickel content analysis in mineral growing media should follow standarised analysis that measures its bioavailable nickel content (i.e. EN 13651).

Paragraph 5 of the FPR specifies that: "*In order to facilitate the assessment of conformity with the requirements of this Regulation it is necessary to provide for a presumption of conformity for EU fertilising products which are in conformity with harmonised standards that are adopted in accordance with Regulation (EU) No 1025/2012 of the European Parliament and of the Council (26) or with common specifications adopted in accordance with this Regulation. (...) If a conformity assessment body demonstrates conformity with the criteria laid down in harmonised standards it should be presumed to comply with the corresponding requirements set out in this Regulation".*

Accordingly, Article 13 - Chapter III of the FPR introduces the concept of presumption of conformity, as follows:

1. EU fertilising products, which are in conformity with harmonised standards or parts thereof, the references of which have been published in the Official Journal of the European Union, shall be presumed to be in conformity with the requirements set out in Annexes I, II and III covered by those standards or parts thereof.

[64] Pendant to be officially published in the Official Journal

2. Tests for verifying the conformity of EU fertilising products with the requirements set out in Annexes I, II and III shall be performed in a reliable and reproducible manner. Tests which are in conformity with harmonised standards or parts thereof, the references of which have been published in the Official Journal of the European Union, shall be presumed to be reliable and reproducible to the extent that the tests are covered by those standards or parts thereof (...)

The European standardisation organisations (CEN) is developing harmonised standards for testing methods to accompany FPR implementation and CE-Mark validation. The work is on-going but the adoption of CEN standards should be set whenever it is technically feasible before the date of the adoption of the Regulation. Otherwise, if for technical reasons it is not deemed feasible to develop a harmonised standard before 16 July 2022, CEN will adopt technical specifications in the form of European standardisation deliverables as a first step. These specifications could help manufacturers to prove conformity of their products with requirements of the Regulation until harmonised Standards can be developed.

Due to the dynamic nature of the work in progress, the recommended test methods will be detailed in the User manual. In this line, the draft amendment to Commission Implementing Decision C(2020) 612 final of 10.2.2020 on a standardisation request to the European Committee for Standardisation as regards the EU fertilising products in support of Regulation (EU) 2019/1009[65], indicates a revised list of harmonised standards for heavy metals detection in soil improvers and growing media to be drafted, with the deadlines for their adoption of 1 December 2024 (see the summarised information in Table 13).

Since it is not included in the heavy metals investigated in the FPR, for Chromium total content EN 13650 is proposed as analytical test method.

After the EUEB meeting held in November 2021:

- the nominal way of expressing the concentration of heavy metals was changed from mg/kg of dry mass, to mg/kg of dry matter in order to align the expression to that used in the FPR;
- the reference to the harmonised standards was removed because this concept is already stated in the general section of 'assessment and verification requirements'.

After the EUEB meeting held in March 2022, the limit value of Cr (TOT) only for mineral growing media was increased from 100 to 310 mg/kg DM, measured with EN 13650 or with future harmonised standards.

Future harmonised standards developed within the FPR will be based only on total mobilization of Cr, as it is currently done in EN 13650. The value of 310 mg/kg DM was based on the test reports of certified laboratories testing mineral growing media. Currently valid criteria allow to extract only the bioavailable content of Cr (TOT) in mineral growing media with EN 13651 and measured it with EN 13650. The possibility to extract only the bioavailable content (EN 13651) of Cr TOT cannot be granted any longer because the FPR allows that metals are only extracted mobilising the whole Cr (TOT) (e.g. using EN 13650) to obtain the complete content of the metal and not only the bioavailable portion. Within the FPR, the only exception is done for nickel in mineral growing media. In this way, the EC aims to prevent any further accumulation of Cr in soil and aims to decrease its human exposure. The fact that the spent mineral growing media can be recycled in the brick industry is not sufficient for an exception. The proposed criterion 2.3 allows that up to 30% of the spent mineral growing media has a different fate than recycling (e.g. in the brick industry). This portion of spent material should be disposed according to the rules in force in each Member State. However, usually the spent mineral growing media in EU are disposed in controlled landfills, where eventually Cr can leach into soil and groundwater. The EC wants to minimise this risk as much as possible. A future Delegated Regulation will set the limit of Cr TOT equal to 400 mg/kg DM, for any EU fertilising product containing thermal

[65]As of July 2021, Available at: https://ec.europa.eu/docsroom/documents/45687

oxidation materials, certain by-products and recovered high purity materials. Based on the available information, growing media do not normally contain such component materials, but 400 mg/kg DM is likely to become a limit in any of the EU fertilising products. One of the main objectives of this revision is the alignment with the FPR.

Additionally, the expression "test reports conducted in accordance with [...]" was substituted with the expression "reports of tests conducted in accordance with [...]". This change clarified that the test must be conducted in accordance with the specified standard. The original expression opened to the interpretation that the report should be produced according to the standard.

Table 13 List of harmonized standards for the determination of specific contaminants in soil improvers and growing media to be drafted

Contaminant	To use as basis the standards:
Determination of the cadmium, lead and nickel content	Extraction: *EN 13650 or EN 16964* Determination: *ISO 11885 or EN 16319 or EN 16963*
Determination of the chromium VI content:	*EN 15192 or ISO 17075-2*
Determination of the mercury content	*ISO 16772*
Determination of the inorganic arsenic content	Extraction: *EN 13650* Determination: *EN 16317*
Determination of the total chromium content	*EN 13650*
Determination of the total copper and zinc content	*EN 13650*
Determination of bioavailable nickel content (only in growing media)	*To be developed*

Source: EC, Internal Market, Industry, Entrepreneurship and SMEs, European Standards Notification System, July 2021[66]

5.4.2. Criterion 4.2. Polycyclic Aromatic Hydrocarbons (PAHs)

Current Criterion 5.2 on Polycyclic Aromatic Hydrocarbons
Proposed criterion 4.2 Limits for polycyclic aromatic hydrocarbons (PAHs) (post public consultation and EUEB meeting)

This criterion applies to growing media, soil improvers and mulch, with the exception of mineral growing media. The content in the product of the following polycyclic aromatic hydrocarbons shall be lower than the values shown in Table 4, measured in terms of dry matter of the product.

Table 4. Limit for PAHs

Pollutant	Maximum content in the product (mg/kg DM)
PAH_{16}	6

PAH_{16} = sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene and benzo[ghi]perylene

Assessment and verification:

[66] https://ec.europa.eu/growth/single-market/european-standards/notification-system_en#future

Current Criterion 5.2 on Polycyclic Aromatic Hydrocarbons **Proposed criterion 4.2 Limits for polycyclic aromatic hydrocarbons (PAHs) (post public consultation and EUEB meeting)**
The applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure indicated in EN 16181 Sludge, treated biowaste and soil - Determination of polycyclic aromatic hydrocarbons (PAH) by gas chromatography (GC) and high performance liquid chromatography (HPLC) or equivalent

Rationales behind the proposed criterion

Aim

It is well documented that some PAHs have toxic, genotoxic, carcinogenic and mutagenic properties (ECHA[67]). Their carcinogenicity is related to the ability to bind the DNA causing a series of disruptive effects that can result in tumor initiation (Abdel-Shafy and Mansour, 2016).

Currently valid criterion is, in general, in line with the requirements of the FPR Regulation. The EU Ecolabel accepts input materials that are from separated and "controlled" sources. No changes are proposed to be introduced.

Main outcomes from stakeholders' consultations

Within the questionnaire on the criteria validity, one-half of participants (53%) did not express any particular opinion in reference to the criterion's revision. 32% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 7% and 8% indicated the need to perform deep or light revision, respectively.

Stakeholders mainly indicated the urgency to harmonise the requirement with the FPR Regulation and argued the necessity to retain the criterion for all constituents of the final product.

Brief analysis of technical and legal aspects

Atmospheric contamination can be considered as the main source of PAHs deposition in soil. The PAHs may further accumulate in plants (e.g., vegetables) and other biota and be transferred to humans via the food chain, or they can strongly sorb on soil, where they can persist for long periods of time (Tao et al, 2004). According to Krzebietke et al (2020) regular application of large doses of manure (40 t/ha every two years) can also raise the load of PAHs in soil. Treated wastewater from industry used in composting of sewage sludge is also supposed to be an important source of PAHs (Kapanen et al, 2013). Approximately. 3 mg PAHs/kg was reported in sewage sludge (composted and non-composted), bio-waste and green waste compost, compost and digestate from source separation, digestate derived from manure/slurry, and digestate derived from renewable raw materials (Wood, 2019).

Of the hundreds of known PAHs, sixteen have been designated "*High Priority Pollutants*" by the US Environmental Protection Agency (US EPA); they include: naphthalene (NAP), acenaphthylene (ACY), acenaphthene (ACE), fluorene (FLU), phenanthrene (PHEN), anthracene (ANTH), fluoranthene (FLTH), pyrene (PYR), benzo[a]anthracene (B[a]A), chrysene (CHRY), benzo[b]fluoranthene (B[b]F), benzo[k]fluoranthene (B[k]F), benzo[a]pyrene (B[a]P), benzo[g,h,i]perylene (B[ghi]P), indeno[1,2,3-c,d]pyrene (IND), and dibenz[a,h]anthracene (D[ah]A). These 16 PAHs are of environmental concern because of their potential toxicity in humans and other organisms and their prevalence and persistence in the environment (IARC, 2006).

PAHs are also regulated in the protocol on persistent organic pollutants (POPs) for long-range, trans-boundary air pollution. The EU POP Regulation (EC, 2019b) includes PAHs in the list of substances subject to release reduction

[67] https://echa.europa.eu/nl/information-on-chemicals/cl-inventory-database

provision[68]. The eight PAHs congeners[69] are classified as known carcinogens of Category 1B acc. in Annex VI of Regulation (EC) 1272/2008 (Classification Labelling and Packaging, CLP Regulation). Additionally, Paragraphs 5 and 6 of entry 50 of Annex XVII to the REACH Regulation ((EC) No 1907/2006) restrict the placing on the market and supply to the general public of polycyclic aromatic hydrocarbons (PAHs) in articles and toys (including activity toys and childcare articles). Some PAHS are classified as substance of very high concern meeting the criteria of Article 57(a) of Regulation (EC) No 1907/2006 (REACH).

Possible limit values scenarios could be informed by the level at which existing safe limits have been set, i.e. national legislation. This assumes the existing limit values are risk based assessed and considered "acceptable" by the responsible organisations. (Saveyn and Eder 2013, Wood 2019)

- 1.5 mg/kg d.m. (France, Benzo[a]pyrene),
- 2.5mg/kg d.m. (France, Benzo[b]fluoranthene),
- 4 mg/kg d.m. (France, Fluoranthene),
- 6 mg/kg d.m. (Austria, PAH6),
- 3 mg/kg d.m. (Denmark, PAH11),
- 3 mg/kg d.m. (Norway, Slovenia PAH16),
- 4 mg/kg d.m. (Switzerland, PAH16),
- 5 mg/kg d.m. (Belgium, PAH16),
- 10 mg/kg d.m. (Luxembourg, PAH16).

According to the FPR, the content of 16 PAHs in the EU Fertilising products (compost and digestate) shall be **lower than 6 mg/kg dry matter**. The 16 PAHS include: *Sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene and benzo[ghi]perylene.* This requirement is fully harmonized with the currently valid EU Ecolabel requirement on limits for Polycyclic Aromatic Hydrocarbons (PAHs) (current Criterion 5.2.).

Conclusions

Currently valid criterion is, in general, in line with the requirements of the FPR Regulation. The EU ecolabel accepts input materials that are from separated and "controlled" sources.

After the EUEB meeting held in November 2021 the nominal way of expressing the concentration of heavy metals was changed from mg/kg of dry mass, to mg/kg of dry matter in order to align the expression to that used in the FPR.

After the EUEB meeting held in March 2022, the expression "test reports conducted in accordance with [...]" was substituted with the expression "reports of tests conducted in accordance with [...]". This change clarified that the test must be conducted in accordance with the specified standard. The original expression opened to the interpretation that the report should be produced according to the standard.

[68] For the purpose of emission inventories, the following four compound indicators shall be used: benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene.

[69] (Benzo[a]pyrene (BaP), benzo[e]pyrene (BeP), benzo[a]antracene (BaA), chrysene (CHR), benzo[b]fluoranthene, (BbF), benzo[j]fluoranthene (BjF), benzo[k]fluoranthene (BkF), dibenzo[a,h]antracene (DBAhA))

5.4.3. Criterion 4.3 and 4.4. Restrictions on substances and mixtures classified hazardous under Regulation (EC) No 1272/2008
Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) 1907/2006

A common preamble has been inserted for the horizontal hazardous substance restrictions – stating that the basis of assessing and verifying compliance with the criteria should be information included in Safety Data Sheets (SDSs) and declarations from chemical suppliers. This is to reduce the risk of possible misinterpretation of the legal text as to the level of detail that is necessary to determine the hazard classifications of the substances and mixtures in chemicals used.

Current Criterion 5.3 on Hazardous substances and mixtures

This criterion applies to growing media, soil improvers and mulch.

The final product shall not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitiser, or carcinogenic, mutagenic or toxic for reproduction hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council .

The product shall not contain substances or mixtures classified as toxic, hazardous to the environment, respiratory or skin sensitisers, or carcinogenic, mutagenic or toxic for reproduction in accordance with Regulation (EC) No 1272/2008 of the European Parliament and as interpreted according to the hazard statements listed in Table 7. Any intentionally added ingredient present at a concentration above 0.010% w/w (in terms of wet weight) in the product shall meet this requirement. Where stricter, the generic or specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall prevail to the cut-off limit value of 0.010% w/w (in terms of wet weight) mentioned above.

Table 7. Restricted hazard classifications and their categorisation

Acute toxicity	
Category 1 and 2	**Category 3**
H300 Fatal if swallowed	H301 Toxic if swallowed
H310 Fatal in contact with skin	H311 Toxic in contact with skin
H330 Fatal if inhaled	H331 Toxic if inhaled
H304 May be fatal if swallowed and enters airways	EUH070 Toxic by eye contact
Specific target organ toxicity	
Category 1	**Category 2**
H370 Causes damage to organs	H371 May cause damage to organs
H372 Causes damage to organs through prolonged or repeated exposure	H373 May cause damage to organs through prolonged or repeated exposure
Respiratory and skin sensitisation	
Category 1A	**Category 1B**
H317: May cause allergic skin reaction	H317: May cause allergic skin reaction
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
Carcinogenic, mutagenic or toxic for reproduction	
Category 1A and 1B	**Category 2**
H340 May cause genetic defects	H341 Suspected of causing genetic defects
H350 May cause cancer	H351 Suspected of causing cancer
H350i May cause cancer by inhalation	
H360F May damage fertility	H361f Suspected of damaging fertility
H360D May damage the unborn child	H361d Suspected of damaging the unborn child
H360FD May damage fertility. May damage the unborn child	H361fd Suspected of damaging fertility. Suspected of damaging the unborn child
H360Fd May damage fertility. Suspected of damaging the unborn child	H362 May cause harm to breast fed children
H360Df May damage the unborn child. Suspected of damaging fertility	
Hazardous to the aquatic environment	
Category 1 and 2	**Category 3 and 4**
H400 Very toxic to aquatic life	H412 Harmful to aquatic life with long-lasting effects
H410 Very toxic to aquatic life with long-lasting effects	H413 May cause long-lasting effects to aquatic life

H411 Toxic to aquatic life with long-lasting effects	
Hazardous to the ozone layer	
H420 Hazardous to the ozone layer	

The most recent classification rules adopted by the Union shall take precedence over the listed hazard classifications. In accordance with article 15 of Regulation (EC) No 1272/2008, applicants shall therefore ensure that any classifications are based on the most recent rules on classification, labelling and packaging of substances and mixtures
The hazard statements generally refer to substances. However, if information on substances cannot be obtained, the classification rules for mixtures shall apply.

Substances or mixtures which change their properties through processing and thus become no longer bioavailable or undergo chemical modification in a way that removes the previously identified hazard are exempted from criterion 5.3.

This criterion does not apply to those final products composed by:
- Materials not included in the scope of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), according its Article 2(2).
- Substances covered by Article 2(7)(b) of the Regulation (EC) No 1907/2006, which sets out criteria for exempting substances within Annex V of that Regulation from the registration, downstream user and evaluation requirements.

In order to determine if this exclusion applies, the applicant shall screen any intentionally added substance present at a concentration above 0.010% w/w (in terms of wet weight).

Assessment and verification:
The applicant shall screen the presence of substances and mixtures that may be classified with the hazard statements reported in this criterion. The applicant shall provide the Competent Body with a declaration of compliance with this criterion for the product.
That declaration shall include related documentation, such as declarations of compliance signed by the suppliers, on the non-classification of the substances, mixtures or materials with any of the hazard classes associated to the hazard statements referred in Table 7 in accordance with Regulation (EC) No 1272/2008, as far as this can be determined, as a minimum, from the information meeting the requirements listed in Annex VII to Regulation (EC) No 1907/2006.
The information provided shall relate to the forms or physical states of the substances or mixtures as used in the final product.

The following technical information shall be provided to support the declaration of classification or non-classification for each substance and mixture:
i. for substances that have not been registered under Regulation (EC) No 1907/2006 or which do not yet have a harmonised CLP classification: information meeting the requirements listed in Annex VII to that Regulation;
ii. for substances that have been registered under Regulation (EC) No 1907/2006 and which do not meet the requirements for CLP classification: information based on the REACH registration dossier confirming the non-classified status of the substance;
iii. for substances that have a harmonised classification or are self-classified: safety data sheets where available. If these are not available or the substance is self-classified then information shall be provided relevant to the substances hazard classification in accordance with Annex II to Regulation (EC) No 1907/2006;
iv. in the case of mixtures: safety data sheets where available. If these are not available then calculation of the mixture classification shall be provided according to the rules under Regulation (EC) No 1272/2008 together with information relevant to the mixtures hazard classification in accordance with Annex II to Regulation (EC) No 1907/2006.
Safety data sheets shall be provided for the materials composing the final product and for substances and mixtures used in the formulation and treatment of the materials remaining in the final product at a concentration above a cut-off limit of 0.010 % w/w (in terms of wet weight) unless a lower generic or specific concentration limit applies in accordance with the Article 10 of Regulation (EC) No 1272/2008.

Safety data sheets shall be completed in accordance with the guidance set out in sections 10, 11 and 12 of Annex II to Regulation (EC) No 1907/2006 (requirements for the compilation of safety data sheets). Incomplete safety data sheets shall require supplementing with information from declarations by chemical suppliers.
Information on intrinsic properties of substances may be generated by means other than tests, for instance through the use of alternative methods such as in vitro methods, by quantitative structure activity models or by the use of grouping or read-across in accordance with Annex XI to Regulation (EC) No 1907/2006.

The sharing of relevant data across the supply chain is strongly encouraged.

In the case of mineral wool, the applicant shall also provide the following:

(a). Certificate awarded for the right to use the European Certification Board for Mineral Wool Products trademark to demonstrate compliance with the Note Q within the Regulation (EC) No 1272/2008.
(b). Test report according to ISO 14184-1 Textiles - Determination of formaldehyde - Part 1: Free and hydrolysed formaldehyde

Criterion 5.4. — Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006

The final product shall not contain any intentionally added substances of very high concern and included in the list provided for in Article 59(1) of Regulation (EC) No 1907/2006, present in the final product in concentrations > 0,010 % in terms of wet weight.

Assessment and verification:
Reference to the latest list of substances of very high concern shall be made on the date of application. The applicant shall provide a declaration of compliance with criterion 5.4, together with related documentation, including declarations of compliance signed by the material suppliers and copies of relevant SDS for substances or mixtures in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits shall be specified in the safety data sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

Proposed revised Criterion on Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008 (post public consultation and EUEB meeting)

***Criterion 4.3* — Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008**

The criterion applies to soil improvers and growing media.

The product shall not be classified in accordance with any of the hazard classes, categories and associated hazard statements codes, in accordance with Regulation (EC) No 1272/2008, that are listed in the following paragraph.

The product shall not contain intentionally added substances or mixtures in concentration greater than 0.010% w/w (in terms of wet weight) that are assigned any of the following hazard classes, categories and associated hazard statement codes, in accordance with Regulation (EC) No 1272/2008.

- Group 1 hazards: Category 1A or 1B carcinogenic, mutagenic and/or toxic for reproduction (CMR): H340, H350, H350i, H360, H360F, H360D, H360FD, H360Fd, H360Df;
- Group 2 hazards: Category 2 CMR: H341, H351, H361, H361f, H361d, H361fd, H362; Category 1 aquatic toxicity: H400, H410; Category 1 and 2 acute toxicity: H300, H310, H330; Category 1 aspiration toxicity: H304; Category 1 specific target organ toxicity (STOT): H370, H372; and
- Group 3 hazards: Category 2, 3 and 4 aquatic toxicity: H411, H412, H413; Category 3 acute toxicity: H301, H311, H331; Category 2 STOT: H371, H373.

The hazard statement codes generally refer to substances. However, if information on substances cannot be obtained, the classification rules for mixtures shall apply.

The use of substances or mixtures that are chemically modified during the production process, so that any relevant hazard for which the substance or mixture has been classified under Regulation (EC) No 1272/2008 no longer applies, shall be exempted from the above requirement.

This criterion does not apply to those components composed of:

- substances not included in the scope of Regulation (EC) No 1907/2006 Article 2(2) of that Regulation.
- substances covered by Article 2(7)(b) of Regulation (EC) No 1907/2006, which sets out the criteria for exempting substances included in Annex V to that Regulation from the registration, downstream user and evaluation requirements.

In order to determine if this exclusion applies, the applicant shall screen any intentionally added substances or mixtures present at a concentration above 0.010% w/w (in terms of wet weight) in the product.

Assessment and verification:

The applicant shall provide a list of all relevant components and chemicals intentionally added in the production process, together with the relevant safety data sheets or chemical supplier declarations that demonstrate the compliance with the requirement.

Proposed revised Criterion on Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008 (post public consultation and EUEB meeting)

Any components or chemicals containing substances or mixtures classified under Regulation (EC) No 1272/2008 shall be highlighted.

The approximate dosing rate of the component or chemical, together with the concentration of the restricted substance or mixture in that component or chemical (as provided in the safety data sheet or supplier declaration) and an assumed retention factor of 100 %, shall be used to estimate the quantity of the restricted substance or mixture remaining in the product.

Justifications for any deviation from a retention factor of 100 % or for chemical modification of a restricted hazardous substance or mixture must be provided in writing.

For component or substances exempted from meeting the requirement of criterion 4.3 (see Annexes IV and V to Regulation (EC) No 1907/2006), a declaration to this effect by the applicant shall suffice to comply.

In the case of mineral wool, the applicant shall also provide the following:

(a). copy of a certificate awarded for the right to use the European Certification Board for Mineral Wool Products trademark as proof compliance with the Note Q of Annex VI to Regulation (EC) No 1272/2008;

(b). copy of a test report according to ISO 14184-1 Textiles - Determination of formaldehyde - Part 1: Free and hydrolysed formaldehyde

The above evidence can also be provided directly to competent bodies by any supplier in the applicant's supply chain.

Proposed revised criterion on Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) 1907/2006 (post public consultation and EUEB meeting)

Criterion 4.4 Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) 1907/2006

The criterion applies to soil improvers and growing media.

The product shall not contain any intentionally added substance meeting the criteria referred to in Article 57 of Regulation (EC) No 1907/2006 that has been identified according to the procedure described in Article 59 of that Regulation and included in the candidate list of substances of very high concern (SVHC) for authorisation.

Assessment and verification

The applicant shall provide a declaration that they have not intentionally added any SVHCs during their production process. This applicant declaration shall be supported by declarations and safety data sheets of all supplied chemicals and materials used to produce the EU Ecolabel product(s) – to confirm that no SVHC has been intentionally added to those supplied chemicals or materials.

Rationales behind the proposed criterion

Aim

The general structure of the horizontal hazardous substance criteria (preamble, horizontal SVHC restrictions and horizontal CLP restrictions) follows the general recommendations of the 1st and 2nd EU Ecolabel Chemicals Task Forces. The final product shall not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitizer, or carcinogenic, mutagenic or toxic for reproduction hazardous to the environment, in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council (EC, 2008b). The general approach above applies to criterion 5.3. and 5.4. but with the difference that no derogations can be made for SVHCs.

The basis for all information related to criteria 5.3. and 5.4 should be a REACH compliant Safety Data Sheet (SDS). If a hazardous substance is present in a product above a certain trigger concentration that is related to the hazards it presents, it must be listed in Section 3 of the SDS.

When the SDS reveals the presence of restricted hazardous substances, its use has to be quantified by estimating the total quantity of the substance added and dividing this by the total production volume of the EU Ecolabel product. This will provide a final product concentration that assumes that all added substance remains in the final product

and none of it reacts to form different products. This initial assumption can then be multiplied by factors that account for degrees of chemical reaction and any losses due to washing out of substances or so on.

Soil improvers and growing media are considered chemical mixtures. Accordingly, under current formulation of criterion 5.3 (CLP restrictions), the cut-off value of the screening of the product's composition for hazards shall be 0.010% w/w. As to the current criterion 5.4. (SVHC restriction) verification of SVHC concentrations in any product can only be verified by declarations from suppliers of ingoing ingredients, chemicals or materials. **REACH only requires** them **to declare if there is an SVHC above 0.1%. In this sense revise requirement on the SVHC restriction ensures that all ingoing ingredients are meeting the cut off limit of <0.1% w/w** (EC, 2006b). .

5.4.3.1. Compliance with REACH and CLP Classification

Compost and digestate

The organic constituents accommodated under the current EU Ecolabel criteria for soil improvers and growing media derive mainly from the processing and/or re-use of waste. Compost, digestate and biogas are covered by Article 2(7)(b) of the Regulation (EC) No 1907/2006 (REACH) and listed within Annex V[70] to this Regulation (EC, 2006b).

Following Commission Regulation (EU) 2019/1691[71]: "*Digestate is a residual semisolid or liquid material that has been sanitised and stabilised by a biological treatment process, of which the last step is an anaerobic digestion step, and where the inputs used in that process are biodegradable materials originating only from non-hazardous source segregated materials, such as food waste, manure and energy crops. Biogas resulting from the same process as digestate or from other anaerobic digestion processes, as well as compost resulting from the aerobic decomposition process of similar biodegradable materials, are already listed in Annex V to Regulation (EC) No 1907/2006. Therefore, digestate that is either not waste or has ceased to be waste should also be listed in that Annex, as it is inappropriate and unnecessary to require that substance to be registered and as its exemption from Titles II, V and VI of Regulation (EC) No 1907/2006 does not prejudice the objectives of that Regulation".*

This exemption stipulated by Annex V of REACH covers compost when it is potentially subject to registration, i.e. when it is no longer a waste, and is understood as being applicable to substances consisting of solid particulate material that has been sanitised and stabilised through the action of micro-organisms and that result from the composting of any bio waste capable of undergoing aerobic decomposition in its entirety.

This explanation is without prejudice to discussions and decisions to be taken under European Union waste legislation on the status, nature, characteristics and potential definition of compost, and may need to be updated in the future. Other wastes not covered by End of Waste criteria are out of the scope of the REACH Regulation.

Mineral constituents

According to the REACH Regulation (Annex V, Point 7), if naturally occurring substances are not chemically modified, such as minerals, ores, ore concentrates, raw and processed natural gas, crude oil, coal, they are also exempted from the registration. This group of substances is characterised by the definitions given in Article 3(39) and 3(40):

The Article 3(39) defines a 'substances which occur in nature' as *'naturally occurring substance as such, unprocessed or processed only by manual, mechanical or gravitational means, by dissolution in water, by flotation, by extraction with water, by steam distillation or by heating solely to remove water, or which is extracted from air by any means.* The Article 3(40) defines "not chemically modified substance" as a "*substance whose chemical structure remains*

[70] Specifies the exempting criteria for substances from the registration, downstream user and evaluation requirements.
[71] Commission Regulation (EU) 2019/1691 of 9 October 2019 amending Annex V to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). OJ L 259, 10.10.2019, p. 9–11

unchanged, even if it has undergone a chemical process or treatment, or a physical mineralogical transformation, for instance to remove impurities."

The ECHA Guidance clarifies this point as follows: *Minerals which occur in nature are covered by the exemption if they are not chemically modified. This applies to naturally occurring minerals, which have undergone a chemical process or treatment, or a physical mineralogical transformation, for instance to remove impurities, provided that none of the constituents of the final isolated substance has been chemically modified*[72].

Mineral wool and CLP Regulation (EC, 2008b)

Mineral wool (CAS: 650-016-00-2)[73] is included in Table 3.1 placed in Part III (Harmonised classification and labelling tables) of Annex VI to CLP Regulation as a substance with assigned Carcinogen 2 hazard class and hazard statement code - H351 with the exceptions that are specified under Notes Q and R specified in Part I (Iintroduction to the list of harmonized classifications and labelling) of that Annex. Whenever the mineral wool falls under the scope of one of these notes, the classification of carcinogen category 2 does not apply to it:

Note Q: *The classification as a carcinogen need not apply if it can be shown that the substance fulfils one of the following conditions:*

- *a short term biopersistence test by inhalation has shown that the fibres longer than 20 µm have a weighted half-life less than 10 days; or*
- *a short term biopersistence test by intratracheal instillation has shown that the fibres longer than 20 µm have a weighted half-life less than 40 days; or*
- *an appropriate intra-peritoneal test has shown no evidence of excess carcinogenicity; or*
- *absence of relevant pathogenicity or neoplastic changes in a suitable long term inhalation test.*

Note R: *The classification as a carcinogen need not apply to fibres with a length weighted geometric mean diameter less two standard geometric errors greater than 6 µm.*

During the previous revision, one of the main manufacturers of mineral wool for the use in growing media in Europe reported that its mineral wool falls under the Note Q provisions, fulfilling all of the conditions for the exclusion of classification as hazardous under this Note.

Based on the above information, it can be concluded that mineral wool is not classified as carcinogenic if it complies with just one of the requirements in Note Q or the requirement in Note R. Given the importance of the hazard, the CLP Regulation is a robust base to ensure the harmlessness of the mineral wool and the compliance with the Article 6.6 of the EU Ecolabel Regulation.

It has been found that mineral wool insulation manufacture process uses urea-extended phenol formaldehyde resins as binder. It has been reported by a manufacturer of mineral wool growing media that phenol formaldehyde resins are also commonly used as binders in the production of those products. In this regard, the industry reported that most formaldehyde in mineral wool is eliminated in the production process through high temperatures, and traces of free formaldehyde might remain in the final product at concentrations below 0.010% w/w (Rodriguez Quintero et al., 2015). In order to control any trace of formaldehyde that might be present in the final product, a test to measure the free-formaldehyde in mineral wool is included as part of the assessment and verification.

[72] https://echa.europa.eu/documents/10162/23047722/draft_guidance_annex_v_echa_en.pdf/f1eefc01-5902-4c16-a61f-bae5df7f2b11

[73] Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content greater than 18% by weight

5.4.3.2. Hazardous substances requirements under Fertilising Product Regulation

The Fertilising Product Regulation should apply without prejudice to CLP Regulation and REACH Regulations. The FPR ensures product safety in function of the quantity of substance:

1. **10-100 tons:** The obligation of meeting the chemical requirements of a component material category: *Where the actual quantities placed on the market are lower than 10 tonnes per company per year, the information requirements determined by Regulation (EC) No 1907/2006 for the registration of substances in quantities of 10 to 100 tonnes should exceptionally apply as a condition for use in EU fertilising products. Those information requirements should apply to the actual substances contained in the EU fertilising product, as opposed to the precursors used for the manufacturing of those substances (…) chemical safety will be better ensured by regulating as component materials the substances formed from the precursors and actually contained in the EU fertilising product. The obligation to comply with all the requirements of a component material category should therefore apply to those substances.*

2. ***More than 100 tons:*** *The obligation of meeting the requirements of Regulation (EC) No 1907/2006: Where the actual quantities of substances in EU fertilising products regulated by this Regulation are higher than 100 tonnes, the additional information requirements laid down in Regulation (EC) No 1907/2006 should apply directly by virtue of that Regulation. The application of the other provisions of Regulation (EC) No 1907/2006 should also remain unaffected by this Regulation.*

Accordingly, Part II (Requirements related to CMCS) of Annex II to FPR (Component Material Categories (CMCs)) for each singular category specifies that:

(…) All substances incorporated into the EU fertilising product, on their own or in a mixture, shall have been registered pursuant to Regulation (EC) No 1907/2006 (2), with a dossier containing:

(a) the information provided for by Annexes VI, VII and VIII to Regulation (EC) No 1907/2006, and

(b) a chemical safety report pursuant to Article 14 of Regulation (EC) No 1907/2006 covering the use as a fertilising product, unless explicitly covered by one of the registration obligation exemptions provided for by Annex IV to Regulation (EC) No 1907/2006 or by points 6, 7, 8, or 9 of Annex V to that Regulation.

(c) composting additives which are necessary to improve the process performance or the environmental performance of the composting process provided that:

(i) the additive is registered pursuant to Regulation (EC) No 1907/2006 (3), with a dossier containing:

—the information provided for by Annexes VI, VII and VIII to Regulation (EC) No 1907/2006, and

—a chemical safety report pursuant to Article 14 of Regulation (EC) No 1907/2006 covering the use as a fertilising product, unless explicitly covered by one of the registration obligation exemptions provided for by Annex IV to Regulation (EC) No 1907/2006 or by point 6, 7, 8 or 9 of Annex V to that Regulation, and

(ii) the total concentration of all additives does not exceed 5% of the total input material weight (…).

Stakeholders' comments after the EUEB meeting

A member of the board showed concerns about the explicit statement of acceptance of ingredients for the final product containing up to 0.1% of SVHC.

It was requested to explicitly reference to 'intentionally added substances or mixtures', and clarify when using the words 'material' or 'component'.

Conclusions

The current criterion 5.3. and 5.4 meet legal requirements of Article 6(6) and 6(7) of EU Ecolabel Regulation No 66/2010. Accordingly, it is proposed to maintain the current formulation of the criteria only simplifying their formulation to enhance better understanding of the EU Ecolabel horizontal requirement on substances classified under Regulation (EC) No 1272/2008 and on substances of very high concern (SVHC restriction).

After the EUEB meeting:

- the proposal of the criterion 4.4 was simplified. More details will be provided in the User Manual.
- in criterion 4.3, the sentence 'As a minimum, all additives used by the applicant must be screened' was removed because it contradicted the previous sentence.
- some editorial editing occurred.

5.4.4. Criterion 4.5. Microbiological criteria

Current Criterion 5.5.on Limits for E. coli and Salmonella spp.

This criterion applies to growing media, soil improvers and mulch, with the exception of mineral growing media.
The content of pathogens in the final product must not exceed the limits set out in the table below

Pathogen	Limit
Escherichia coli	1 000 CFU /g fresh weight
Salmonella spp.	Absence in 25 g fresh weight

CFU= colony-forming units.

Assessment and verification: *The applicant shall provide the Competent Body with test reports conducted in accordance with the testing procedure indicated in Table 9. Standard test method for E. coli and Salmonella spp.*

Parameter	Test method
E. coli	CEN/TR 16193 Sludge, treated biowaste and soil. Detection and enumeration of *Escherichia coli* or equivalent
Salmonella spp.	ISO 6579 Microbiology of food and animal feeding stuffs — Horizontal method for the detection of *Salmonella* spp.

Proposed revised criterion on Microbiological criteria (post pubic consultation and EUEB meeting)

This criterion applies to growing media and soil improvers, with the exemption of mineral growing media.

The content of primary pathogens in the product shall not exceed the maximum levels set in Table 5

Table 5 Limit value proposed

Micro-organisms to be tested	Sampling plans			Limit
	n	c	m	M
Salmonella spp.	5	0	0	Absence in 25 g or 25 ml
Escherichia coli or Enterococcaceae	5	5	0	1 000 CFU in 1 g or 1 ml

CFU = colony-forming units

Where:

- *n is the number of samples to be tested;*
- *c is the number of samples where the number of bacteria expressed in CFU is between m and M;*
- *m is the threshold value for the number of bacteria expressed in CFU that is considered satisfactory; and*
- *M is the maximum value of the number of bacteria expressed in CFU.*

Assessment and verification: *The applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure indicated in Table 6*

Table 6 Standard test method for the detection of specific pathogens

Parameter	Test method
E. coli	CEN/TR 16193 or ISO 16649-2 or EN ISO 9308-3
Salmonella spp.	EN ISO 6579 or CEN/TR 15215
Enterococcacea	EN 15788 or EN ISO 7899-1 or BEA method

Aim

The human health may be at risk of possible exposure to certain pathogenic microorganism due to their presence in soil, or raw water used for preparation of the nutrient solution or for dissolving or diluting chemical protection agents, or in plant material (seeds, small plants). Growing medium amended with improperly composted animal wastes can be an important port of entry for human pathogens transmitted through feacal – oral route (Raviv (Eds) et al, 2019). To ensure the sanitary quality of composts, any raw compost feedstock based on animal waste material should be checked with respect to its contaminant load. *Salmonella spp., Escherichia coli, and Enterococcaceae* are indicator organisms.

Main outcomes from stakeholders' consultations

The results of questionnaire observed the split view among stakeholders.: 37% of the responses indicated the soundness of the currently valid criterion, whereas 38% - the need for a thorough revision. Additional 5% of participants favored incorporation of minor changes into the criterion. Additional comments collected reveal that the revision of criterion 5.5. should focus on the monitoring's rules and harmonization with CEN TC Standards linked to the FPR.

Stakeholders informed that the limit values settled by the FPR come from other Regulations established for totally different matrices i.e. food stuffs and milk products. Various stakeholders considered as unnecessary to use the same sampling plan as the FPR, which was considered a disproportionate burden for small producers. The cost of complying to the EU Ecolabel might be likely to discourage SME applicants. However, CEN TC 223 WG 5 is currently working on the development of suitable methods for the detection of the listed pathogens. Unfortunately, these methods are not available yet.

Brief analysis of technical and legal aspects

Salmonella are a genus of enteric pathogenic bacteria that are responsible for many mild to potentially fatal (typhoid) gastric diseases. They are often found associated with food stuffs and faecal material of animal origin. Consequently, they are potentially present in compost and digestate feedstocks. They may also contaminate green and garden wastes if containing faecal material, e.g. from animal bedding, and natural faecal deposition (Saveyn and Eder, 2013). The FPR proposes that a product is free of Salmonella in any of 5 samples (a limit of absence in

25 g or 25 ml), which is a harmonized approach with the currently valid EU ecolabel criterion 5.5 (a limit of absence in 25 g.

Escherichia coli is a common microorganism found in significant numbers in the intestinal tract of all animals. Most strains are not pathogenic and live in the intestine as a normal part of the gut flora, but there are some notable pathogenic strains, e.g. 0157. Its virtually universal presence in faecal material means that E. coli is used in many areas as an organism to indicate faecal contamination and, as a consequence, the potential presence of faecal-derived pathogens. The analysis of E. coli is a relatively low cost and established methodology, and limits for E.coli appear widely in standards for composts and digestates, with similar limit of 1000 CFU[74] / g fresh weight (Saveyn and Eder, 2013).

The Enterococcaceae are a family of Gram-positive bacteria placed in the order Lactobacillales. Representative genera include Enterococcus, Melissococcus, Pilibacter, Tetragenococcus, and Vagococcus. The taxonomy of enterococci has changed considerably over the past ten years, and the genus now includes over forty distinct species with various habitats, tropisms, and metabolic and phenotypic characteristics. These habitats include animal hosts, as well as plants, soil and water, and manmade products, including fermented foods and dairy products (Raviv (Eds) et al, 2019).

Proposal for the criterion revision

The current EU Ecolabel criteria for growing media, soil improvers and mulch include monitoring for *Salmonella spp. and E.coli.* The criterion largely echoes the FPR, i.e. for *E.coli or Salmonella* monitoring. Nevertheless, the FPR establishes the equivalency for testing of Escherichia coli and Enterococcaceae content. It requires that the average number of viable counts for *E.coli* or *Enterococcaceae* isolated from five samples must not exceed 1000 CFU/g in all of them.

Although the FPR uses methods, test number and values referred to the food stuff industry, the criterion 4.5. is proposed to be fully harmonised with the safety sanitary rules established by Annex I to FPR, Part II. This choice was made because currently there is no set of values, recognised by the scientific community, that strictly refers to growing media and soil improvers. CEN TC 223 WG 5 is working on the development of suitable methods for the detection of the listed pathogens.

The meaning of n, c, m, and M was added to the criterion, and the heading was changed to "microbiological criteria" to correctly reflect the nature of the requirement.

5.4.5. Analysis of the feasibility to add a new criterion on the presence of veterinary medicines and pesticide residues

Animal by-products can be used as component materials in soil improvers. Animal manure might be contaminated by contaminants of emerging concern (CEC) such as veterinary medicines or pesticides. In the EU, between 2011 and 2012, the use of antibiotics on farm animals doubled the use in human medicine (Buckwell and Nadeu, 2018) Some antibiotics are relatively resistant to degradation (Albero et al. 2018, Filippitzi et al., 2019). The common use of antibiotics on farm animals also grows the concern about the antimicrobial resistance (Boelee et al., 2019), changes in the soil microbial composition (Cycon et, 2019) as well as high mobility of micro-contaminants in water (Wood, 2019). Tetracyclines enrofloxacin, tylosin and sulphodiazine are among the most commonly used veterinary antibiotics that show the highest risks to soils in the EU (de la Torre et al. 2012, Fekadu et al. 2019). Also hormones (oestrogens, androgens, progesterone and various synthetic hormones) have generated wide interest because of

[74] CFU - colony forming units

their critical properties such as endocrine disrupting effects (Lorenzen et al., 2004, Wood, 2019). When antibiotic residues enter the soil, the main processes determining their persistence are sorption to organic particles and degradation/transformation. Manure processing i.e. anaerobic digestion, especially if combined with a pasteurisation step, may partially remove antibiotics and other pharmaceutical compounds (Huygens et al, 2020).

Pesticides, including herbicides such as pyridine carboxylic acids, are registered for application to pasture, grain crops for feeding purposes, and residential lawns. They are used to control a wide variety of broadleaf weeds including plants toxic for grazing animals. Also fungicides and insecticides are commonly applied for plant protection purposes. These pesticides pass through the animal's digestive tract and are excreted in urine and manure. (Saveyn and Eder, 2013) states that "the measurement data suggests that pesticides are likely to be of very low concern for compost/digestate quality." This is concurrent with the risk assessment and analysis of management options for digestate and compost as fertilisers that was conducted by Wood (2019) for the European Commission. The Stockholm Convention on Persistent Organic Pollutants constitutes a safeguard for the use of CECs. The Fertilising Products Regulation is the main regulatory activity that addresses the risk from compost and digestate used as fertilisers on the EU-level.

Huygens et all (2020) extensively analyses different scenarios for the safe use of processed manure. The authors did not propose any additional criterion to limit the presence of CECs in RENURE[75] because:

- *"(…)The proposed criteria on TOC:TN or mineral:TN will effectively limit the CEC levels in candidate RENURE N fertilisers;*
- *The assessment indicated that the overall effects are multifaceted with local-scale disadvantages of increased CEC loads that could be offset by the wider-scale benefits of manure processing as a means to remove CECs from the agrifood system. Hence, no overall adverse environmental impacts are indicated;*
- *Manure processing should not be used as an end-of-pipe solution to mitigate CEC contamination in the environment. Other specific pieces of EU legislation, initiatives and incentives may be more suitable to prevent at the source CECs from entering the environment (e.g. legislation on veterinary medicinal products, pharmacologically active substances in foodstuffs, the sustainable use of pesticides, and water quality; recent strategies and proposed actions to reduce risks related to pharmaceutical compounds are also outlined in the European Union Strategic Approach to Pharmaceuticals in the Environment);*
- *More information is still needed to understand and evaluate certain pharmaceuticals as regards their environmental concentrations and the resulting levels of risk (see European Commission Communication on the EU Strategic Approach to Pharmaceuticals in the Environment);*
- *The absence of international measurement standards (…)".*

Conclusions:

Given the limited information collected form the scientific literature, and based on the analysis of Huygens et al. (2020), no further action is proposed. The inclusion of the requirement that addresses the potential presence of veterinary medicines and pesticide residues could be reassessed on the occasion of the next revision.

After the EUEB meeting held in March 2022, the expression "test reports conducted in accordance with […]" was substituted with the expression "reports of tests conducted in accordance with […]". This change clarified that the test must be conducted in accordance with the specified standard. The original expression opened to the interpretation that the report should be produced according to the standard.

[75] REcovered Nitrogen from manURE (RENURE)

5.5. Criterion. 5 Fitness for use

Current Criterion 6 on Stability

This criterion applies to growing media, soil improvers and mulch, with the exception of mulch totally composed of lignocellulosic constituents and mineral growing media.

Soil improvers and mulch for non-professional applications and growing media for all applications shall meet one of the requirements presented in Table .

Table Stability requirements of soil improvers and mulch intended for non-professional applications and growing media intended for all applications

Stability parameter	Requirement
Maximum Respirometric index	15 mmol O_2/kg organic matter/h
Minimum Rottegrad, where applicable	IV (self-heating test temperature rise of maximum 20 °C above ambient temperature)

Soil improvers and mulch for professional applications shall meet one of the requirements presented in Table .

Table Stability requirements of soil improvers and mulch intended for professional applications

Stability parameter	Requirement
Maximum Respirometric index	25 mmol O_2/kg organic matter/h
Minimum Rottegrad, where applicable	III (self-heating test temperature rise of maximum 30 °C above ambient temperature)

Assessment and verification:

The applicant shall provide the Competent Body with test reports conducted in accordance with the testing procedure indicated in Table .

Table Standard test method for stability

Parameter	Test method
Respirometric index	EN 16087-1 Soil improvers and growing media - Determination of the aerobic biological activity. Oxygen uptake rate (OUR)
Rottegrad	EN 16087-2 Soil improvers and growing media. Determination of the aerobic biological activity. Self heating test for compost

Current Criterion 7 on Physical Contaminants

This criterion applies to growing media, soil improvers and mulch, with the exception of mineral growing media.

The content of glass, metal and plastic with mesh size of > 2 mm in the final product shall not exceed 0.5 %, measured in terms of dry weight.

Assessment and verification:

The applicant shall provide the Competent Body with test reports conducted in accordance with the testing procedure indicated in the Technical Specification CEN/TS 16202 (Sludge, treated biowaste and soil - Determination of impurities and stones), or another equivalent testing procedure authorised by the Competent Body.

Current Criterion 8 on Organic matter and dry matter

Criterion 8 - Organic matter and dry matter

This criterion applies to soil improvers and mulch.

The organic matter as loss on ignition of the final product shall be at least 15% dry weight (% DW).

The dry matter content of the final product shall be at least 25% of the fresh weight (% FW).

Assessment and verification:

The applicant shall provide the Competent Body with test reports conducted in accordance with the testing procedure presented in Table.

Table Standard test methods for Dry matter and Organic matter

Parameter	Test method
Dry matter (% FW)	EN 13040 Soil improvers and growing media. Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory compacted bulk density
Organic matter as Loss on Ignition (% DM)	EN 13039 Soil improvers and growing media. Determination of organic matter content and ash

Current Criterion 9 on Viable weed seeds and plant propagules

Criterion 9 - Viable weed seeds and plant propagules

This criterion applies to growing media and soil improvers, with the exception of mineral growing media.

Final products shall not contain more than two units of viable weed seeds and plant propagules per litre.

Assessment and verification:

The applicant shall provide the Competent Body with a test report in accordance with the testing procedure indicated in the Technical Specification CEN/TS 16201 (Sludge, treated biowaste and soil - Determination of viable plant seeds and propagules), or another equivalent testing procedure authorised by the Competent Body.

Current Criterion 10 on Plant response

Criterion 10 - Plant response

This criterion applies to growing media and soil improvers.

Final products shall not adversely affect plant emergence or subsequent growth.

Assessment and verification:

The applicant shall provide the Competent Body with a valid test conducted in accordance with the testing procedure indicated in EN 16086-1 (Soil improvers and growing media - Determination of plant response - Part 1: Pot growth test with Chinese cabbage).

Proposed revised criterion on Fitness for use (post public consultation and EUEB meeting)

Criterion 5.1 – Stability

This criterion applies to growing media and soil improvers, with the exception of mulches totally composed by lignocellulosic components and mineral growing media.

Soil improvers and mulch for non-professional applications and growing media for all applications, shall meet one of the requirements presented in Table 7

Table 7. Stability requirements of soil improvers intended for non-professional applications and growing media intended for all applications

Stability parameter	Requirement
Maximum Respirometric index	15 mmol O_2/kg organic matter/h
Minimum Rottegrad, where applicable	IV (self-heating test temperature rise of maximum 20 °C above ambient temperature)

Soil improvers for professional applications shall meet one of the requirements presented in Table 8.

Table 8. Stability requirements of soil improvers intended for professional applications

Stability parameter	Requirement
Maximum Respirometric index	25 mmol O_2/kg organic matter/h
Minimum Rottegrad, where applicable	III (self-heating test temperature rise of maximum 30 °C above ambient temperature)

Assessment and verification

The applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure indicated in Table 9.

Table 9. Standard test method for the determination of stability parameters

Parameter	Test method
Respirometric index	EN 16087-1
Rottegrad	EN 16087-2

Criterion 5.2. – Macroscopic impurities

This criterion applies to growing media and soil improvers, with the exception of mineral growing media:

(a) no more than 3 g/kg dry matter of macroscopic impurities above 2 mm in any form of glass and metal each;
(b) no more than 2,5 g/kg dry matter of macroscopic impurities above 2 mm in form of plastic; and
(c) no more than 5 g/kg dry matter of the sum of the macroscopic impurities referred to in point (a) and point (b).

Assessment and verification

The applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure indicated in the Technical Specification CEN/TS 16202; or another equivalent testing procedure authorised by the competent body.

Criterion 5.3 – Organic matter and dry matter in soil improvers

This criterion applies to soil improvers.

The organic matter as loss on ignition of the product shall not be lower than 15% dry mass or 8.5 % of organic carbon (Corg) content by mass.

The dry matter content of the product shall not be lower than 25% fresh weight (% FW).

Assessment and verification

The applicant shall provide the competent body with ~~test~~ reports of tests conducted in accordance with the testing procedure presented in Table 10.

Where compliance is assessed based on organic matter the following conversion factor applies: organic carbon (Corg) = organic matter × 0,56

Table 10. Standard test methods for the determination of dry matter, organic matter and total organic carbon contents (TOC)

Parameter	***Test method***
Dry matter (% FW)	EN 13040
Organic matter as loss on ignition (% dry mass)	EN 13039
Total organic carbon (TOC) (% dry mass)	EN 15936

Criterion 5.4 – Viable weed seeds and plant propagules

This criterion applies to growing media and soil improvers, with the exception of mineral growing media.

In the product, the content of viable weed seeds and plant propagules shall not exceed two units per litre.

Assessment and verification

The applicant shall provide the competent body with a test report in accordance with the testing procedure indicated in the Technical Specification CEN/TS 16201, or another equivalent testing procedure authorised by the competent body.

Criterion 5.5 – Plant response

This criterion applies to growing media and soil improvers.

Products shall not adversely affect plant emergence or subsequent growth.

Assessment and verification

The applicant shall provide the competent body with a valid test conducted in accordance with the testing procedure indicated in EN 16086-1:

Rationales behind the proposed criterion

Aim

This chapter analyses the current fitness for use requirements (Criterion 6 to 10) together with the respective assessment and verifications. To simplify the document Criteria 6-10 are proposed to be bundled under a common requirement: *Fitness for use*, which reflects the intention of these criteria.

The requirements for compost quality depend on its final destination, which includes agriculture, horticulture, and urban landscaping. Organic wastes are composted to stabilize organic matter, reduce the moisture content, increase the concentrations of plant nutrients, eliminate pathogens and weed seeds, develop disease suppressiveness, and reduce greenhouse gas emissions. The development of a market for compost greatly depends on the definition and adoption of quality standards (Pilar Bernal et al, 2017).

Main outcomes from stakeholders' consultations

Following information was collected from stakeholders inquired in October 2020 about the criteria validity:

1. For criterion 6 (Stability), 25% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 15% and 25% indicated the need to deep or light revision, respectively. Additional comments collected reveal that the revision of criterion 6 should re-assess the best practice.
2. For criterion 7 (Physical contaminants), the vast majority of stakeholders (77%) considered that the criterion is adequate and does not need to be changed.
3. For criterion 8 (Organic matter and dry matter), the majority of stakeholders (60%) considered that the criterion is adequate and does not need to be changed, whereas 2% and 10% indicated the need for a thorough or light revision.

4. For criterion 9 (Viable weed seeds and plant propagules), 45% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 25% and 3% indicated the need for a thorough or light revision, respectively. It was noted that using different test methods limits comparability of the results.

5. For criterion 10 (Plant response), 62% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 13% and 15% indicated the need for a thorough or light revision, respectively. Stakeholders generally discussed the appropriateness of test methods and requested thresholds.

During the technical sub-group meeting in June 2021, stakeholders confirmed the need to keep the distinctive requirement on stability for professional and non-professional horticulture.

It was also suggested to take into consideration a requirement for stones of the size larger than 5 mm due to the possible damage to agriculture machinery. Another stakeholder, however pointed out that presence of stones is not a purely environmental requirement, and that the cost of testing should be kept at the reasonable level to be accessible by the SMEs.

In reference to the organic matter content, it was clarified that the limit of 15% of DW was set because producers have difficulties reaching higher values, and compost could contain up to 85% of mineral like sand.

For the requirement on *Viable weed seeds and plant propagules*, the current criterion was considered demanding to include materials like reeds and sphagnum moss, which could be a good alternative to the use of peat. It was however assumed as necessary to keep the status quo, because customers do not want to have unknown plants growing in their products.

During the public consultation stakeholders pointed out that the ambition level for stability requirement is very demanding for non-professional applications. New assessment and harmonisation with the FPR was recommended. A clarification was also required to indicate if the limit of 3 g/kg applies to glass and metal, each.

As for the organic matter content, stakeholders noticed that 15% threshold seems too low and very unselective, compared to the usual profile of organic soil improvers, which are mainly composed of materials of organic origin. At least 35% dry organic matter was proposed as quality organic amendment. By contrast, other stakeholders emphasized that the proposed threshold will exclude the utilization of digestate.

5.5.1. Stability

Stability is considered a key property that a mature compost should possess. A stability requirement prevents the presence of materials that have hardly undergone any treatment (e.g. so-called "shred-and-spread" compost) and so might still be classified as biologically active. Stability indicates the degree of biological decomposition that the composting feedstocks have achieved, it is related to the microbial activity, and hence the potential for unpleasant odor generation. All in all, stability is considered a key property that a mature compost should possess (Pilar Bernal et al, 2017). When unstable materials are added to growing media they may have a negative impact on plant growth due to reduced oxygen content and/or available nitrogen and/or the presence of phytotoxic compounds (Wever and Scholman, 2011).

The European Compost Network Quality Assurance Standard (ECN –QAS, 2018) defines stability/stabilisation: as a stage in the decomposition of organic matter during composting. The formulation of the current criterion 6 ensures that the materials were processed to get a reasonable level of aerobic stabilization. In the case of digestates, a post-composting process would be needed, to overcome the market barriers identified and to improve the perception of the waste-derived products. This aims to avoiding methane and odour emissions, while it suffices to comply with the market expectations for professional purposes.

The current criterion applies to growing media, soil improvers and mulch, with the exception of mulch totally composed of lignocellulosic constituents[76] and of mineral growing media. It also makes a distinction between professional and non-professional use of soil improvers. This division was introduced based on stakeholders input. For growing media, the manufacturers use stable/mature compost, and therefore a specific value for professional uses was assumed as not needed. The CEN has issued two methods for characterizing the stability: 1) the OUR (oxygen uptake rate) method (CEN 16087-1, 2011) and 2) the "self-heating test" (CEN 16087-2, 2011). The current limits are based on the referred standards.

The classification of compost stability under current criterion is based on Brinton (1995) and Veeken (2003), see Table 14 and Table 15.

Table 14. Compost stability based on Rottegrad

Temperature rise above ambient (C)	Official Class of stability	Descriptors of Class or Group	Major Group
< 10	V	Very stable, well-aged compost	Finished compost
10 - 20	IV	Moderately stable, curing compost	
20 - 30	III	Still decomposing, active compost	Active Compost
30 - 40	II	Immature , young or very active compost	
> 40	I	Fresh, raw compost, just mixed ingredients	Fresh compost

Source: Brinton et al, 1995

Table 15. Compost stability based on Respirometric index

Category of compost product	Oxygen uptake rate (mmol O_2/kg VS/h)	Oxygen uptake rate (mg O_2/kg VS/h)	Equivalent CO_2 evolution rate (mg CO_2/kg VS/day)
Very unstable	> 30	> 960	> 32
Unstable	15 – 30	480 – 960	16 – 32
Stable	5 – 15	160 – 480	5 – 16
Very stable	< 5	< 160	< 5

Source: Veeken et al, 2003

The stability requirement for soil improvers and mulch for professional applications is harmonised with the stability criteria established by the FPR for compost (CMC 3), fresh crop digestate (CMC 4), and digestate other than fresh crop digestate (CMC 5):

(a) Oxygen uptake rate[77]: maximum 25 mmol O_2/kg organic matter/h; or
(b) Self heating factor[78]: minimum Rottegrad III.

During the technical sub-group meeting, stakeholders decided to maintain the division between the reference values for professional and non-professional use. The proposed criterion for professional and non-professional use reflects currently valid requirement.

[76] Mulches are composed of vegetal by-products (barks, straws, wood chips...) which are very dry and stable.
[77] an indicator of the extent to which biodegradable organic matter is being broken down within a specified time period. The method is not suitable for material with a content of particle sizes > 10 mm that exceeds 20 %
[78] the maximum temperature reached by a compost in standardised conditions as an indicator of the state of its aerobic biological activity

5.5.2. Macroscopic impurities

The FPR specifies that "*impurities in EU fertilising products derived from bio-waste, in particular polymers but also metal and glass, should be either prevented or limited to the extent technically feasible by detection of such impurities in separately collected bio-waste before processing*". Accordingly compost (CMC 3) and digestate (CMC 5) should contain no more than 3 g/kg dry matter of macroscopic impurities above 2 mm of glass, metal or plastics and no more than 5 g/kg dry matter of the sum of these impurities (glass, metal or plastics) .

Additionally from 16 July 2026, the presence of plastics above 2 mm within the maximum limit value shall be no more than 2.5 g/kg dry matter. By 16 July 2029 the limit-value of 2.5 g/kg dry matter for plastics above 2 mm shall be re-assessed in order to take into account the progress made with regards to separate collection of bio-waste.

The current criterion 7 requires that the final product content of glass, metal and plastic with mesh size of > 2 mm shall be lower than 0.5%, measured in terms of dry weight (5 g per 1kg). This is harmonised with the ECN-QAS that indicates horizontal technical specification EN TS 16202 a method to determine the physical impurities > 2 mm and stones > 5 mm in sludge, treated biowaste and soil (ECN, 2018). This is in line with the current assessment and verification of criterion 7.

The overall limit in PAS 100[79] for total glass, metal and plastic and any "other" non stone fragments > 2mm is 0.25%. PAS 100 also requires that the total level of plastic > 2mm does not exceed 0.12%, however WRAP Guidelines for the Specification of Quality Compost for use in Growing Media (2014) recommends that plastic > 2mm should nor exceed 0.05% DM.

The criterion 7 is proposed to be harmonised with the FPR considering the incorporation of restriction on plastic that comes into force in 2026. Wording of the proposed criterion was revised to clarify that the limit of 3 g/kg applies to each of glass and metal.

5.5.3. Organic matter and dry matter in soil improvers

The current requirement on organic matter content (OM) for the organic constituents is harmonized with the EoW criteria for biodegradable waste and refers to soil improvers.

The FPR requires organic carbon (Corg) labelling, indicating that where compliance is assessed based on organic matter the following conversion factor applies: *organic carbon (Corg) = organic matter × 0,56.*

In this respect, an organic soil improver for the product function category (PFC 3(A)) (organic soil improvers) should contain at least 20% dry matter and at least 7,5% by mass of organic carbon (Corg) content.

The ECN-QAS for compost quality requires soil improvers to contain at least 15% of organic matter [% DM], that is defined as the carbon fraction of a sample of compost which is free from water and inorganic substances, clarified in EN 12829 as "loss of ignition" at 550C or in EN 13039 as "loss of ignition" at 450 C. In Spain, different minimum concentrations are established according to the compost origin, with the minimum OM concentration being 35% for general compost, but 40% for green compost (Real Decreto 506/2013)[80]. The quality standard RAL GZ251 requires at least 30% of organic matter content.

The proposed revision does not introduce any change to the currently valid requirement that is built based on End-of-waste criteria for compost and digestate (Rodriguez – Quintero, 2015). The inclusion of digestate is one of the objectives of the revision. Digestion is a biological process conducted in the absence of oxygen, by which organic matter is transformed into biogas and carbon dioxide, of which the former can be used to produce energy and heat. The organic matter fed into the anaerobic digestion system is not fully degraded during the process and approximately 40% to 60% of carbon is converted into methane, while the remaining portion of carbon is retained in the digestate (Alrefai et al., 2017). The amounts of organic dry matter and the carbon content of digestate

[79] PAS 100, Publically Available Specification for Composted Materials,
[80] Real Decreto 506/2013, de 28 de junio, sobre productos fertilizantes. Documento BOE-A-2013-7540

decreases by the decomposition of easily degradable carbon compounds in the digester. The remaining fraction of organic matter in digestate is less degradable and can contributes to soil organic matter. The stable fraction of the original organic matter that remains after 1 year is often referred to as the "effective organic matter" (Egene et al, 2020).

It needs to be stressed that, under the FPR, higher organic carbon content (at least 15%) is required for organic fertilizers (PFC1). This is a readily available form of organic matter. Whereas in organic soil improvers the effective organic matter content (EOM) gives a good indication of the part of organic matter that contributes to soil organic matter and soil quality. In this sense, Veeken et al (2017) stressed the importance to make a distinction between organic sources that mainly contribute to nutrient fertilisation and organic sources that mainly contribute to soil organic matter.

The dry matter content of the crude digestate varies significantly depending on the product, from high water content sludge to more solid materials similar to digestate from source separated biowaste). Agricultural digestate is liquid in most cases (usually 70-90% water content), particularly due to the use of important quantities of manure (itself usually 90-96% liquid). Hence, the dry matter content of a crude digestate may vary between ca. 2% to more than 20% depending on the source (Wood, 2019). Analysis of five digestate types revealed a dry matter content of 1.9 – 4.56% in the separated liquor, for liquid digestate, the organic matter content of the dry matter of the liquor was 69.6% OM (WRAP, 2011). Digestate household waste may contain as much as 15% of dry matter, and 9.8% of organic matter (Veeken et al, 2017).

All in all, the ambition level of the proposed criterion 5.3 is more demanding than the FPR, because it requires at least 25% of dry matter content (% FW), and at least 15% of organic matter content (% DW). (*Note:* The minimum organic matter content corresponds to 8.4% of organic carbon (Corg) content by mass). Altogether, the proposed minimum OM content in a product seems to be a reasonable approach that accommodates compost and digestate and targets long term benefits (to improve soil quality).

5.5.4. Viable weed seeds and plant propagules

The ECN-QAS defines "Weed seed" *as all viable seeds (and plant propagules) found in end product (FprCEN/TS 16201)* (ECN, 2018).

The current criterion 10 was build based on the standard RAL-GZ 250/2 (Quality Parameters for Growing Media) and RAL-GZ 250/1-2 (Quality Parameters for Composted Bark). The verification method is the one within the CEN/TC 400 and the limit is based on the work developed for the EoW criteria for biodegradable waste. The precautionary limit value of less than 2 seeds per litre is also indicated by the ECN-QAS (ECN, 2018)

5.5.5. Plant response

The ECN-QAS defines the plant response as "*compost quality testing in order to prevent composts with any plant growth inhibiting factors from entering in the market (pre-normative standards of CEN/TC 223 prEN 16086:2010 and prEN 16089:2010) for soil improvers and growing media)*" (ECN, 2018).

After the EUEB meeting held in March 2022, in the criterion 5 the expression "test reports conducted in accordance with [...]" was substituted with the expression "reports of tests conducted in accordance with [...]". This change clarified that the test must be conducted in accordance with the specified standard. The original expression opened to the interpretation that the report should be produced according to the standard.

5.6.Criterion 6. Growing media features

Current Criterion 11 – Growing media features

Criterion 11 - Growing media features

This criterion only applies to growing media.

Criterion 11.1 - Electrical conductivity

The electrical conductivity of the final product shall be below 100 mS/m.

Assessment and verification: The applicant shall provide the Competent Body with a test report conducted in accordance with the testing procedure indicated in EN 13038 (Soil improvers and growing media - Determination of electrical conductivity).

Criterion 11.2 - pH

The pH of the final product shall be in the range 4 - 7.

Assessment and verification: The applicant shall provide the Competent Body with a test report conducted in accordance with the testing procedure indicated in EN 13037 (Soil improvers and growing media - Determination of pH).

Criterion 11.3 - Sodium content

The sodium content in water extracts of the final product shall not exceed 150 mg/l of fresh product.

Assessment and verification: The applicant shall provide the Competent Body with a test report conducted in accordance with the testing procedure indicated in EN 13652 (Soil improvers and growing media - Extraction of water soluble nutrients and elements).

Criterion 11.4 - Chloride content

The chloride content in water extracts of the final product shall not exceed 500 mg/l of fresh product.

Assessment and verification: The applicant shall provide the Competent Body with a test report conducted in accordance with the testing procedure indicated in EN 13652 (Soil improvers and growing media - Extraction of water soluble nutrients and elements).

Proposed revised criterion on Growing media features (post public consultation and EUEB meeting)

Criterion 6 – Growing media features

This criterion only applies to growing media.

Criterion 6.1 – Electrical conductivity

The electrical conductivity of the product shall be below 100 mS/m.

Assessment and verification

The applicant shall provide the competent body with ~~a~~the ~~test~~ report of the test conducted in accordance with the testing procedure indicated in EN 13038

Criterion 6.2 Sodium content

The sodium content in water extract of the product shall not exceed 150 mg/l fresh product.

Assessment and verification

The applicant shall provide the competent body with ~~a~~the ~~test~~ report of the test conducted in accordance with the testing procedure indicated in EN 13652.

Criterion 6.3 Chloride content

The chloride content in water extract of the product shall not exceed 500 mg/l fresh product.

Assessment and verification

The applicant shall provide the competent body with ~~a~~the ~~test~~ report of the test conducted in accordance with the testing procedure indicated in EN 16195

Rationales behind the proposed criterion

Aim

This chapter seeks the verification if the current requirements for the performance of growing media together with the respective assessment and verifications are valid or they need to be updated and adapted to the current state of the knowledge.

Main outcomes from stakeholders' consultations

For criterion 11 (Growing media features), 30% of stakeholders inquired within the questionnaire (October 2020) indicated the soundness of the criterion, whereas 30% - the need for its thorough revision, and 10%, the need to introduce minor adjustments. Stakeholders pointed out the need to harmonise the requirement with the FPR to analyse the validity of requested test methods and thresholds.

The pH of soil impacts plant growth though its control on nutrients availability and uptake as well as microorganism activity. Many composts have relatively high (>7.0) pH values, therefore their use for plants that are sensitive to high pH should be done with caution. The revised WRAP recommendations (WRAP, 2014) indicates the target pH range as 6.0 – 8.0. The revised RAL-GZ 250/2 and the RAL-GZ 250/3 (RAL, 2018) indicates pH of 5,0 - 6,5 for all plants exempt from acidophilic plants for which pH of 3.4 - 4.6 is indicated with permitted tolerance of +/- 0.4.

The discussion with the technical sub-group in June 2021 revealed that requirements on pH should be removed because different plants require different pH values, additionally incorporation of compost would require increase in the upper limit value for pH. It was agreed that the pH value should only be reported on the product (Criterion 7), which is in line with the FPR. Moreover, based on stakeholders' feedback the criterion on pH has proven to create an obstacle to the uptake of these criteria, especially for product based on compost.

By contrast, the requirements for electrical conductivity, sodium content and chloride content should be kept to avoid soil salinization.

During the public consultation stakeholders informed that the proposed value of 60 mS/m might only be considered for an average fertilization level. The optimal value will also depend on the type of plant, i.e. French Standard NF 142 links the limit with the type of plant: 45, 65, and 90 mS/m, the latter referring to the limit value for geranium and balcony potting. It was also stated that the proposed value might limit the possibility to use compost and digestate as component of a final product.

Electrical conductivity (EC), sodium content, and chlorine content

Electrical conductivity is an indirect measurement of salinity, and therefore an important parameter to be checked for products coming into direct contact with plant roots. The requirement was not applied to soil improvers or mulches since they are added to or spread on soil, where the soluble elements that constitute the electrical conductivity would quickly dissipate. Nevertheless, following Pilar Bernal et al. (2017), a high electrical conductivity of compost can reduce its quality, especially when used as a component of growing media.

The FPR does not establish a specific threshold but requires provision of information on the electrical conductivity for soil improvers and growing media, except for mineral wool (Annex III, Part II). According the ECN quality standard, electrical conductivity should be characterised for digestate used as mixing compound in growing media. The

recommended test method is EN 13038 (ECN, 2018) that applies the extraction ratio 1:5 (1 V sample + 5 V water). The WRAP (WRAP, 2014) recommendations indicate the upper limit of 150 mS/m (1500 µS/cm), with the target value below 60 mS/m (600 µS/cm) based on EN 13038. The electrical conductivity (1:5) below 65 mS/m was found to be suitable for most plants (Rodriguez Quintero et al, 2015). The current EU Ecolabel criterion for growing media states that, the electrical conductivity of the products shall not exceed 100 mS/m.

A subsoil that contains a lot of sodium chloride (NaCl) might cause the osmotic effect of the salt making water less available for the uptake by plant. The high concentrations of NaCl can also reduce growth by the accumulation of high concentrations of both Na+ and Cl– simultaneously. High Cl– concentration reduces the photosynthetic capacity and quantum yield due to chlorophyll degradation, whereas high Na+ interferes with K+ and Ca2+ nutrition and results in a depression of photosynthesis and growth (Tavakkoli et al, 2011). The current criteria on sodium (Criterion 11.3) and chlorine content (Criterion 11.4) are based on the WRAP recommendations for compost to be used in growing media (WRAP, 2014) and Quality Parameters for Quality Assurance Flower Potting Soil (RAL, 2018). The revised WRAP guidance (2014) indicates the best practice value below 100 mg Na/l for sodium and below 500 mg Cl/l for chlorine, with the acceptable upper limit of 150 mg Na/l for sodium, and for 1000 mg Cl/l for chlorine.

The ECN guidelines 'Specification for the use of quality compost in Growing media' set the following thresholds for the analysed parameters: EC below 190mS/M, Na below 250mg/l and Cl below 750. It needs to be specified that the criterion refers to a final product (growing media) that is a mix of different components. Grigatti et al (2007) found the optimal response of growing media containing 25–50% of composts fraction. Following Raviv (2013) normally the fraction of the compost in the growing media mixture should not exceed 50%.

Based on the feedback collected it is proposed to maintain threshold values as required by the currently valid criterion for all parameters. This proposal, ahead of all meant to accommodate the use of digestate and compost under the scheme.

Table 16. Summary of the rationales behind the revised criterion on growing media features

Criterion on	Current	Proposed	Rationales
Electrical conductivity	<100 mS/m (EN 13038)	<100 mS/m (EN 13038)	• WRAP (2014) recommendations <150 mS/m, with the target value below 60 mS/m. • <65 mS/m most suitable for plants (Rodriguez Quintero, 2015) • FPR - provision of information for SI and GM, except for mineral wool (Annex III, Part II). • ECN (compost) 1<90 mS/M
Sodium content	<150 mg/l of fresh product (EN 13652)	<150 mg/l (EN 13652)	• WRAP (2014): Target: < 100 / upper limit: 150. • RAL (2018)<100 for all plants but <35 for acidophilic plants. • ECN (compost) <250 mg/l
Chloride content	<500 mg/l of fresh product (EN 13652)	<500 mg/l *(EN 16195)*	• WRAP (2014):Target: <500 / upper limit: 1000, WRAP (2014), EN 13652. • RAL (2018): 200 mg/l for all plants but <100 for acidophilic plants (VDLUFA-Methode I A 13.4.3) RAL-GZ 250/2 and 250/3. • ECN (Compost)<750

Source: WRAP (2014), RAL-GZ 250 (2018), and ECN (2018)

The test methods are proposed to be harmonised with the EN standards revised/developed by CEN Technical Committee under the FPR. The verification test method for chloride was accordingly harmonised with that included in the communication of the draft amendment to Commission Implementing Decision C(2020)612 final of 10.2.2020

on a standardisation request to the European Committee for Standardisation as regards the EU fertilising products in support of Regulation (EU) 2019/1009[81],

After the EUEB meeting held in March 2022, the expression "a test report conducted in accordance with [...]" was substituted with the expression "the report of the test conducted in accordance with [...]". This change clarified that the test must be conducted in accordance with the specified standard. The original expression opened to the interpretation that the report should be produced according to the standard.

[81]As of July 2021, Available at: https://ec.europa.eu/docsroom/documents/45687

5.7. Criterion 7. Provision of information

Current criterion on Provision of information

This criterion applies to growing media, soil improvers and mulch.

The following information shall be provided with the product either on the packaging or in accompanying fact sheets.

Criterion 12.1 – Soil improvers

a) *The name and address of the body responsible for marketing;*
b) *A descriptor identifying the product by type, including the wording "SOIL IMPROVER";*
c) *A batch identification code;*
d) *The quantity (in weight);*
e) *Range of moisture content;*
f) *The main materials (those over 5% by weight) from which the product has been manufactured;*
g) *The recommended conditions of storage and the recommended 'use by' date;*
h) *Guidelines for safe handling and use;*
i) *A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of the product for particular plant groups (e.g. calcifuges or calcicoles);*
j) *pH (reference of the test method used);*
k) *Organic carbon content (%), total nitrogen content (%) and inorganic nitrogen content (%) (reference to the test method used);*
l) *Carbon/Nitrogen ratio;*
m) *Total phosphorus (%) and total potassium (%) (reference to the test method used) ;*
n) *For products for non-professional use, a statement about the stability of organic matter (stable or very stable);*
o) *A statement on recommended methods of use;*
p) *In non-professional applications: recommended rate of application expressed in kilograms of product per unit surface area (m^2) per annum.*

Criterion 12.2 – Growing media

a) *The name and address of the body responsible for marketing;*
b) *A descriptor identifying the product by type, including the wording "GROWING MEDIUM";*
c) *A batch identification code;*
d) *The quantity (in volume or number of slabs, in case of mineral wool, specifying the dimensions of the slab);*
e) *Range of moisture content;*
f) *The main materials (those over 5% by volume) from which the product has been manufactured;*
g) *The recommended conditions of storage and the recommended 'use by' date;*
h) *Guidelines for safe handling and use;*
i) *A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of the product for particular plant groups (e.g. calcifuges or calcicoles);*
j) *pH (EN 13037);*
k) *Electrical Conductivity (1:5 extraction);*
l) *Germination inhibition (EN 16086-1);*
m) *Growth inhibition (EN 16086-1);*
n) *A statement about the stability of organic matter (stable or very stable);*
o) *A statement on recommended methods of use;*
p) *For mineral growing media, a statement about the professional horticultural application.*

Criterion 12.3 – Mulch

a) *The name and address of the body responsible for marketing;*
b) *A descriptor identifying the product by type, including the wording "MULCH";*
c) *A batch identification code;*
d) *The quantity (in volume);*
e) *Range of moisture content;*

f) The main materials (those over 5% by volume) from which the product has been manufactured;
g) Guidelines for safe handling and use;
h) A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of the product for particular plant groups (e.g. calcifuges or calcicoles);
i) pH (reference of the test method used);
j) A statement about the stability of organic matter (stable or very stable), where applicable, for non-professional uses;
k) A statement on recommended methods of use;
l) In non-professional applications: recommended rate of application expressed in mm.

Assessment and verification:

The applicant shall declare that the product complies with this criterion and provide the Competent Body with a sample of the packaging or fact sheets or the text of the user information written on the packaging or accompanying fact sheets.

Proposed revised criterion on Provision of information (post public consultation and EUEB meeting)

Criterion 7 – Provision of information

This criterion applies to growing media and soil improvers

The information indicated under Criterion 7.1. or 7.2, as applicable, shall be provided.

The information shall be provided with the product either on the packaging or in accompanying documents.

An EU fertilising product falling within the product function category 3(A) (organic soil improvers) or the product function category 4 (growing media) under the terms of Regulation (EU) 2019/1009 shall be deemed to comply with the requirement.

For mineral growing media, the provision of information shall include a statement about the professional horticultural application.

Criterion 7.1. *Soil improvers*

a) the name and address of the body responsible for marketing;

b) a descriptor identifying the product by type, including the wording "SOIL IMPROVER";

c) a batch identification code;

d) the quantity (indicated by mass or volume);

e) range of moisture content or the dry matter content expressed as % by mass;

f) a list of all components above 5 % by product weight or volume in descending order of magnitude by dry weight; where the components is a substance or a mixture, it shall be identified as specified in Article 18 of Regulation (EC) No 1272/2008;

g) the recommended conditions of storage and the recommended 'use by' date;

h) guidelines for safe handling and use, including any relevant information on measures recommended to manage risks to human, animal or plant health, to safety or to the environment;

i) instructions for intended use, including application rates, timing and frequency, and target plants or mushrooms;

j) pH;

k) electrical conductivity given as mS/m;

l) organic matter content or Organic carbon (Corg) content, expressed as % by mass;

m) minimum amount of organic nitrogen (Norg), expressed as % by mass, followed by a description of the origin of the organic matter used;

n) the ratio of organic carbon to total nitrogen (Corg/N).

o) the following nutrients shall be declared, expressed as % by mass, if exceeding 0.5 % by mass: nitrogen (N), phosphorus pentoxide (P_2O_5) and potassium oxide (K_2O).

Criterion 7.2 Growing media

a) the name and address of the body responsible for marketing;

b) a descriptor identifying the product by type, including the wording "GROWING MEDIUM";

c) a batch identification code;

d) the quantity:

- For plugs of mineral wool, expressed as number of pieces and the two dimensions diameter and height;
- for mineral wool, having forms other than plugs, expressed as number of pieces and the three dimensions length, height, and width;
- for other pre-shaped growing media, expressed as size in at least two dimensions;
- for other growing media, expressed as total volume;
- except for pre-shaped growing media, quantity expressed as volume of materials with a particle size greater than 60 mm, when present;

e) range of moisture content or the dry matter content expressed as % by mass;

f) a list of all components above 5 % by product weight or volume in descending order of magnitude by dry weight; where the component is a substance or a mixture, it shall be identified as specified in Article 18 of Regulation (EC) No 1272/2008;

g) the recommended conditions of storage and the recommended 'use by' date and production date;

h) guidelines for safe handling and use, including any relevant information on measures recommended to manage risks to human, animal or plant health, to safety or to the environment;

i) instructions for intended use, including application rates, timing and frequency, and target plants or mushrooms;

j) pH;

k) electrical conductivity given as mS/m, except for mineral wool;

l) nitrogen (N) extractable by $CaCl_2$/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 150 mg/l;

m) phosphorus pentoxide (P_2O_5) extractable by $CaCl_2$/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 20 mg/l;

n) potassium oxide (K_2O) extractable by $CaCl_2$/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 150 mg/l;

q) the following nutrients expressed as % by mass shall be declared, if exceeding 0.5 % by mass: nitrogen (N), phosphorus pentoxide (P_2O_5) and potassium oxide (K_2O).

r) Chromium (total), quantified as set in criterion 4.1(b), if above 200 mg/kg DM;

o) a statement about the professional horticultural application, in the case of mineral growing media.

Assessment and verification:

The applicant shall declare that the product complies with this criterion and provide the competent body with the text of the user information written on the packaging or on accompanying fact sheets.

Rationales behind the proposed criterion

Aim

To support the policy harmonisation, it is considered relevant to accommodate under the EU Ecolabel scheme these products that are CE labelled in the product function category: soil improvers and growing media. For this reason, it is proposed to harmonise the criterion's formulation with specifications established by the FPR. This will simplify the compliance check and will establish the base to consider CE marked product compliant with the requirement. All in all, alignment with the labelling rules established by the FPR might generate several noticeable benefits to an applicant, verification body and an end-user, among them:

- Simplification of the criteria and removal of additional administrative burden for an applicant by the mutual recognition of CE marking.
- Reduction of CBs workload if control mechanisms are fully or partially implemented at the EU level.
- Supporting FPR implementation towards the unification of EU fertilizer product labelling scheme.
- Consumer receives information in the "standardised" form.

Main outcomes from stakeholders' consultations

As the outcome of the criteria validity assessment (October 2020), 52% of stakeholders considered that the criterion is adequate and does not need to be changed, whereas 10% and 15% indicated the need for a thorough or light revision, respectively. In general, stakeholders requested to simplify the rules for the provision of information, as well as to assess if all information requested brings additional benefits for the end-user. It was also suggested to harmonise the provision of information with the labelling instructions established by the FPR in combination with related EN Standards. Stakeholders noticed that some information should rather be incorporated into product technical dossier and not to be displayed on the product packaging.

During the technical sub-group meeting in June 2021, experts agreed about having the same layout of the CE marked product, but additional information about functional requirements should be described.

It was also suggested to report on the label the range of the moisture content, rather than the specific value as suggested by the FPR. This is important because the moisture content varies according to the external atmospheric conditions. Stakeholders also noticed that components of growing media are always labelled in % by volume.

Legal and technical aspects

According to the FPR, the EU fertilising product '***means a fertilising product which is CE marked when made available on the market'***. Harmonised product labelling is one of the key product requirements as specified by Art 4 of the FPR. If a product meets the safety, quality and labelling requirements, it can be placed on the market according to a specific conformity assessment procedure within the meaning of Article 15 in conjunction with Annex IV to the FPR. It can be CE marked and sold freely throughout the EU and may no longer be hindered by product-related national measures and regulations, which is expressly stipulated by Article 3 of the FPR. Accordingly, no Member State may demand additional marking elements for such EU fertilising products based on its national regulations, nor may national regulations result in EU fertilising products having to be changed in their composition. The Regulation (EU) No 2019/1009 ensures a level playing field for all fertilising products and enables the free trading that is an enormous advantage for companies operating throughout the EU.

The FPR applies to a CE marked product when made available on the market. **The manufacturers of fertilisers that do not bear the CE marking will still have the opportunity of marketing and selling them on their local national market** (under obligation to meet the national rules for fertilising products). **This means that FPR**

will exist in parallel to the national legislation with mutual recognition. Product manufacturer will accordingly have a certain freedom of choice. In this line, **EU Ecolabel can also be awarded to non-CE marked** products as long as they are sold on the national market, under the obligations of that specific country.

Annex III to the FPR specifies the labelling requirements for EU fertilising products. The requirements laid down in Part II and Part III of this Annex for a given PFC apply to EU fertilising products in all subcategories of that PFC. Part III of Annex III informs about the permissible tolerances for the declared parameters. For a better visualisation, the key differences between the labelling rules established by the FPR and the currently valid EU Ecolabel criterion 12 are marked in blue. The comparison includes general labelling requirements (Part I to Annex III to FPR) and product specific labelling requirements (Part II to Annex III to FPR) for the product function category: growing media and soil improvers.

Based on Table 17, the provision of information on a product as established by the FPR is much broader than that under criterion 12. The FPR labelling rules address all fertilising product categories, whereas EU Ecolabel refers only to soil improvers and growing media. It is important to stress that the FPR also requires provision of information on the product chemical profile. Part III of Annex III to FPR indicates the acceptable tolerances for the declared parameters.

Three optional proposals for product labelling requirement were discussed along the revision process:

- Option I – to fully harmonise product labelling with the rules established by the FPR for the given product category, referring to the Part I and II of Annex III to Regulation (EU) 2019/1009 for a given product function category soil improvers or growing media, as applicable, as defined in Part I of Annex I to this Regulation.

- Option II - To withdraw the criterion and to ensure, under the preamble to the Annex of the revised Commission Decision, the provision of information in line with the FPR labelling requirements specified under Annex III to Regulation (EU) 2019/1009.

- Option III - To list these FPR labelling requirements that correspond to the currently valid criterion (Table 17).

The main drawback for Option I and II was attributed to the fact that a potential applicant that is not targeting CE marking would need to adapt to the labelling requirements of the FPR.

Option III harmonizes the current criterion 12 with terminology established by Part I and II of Annex III to Regulation (EU) 2019/1009. It is meant to establish the compliance between EU fertilising products (CE marked) and EU Ecolabel product without requiring license holders to conduct the conformity check with the FPR. The EU Fertilising product falling within product function category soil improvers (PFC 3) or growing media (PFC 4) in the meaning of Regulation (EU) 2019/1009 shall be deemed to comply with the requirement.

Following Commission Delegated Regulation (C(2021) 4250 final, "*the element on which the 5% limit is applied should be adapted to the physical characteristics of the fertilising product concerned and thus a declaration of ingredients representing 5% of volume should be allowed. Especially in case of products where the quantity is indicated by volume, listing the ingredients representing 5% of the volume is preferable as the relative ingredients' weight by products weight is not always known. As regards the EU fertilising product in liquid form, it is appropriate to label the ingredients above 5% by dry weight as otherwise there might be situations in which only water would be listed as an ingredient".*

After the EUEB meeting held in November 2021:

- The product function categories involved were specified to avoid any confusion;

- The word 'ingredient' was substituted with the word 'component' according to the given definition;
- Specifications about plugs of mineral wool were necessary due to different shape compared to the other forms available on the market. The proposed dimensions were aligned with the on-going standardization work.
- In the section of the 'assessment and verification', the sentence about the EU fertilising product was removed because it applies anyway to those products.

After the EUEB meeting held in March 2022, a requirement was added – reporting the concentration of Cr (TOT) in growing media, when this concentration is above 200 mg/kg DM. This is an alignment to the FPR due to the new limit set in criterion 4.1(b).

Table 17. Comparison between current criterion 12 on the provision of information and FPR requirements on product labelling.

EU Ecolabel			Fertilising Product Regulation	
Soil improvers	**Mulch**	**Growing media**	**PFC 3(A):ORGANIC SOIL IMPROVERS**	**PFC 4: GROWING MEDIUM**
The name and address of the body responsible for marketing;	The name and address of the body responsible for marketing;	The name and address of the body responsible for marketing;	x	x
A descriptor identifying the product by type, including the wording "SOIL IMPROVER";	A descriptor identifying the product by type, including the wording "SOIL IMPROVER";	A descriptor identifying the product by type, including the wording "GROWING MEDIUM";	-for EU fertilising products in PFC 1 to PFC 6, the designation as indicated in Part I of Annex I of the PFC corresponding to the product's claimed function; or -for EU fertilising products in PFC 7, the designations as indicated in Part I of Annex I of all the PFCs corresponding to the claimed functions of the component EU fertilising products;	
A batch identification code;	A batch identification code;	A batch identification code;	x	x
The quantity (in weight);	The quantity (in weight);	The quantity (in volume or number of slabs, in case of mineral wool, specifying the dimensions of the slab);	the quantity of the EU fertilising product, indicated by mass or volume;	
				Quantity: —for mineral wool, expressed as number of pieces and the three dimensions length, height, and width; —for other pre-shaped growing media, expressed as size in at least two dimensions; —for other growing media, expressed as total volume; —except for pre-shaped growing media, quantity expressed as volume of materials with a particle size greater than 60 mm, when present;
Range of moisture content;	Range of moisture content;	Range of moisture content;	The dry matter content expressed as % by mass shall be declared	x
The main materials (those over 5% by weight) from which the product has been manufactured;	The main materials (those over 5% by weight) from which the product has been manufactured;	The main materials (those over 5% by volume) from which the product has been manufactured;	a list of all ingredients above 5 % by product weight in descending order of magnitude by dry weight, including the designations of the relevant CMCs as referred to in Part I of Annex II to this Regulation; where the ingredient is a substance or a mixture, it shall be identified as specified in Article 18 of Regulation (EC) No 1272/2008.	
The recommended conditions of storage and the recommended 'use by' date;	x	The recommended conditions of storage and the recommended 'use by' date;	recommended storage conditions;	
				production date.
Guidelines for safe handling and use;	Guidelines for safe handling and use;	Guidelines for safe handling and use;	any relevant information on measures recommended to manage risks to human, animal or plant health, to safety or to the environment;	
A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of	A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of the product for	A description of the purpose for which the product is intended and any limitations on use, including a statement about the suitability of the product for	-Where the EU fertilising product contains a substance for which maximum residue limits for food and feed have been established in accordance with Regulation (EEC) No 315/93, Regulation (EC) No 396/2005, Regulation (EC) No 470/2009 or Directive 2002/32/EC, the instructions referred to in point 1(d) shall ensure that the intended use of the EU fertilising product does not lead to the exceedance of those limits in food or feed.	

EU Ecolabel			Fertilising Product Regulation	
Soil improvers	**Mulch**	**Growing media**	**PFC 3(A):ORGANIC SOIL IMPROVERS**	**PFC 4: GROWING MEDIUM**
the product for particular plant groups (e.g. calcifuges or calcicoles);	particular plant groups (e.g. calcifuges or calcicoles);	particular plant groups (e.g. calcifuges or calcicoles);	-Where the EU fertilising product contains derived products within the meaning of Regulation (EC) No 1069/2009 other than manure, the following instruction shall be provided on the label: 'Farmed animals shall not be fed, either directly or by grazing, with herbage from land to which the product has been applied unless the cutting or grazing takes place after the expiry of a waiting period of at least 21 days.'. -Where the EU fertilising product contains ricin, the following instruction shall be provided on the label: 'Hazardous to animals in case of ingestion'. -Where the EU fertilising product contains unprocessed or processed cocoa shells, the following instruction shall be provided on the label: 'Toxic to dogs and cats'. -Where the EU fertilising product contains a polymer with the purpose of binding material in the product, as referred to in point 1(c) of CMC 9 in Part II of Annex II, the user shall be instructed not to use the product in contact with soil, and in collaboration with the manufacturer, make sure of a sound disposal of the products after end of use.	
pH (reference of the test method used);	pH (reference of the test method used);	pH (EN 13037);	pH	pH
Organic carbon content (%), total nitrogen content (%) and inorganic nitrogen content (%) (reference to the test method used);			Where the information requirements in this Annex refer to organic carbon (Corg), the information may refer to organic matter instead of or in addition to organic carbon (Corg), in accordance with the following conversion factor: *organic carbon (Corg) = organic matter × 0,56.*	
			organic carbon (Corg) content, expressed as % by mass;	x
			minimum amount of organic nitrogen (Norg), expressed as % by mass, followed by a description of the origin of the organic matter used;	—nitrogen (N) extractable by CaCl2/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 150 mg/l;
Carbon/Nitrogen ratio;			the ratio of organic carbon to total nitrogen (Corg/N).	x
Total phosphorus (%) and total potassium (%) (reference to the test method used) ;			The following nutrients expressed as % by mass shall be declared, if exceeding 0,5 % by mass: nitrogen (N), phosphorus pentoxide (P2O5) and potassium oxide (K2O).	—phosphorus pentoxide (P2O5) extractable by CaCl2/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 20 mg/l; —potassium oxide (K2O) extractable by CaCl2/DTPA (calcium chloride/ diethylenetriaminepentaacetic acid; 'CAT-soluble'), if above 150 mg/l;
For products for non-professional use, a statement about the stability of organic matter (stable or very stable);	A statement about the stability of organic matter (stable or very stable), where applicable, for non-professional uses;	A statement about the stability of organic matter (stable or very stable);	x	x
A statement on recommended methods of use;	A statement on recommended methods of use;	A statement on recommended methods of use;	instructions for intended use, including application rates, timing and frequency, and target plants or mushrooms;	
In non-professional applications: recommended rate of application expressed in kilograms of product per unit surface area (m2) per annum.	In non-professional applications: recommended rate of application expressed in mm.	For mineral growing media, a statement about the professional horticultural application.		
x	x	Electrical Conductivity (1:5 extraction);	electrical conductivity, given as mS/m;	electrical conductivity given as mS/m, except for mineral wool;
x	x	Germination inhibition (EN 16086-1);	x	*x*
x	x	Growth inhibition (EN 16086-1);	x	*x*
x	x	x	Information other than the information required under points 1 to 6:	

EU Ecolabel			Fertilising Product Regulation	
Soil improvers	Mulch	Growing media	PFC 3(A):ORGANIC SOIL IMPROVERS	PFC 4: GROWING MEDIUM
			(a)shall not mislead the user, for example by attributing to the product properties that it does not possess, or by suggesting that the product possesses unique characteristics which similar products also have; (b)shall relate to verifiable factors; (c)shall not make claims such as 'sustainable' or 'environmentally friendly' unless such claims refer to legislation, or clearly identified guidelines, standards or schemes, with which the EU fertilising product complies; and (d)shall not make claims by means of statements or visual representations that the EU fertilising product prevents or treats plant diseases or protects plants against harmful organisms.	
x	x	x	The phrase 'poor in chloride' or similar may only be used if the chloride (Cl^-) content is below 30 g/kg of dry matter.	
x	x	x	Where the nutrient content information requirements in this Annex are expressed in oxidised form, the nutrient content may be expressed in elemental form instead or in addition to the oxidised form in accordance with the following conversion factors: phosphorus (P)= phosphorus pentoxide (P_2O_5) × 0,436; potassium (K)= potassium oxide (K_2O) × 0,830; calcium (Ca)= calcium oxide (CaO) × 0,715; magnesium (Mg)= magnesium oxide (MgO) × 0,603; sodium (Na)= sodium oxide (Na_2O) × 0,742; sulphur (S)= sulphur trioxide (SO_3) × 0,400.	

Source: (EC 2019, EC 2015)

5.8. Criterion 8. Information appearing on the EU Ecolabel

Criterion on Information appearing on the EU Ecolabel
The optional label with text box shall contain the following text: *—promotes the recycling of materials* *—promotes the use of renewable and recycled materials* *For soil improvers and mulch, the additional information shall be included:* *—reduces soil and water pollution, by limiting heavy metals concentrations* *The guidelines for the use of the optional label with the text box can be found in the 'Guidelines for the use of the EU Ecolabel logo' on the website:* *http://ec.europa.eu/environment/ecolabel/documents/logo_guidelines.pdf* *Assessment and verification: The applicant shall provide the Competent Body with a sample of the product packaging showing the label, together with a declaration of compliance with this criterion.*
Proposed revised criterion on Information appearing on the EU Ecolabel (post open consultation and EUEB meeting)
Criterion 8 – Information appearing on the EU Ecolabel If the optional label with text box is used, it shall contain the following three statements: - promotes the recycling of materials; - promotes the use of materials produced in a more sustainable manner, thus reducing environmental degradation. For soil improvers, the additional information shall be included: - contributes to reducing soil and water pollution. The applicant shall follow the instructions on how to properly use the EU Ecolabel logo provided in the EU Ecolabel Logo Guidelines: https://ec.europa.eu/environment/ecolabel/ ***Assessment and verification:*** *The applicant shall provide a declaration of compliance with this criterion, supported by a high resolution image of the product packaging that clearly shows the label, the registration/licence number and, where relevant, the statements that can be displayed together with the label*

Rationale behind the criterion

The discussion with stakeholders indicated the agreement to maintain the criterion in its current form, and to revise the formulation of the criterion. A digital image of a product is considered sufficient to verify compliance with the criterion.

6. MAIN CHANGES PROPOSED FOR THE REVISED CRITERIA COMPARED TO CURRENTLY VALID REQUIREMENTS

The key changes proposed for the revised criteria are summarised below and compared with the EU Ecolabel criteria for growing media, soil improvers and mulch as established by Commission Decision (EU) 2015/2099, which is a subject of this revision.

Although no new requirement has been added, the precise wording, sub-structure and ambition level of the current criteria have been updated. These changes reflect knowledge gained through interaction with stakeholders, data collection and desk research as well was accommodate the recent policy developments.

On that account, whenever applicable, the revised criteria and terminology used are proposed to be consistent with Fertilising Product Regulation (EU) 2019/1009. This, due to the mutual recognition, is supposed to reduce additional administrative burdens and decrease overall application cost, and is also likely to stimulate the uptake of the product group.

Notwithstanding, it is important to notice that these requirements that are built on the FPR, in general, represent a higher overall ambition level than the Regulation. The similarities or differences in the ambition level between the currently valid criteria set, the FPR, and the proposed criteria are also outlined below, if applicable.

In general, the proposed EU Ecolabel criteria are characterised by the following new features:

- More secondary raw materials are accepted into the scheme to incentivise the circular economy, and in particular promote a more resource-efficient use of nutrients.
- A decreased content of contaminants, like heavy metals, improves the safety of the products, and reduces the possible risk to human, animal or plant health or to the environment.
- New principles set by the latest EU strategic context are included in the proposed criteria with particular reference to the Biodiversity Strategy and Soil Strategy.
- The content of impurities, such as plastics, metal and glass, is proposed to be limited to the technically feasible extent.

Note: Due to the complexity of applying a number of pass-fail conditions to an entire industry, the cumulative effect of all of changes that are proposed is not possible to be evaluated.

1. SCOPE AND DEFINITION

- For the sake of coherence across different policies, the name of the product group is now harmonised with the product function categories PFC 3 (soil improvers) and PFC 4 (growing media) as established by Fertilising Product Regulation.
- The FPR and CEN/TC 223 understand mulches as sub-category of soil improvers. The proposed change to the name of the product group clarifies the type of products that are included in the scope. The current scope is harmonised with the industry practice. However, additional clarification is added under definitions that the mulch product category is understood as soil improver.

2. GENERAL ASSESSMENT AND VERIFICATION

- The general rules for the assessment and verification are harmonised horizontally with other EU Ecolabel product groups.
- No content wise changes to the current formulation of the sampling and testing requirements are proposed. These are built on the European Standard EN 12579 that specifies methods for sampling soil improvers and growing media (excluding liming materials) for subsequent determination of quality and quantity.

- The future FPR harmonised standards for test and sampling methods are taken as reference as soon as they will be available.

3. CRITERION 1: COMPONENTS

- The term constituent does not appear in the Fertilising Product Regulation and is proposed to be replaced by "component material" in line with that Regulation. It is also proposed to simplify the requirement on input materials by merging the currently valid Criterion 1 and 2 under the common denominator: Components.

The non-peat content can only be verified by a manufacturer if the single input material, or a mix of single input materials, such as bark, wood, etc, is used in a final product. If a manufacturer uses separately collected green waste or bio-waste to produce compost, such input material might contain root balls containing peat. Therefore, the EUEL criterion on peat exclusion is proposed to be modified as follows: 'A final product shall not contain intentionally added peat.'

Criterion 1.1. Organic components of the product

- The proposed criterion lists which materials can be used untreated as organic component, and which materials must undergo aerobic composting or anaerobic digestion before being used as organic components. This assure the inclusion of compost and digestate produced using specific materials.

- Criterion 1.1. is proposed to be converted into a positive list of admitted components. The inclusion criteria are largely harmonised with Fertilising Product Regulation, and they set a wider range of materials to promote the circular economy.

- The word "fiberisation" is proposed to be added to Criterion 1.1.(a) to accommodate heat treated components such as wood and wood fibre.

- The exclusion criterion of several materials that cannot be accepted, even after processing, under the EU Ecolabel growing media and soil improvers, is fully harmonised with the FPR; namely: 1) *materials originating from mixed municipal waste; 2) sewage sludge, industrial sludge or dredging sludge*; 3) *animal by-products or derived products falling within the scope of Regulation (EC) No 1069/2009, for which no end point in the manufacturing chain has been determined* (Criterion 1.1.(2)). The specific list of admitted sludge is harmonised with the currently valid criterion.

- The reference to "Materials derived from any other biomass by-products that are not mentioned above, as defined in Article 5 of Directive 2008/98/EC, " is proposed to be withdrawn due to the lack of clarity on the inclusion/exclusion criteria.

- It is proposed to withdraw the reference to manure. Manure that will be placed on the market needs to comply with the conditions outlined in Regulation 142/2011, Annex XI, Section 2. Hence, the manure that we include is likely to fall under Category 2 or Category 3 materials or derived products that have reached an end point in the manufacturing chain.

4. CRITERION 2: MINERAL COMPONENTS

Criterion 2.1 – Energy consumption and CO_2 emissions during the manufacture of mineral growing media

- Limit values were referred to "product", which is defined as the mineral wool in any of the forms placed on the market (e.g. slabs, cubes, plugs).
- Limit value of the CO_2 emissions was decreased from 0.8 to 0.7 t CO_2/t of product, which is a value that currently can be met by about 25% of the European plants.

- The factor 2.5 in the formula about the energy-to-product ratio was decreased to 2.1, in accordance to the Annex IV to Directive (EU) 2018/2002 on energy efficiency.

- Indirect CO_2 emissions are now directly calculated in accordance with Commission Delegated Regulation (EU) 2019/331.

- Three legal references were updated:

    - Commission implementing Decision 2011/877/EU was repealed by COMMISSION DELEGATED REGULATION (EU) 2015/2402 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU.

    - Commission Regulation (EU) No 601/2012 was repealed by COMMISSION IMPLEMENTING REGULATION (EU) 2018/2066 on the monitoring and reporting of greenhouse gas emissions.

    - Commission Regulation (EU) No 600/2012 was repealed by COMMISSION IMPLEMENTING REGULATION (EU) 2018/2067 on the verification of data and on the accreditation of verifiers.

Criterion 2.2 – Sources of mineral extraction

- The requirement is proposed to be expanded to all excavation sites to ensure an overall implementation of the mitigation hierarchy.

- The proposed criterion is fully harmonised with criterion 1.1. set by Commission Decision (EU) 2021/476 establishing EU Ecolabel criteria for hard floor covering.

Criterion 2.3. Mineral growing media use and after use

- Definition of horticultural application was specified adding "green walls and/or green roofs".

- It was specified that the mandatory recycled portion of the applicant sales (70%) is expressed in volume.

5. CRITERION 3 – ORGANIC COMPONENTS AND RECYCLED/RECOVERED MATERIALS IN GROWING MEDIA

Specific documents are requested about the amount and origin of recycled material used for the production of mineral wool. Additionally, the word "constituent" was substituted with the word "component" to harmonise wording in the whole document.

6. CRITERION 4 –~~EXCLUDED AND LIMITED~~ RESTRICTED SUBSTANCES

Criterion 4.1 – Limits for Heavy metals

The ambition level of revised thresholds values for heavy metals content in a final product is on average equal or higher than that established by the FPR and several Member States.

- For soil improvers, the currently valid requirement refers to "*soil improvers, mulch and organic constituents of growing media*". This is proposed to be changed, and in line with the FPR, after consultation with the technical sub-group in June 2021, the requirement is proposed to be allocated to the final product: soil improvers and growing media.

- ARSENIC: The requirement that sets a maximum permitted content of arsenic is a new entrance to the list of restricted PTEs. This harmonises the EU Ecolabel restricted PTEs list with the FPR, which establishes the limit content of 40 mg As/kg DM. The maximum permitted content of As in growing media and soil improvers across some Member States varies between 10 and 50 mg/kg DM. The threshold of 10 mg/kg DM is proposed, which represents four times higher ambition level than that required by the FPR, and five times higher than the limit found in some Member States.

- CADMIUM: The currently valid EUEL reference value for GM of 3 mg/kg DM is twice less ambitious than the threshold established by the FPR (1.5 mg/kg DM). The average permitted Cd content in growing media across several Member States is in the range of 1.5 to 3 mg/kg DM (Table 10). A new proposed EUEL reference value of 1.3 mg/kg DM increases the ambition level by almost 60% and is based on the ECN-QAS for compost and digestate (ECN, 2018). When comparing with the FPR the proposed revised threshold represents more than 10% higher ambition level, and it is also beneath the average reference value for Cd required by several Member States. For soil improvers product category, no changes in the reference value for Cd are proposed.

- CHROMIUM– The currently valid criterion refers to total chromium. It is proposed to reduce the reference value to 100 mg/kg DM for soil improvers and growing media other than mineral growing media. Only for mineral growing media, the limit of total chromium is proposed equal to 310 mg/kg DM, due to peculiar composition of these products. The proposed revised reference value is based on national requirements for Cr total, of which the lower range is 50-100 mg /kg, and test reports from certified laboratories. The proposed criterion includes measurements of Cr(VI) only for mineral growing media, and it uses the same limit value used in the currently valid criterion (2 mg /kg).

- COPPER: During the technical sub-group meeting, considering that copper is a macronutrient for the plants, stakeholders proposed to harmonise the reference value for copper with that established by the FPR for growing media (200 mg/kg DM). On average, depending on the product type, the national legislation across several Member States refers to the Cu limit content in the range of 100-300 mg/kg DM (mathematical average value of 230 mg/kg DM).

- MERCURY: The currently valid EUEL reference value of 1 mg/kg DM is in line with the FPR, and is also the most commonly referred (9 out of 16 Members States) threshold value across analysed Member States' legislation. Nevertheless, several Member States under the national legislation set up the limit in the range of 0.3-0.8 mg/kg DM. It is proposed to harmonised the revised reference value with the ECN-QAS for compost and digestate - 0.45 mg/kg DM (ECN, 2018). This represents an increase in the ambition level by 55%.

- NICKEL: The currently valid EUEL reference value of 90 mg/kg DM for GM is less ambitious than the threshold established by the FPR (50 mg/kg DM). The revised value is proposed to be harmonised with ECN-QAS. This doubles the ambition level of the currently valid requirement.

- LEAD: The currently valid EUEL reference value of 150 mg/kg DM for GM is higher than the threshold established by the FPR (120 mg/kg DM). The reference value for lead for growing media is proposed to be harmonised with the currently valid reference value for soil improvers (100 mg/kg DM). This increments the ambition level of the revised threshold by slightly more than 15% and 30%, when comparing with the FPR and currently valid EU Ecolabel threshold for lead content in growing media, respectively.

- The test methods required for the assessment and verification are proposed to be fully harmonised with the testing requirements established by the FPR and on-going work of the CEN Technical Committee.

Criterion 4.3 and 4.4.
Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008
Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) No 1907/2006

The revised structure of the horizontal hazardous substance criterion 4.3. (CLP restrictions), and criterion 4.4 (SVHC restriction) follows the general recommendations of the EU Ecolabel Chemicals Task Force and focuses on the final product.

- Soil improvers and growing media are considered chemical mixtures. Accordingly, under current formulation of CLP restrictions criterion the cut-off value of the screening of the product's composition for hazards shall be 0.010% w/w.
- The SVHCs are regulated complying with the REACH Regulation 1272/2008. Therefore, SVHC are proposed to be restricted to 0.10% at the level of ingoing substances, and not at the level of the final product (0.01% w/w). Verification of SVHC concentrations in any product can only be performed by declarations from suppliers of ingoing ingredients, chemicals or materials. REACH only requires them to declare if there is an SVHC above 0.1%. This represents the more stringer approach (allocation to incoming substances), which is possible without any major increase in assessment and verification difficulties thanks to the communication requirements set out by REACH.

Criterion 4.5. Microbiological criteria

- The current EU Ecolabel criterion includes monitoring for *Salmonella spp.* and *Escherichia coli.* The FPR establishes the equivalency for testing of *E.coli* and *Enterococcaceae* content. The revise criterion is proposed to be harmonised with the FPR, by adding testing requirement for *Enterococcaceae* content.

7. CRITERION. 5 FITNESS FOR USE

The proposed Criterion 5 accommodates the currently valid Criteria 6 to 10 under a common denominator: *Fitness for use*. This change aims at simplification of the criteria text, and also targets a logical grouping of these requirements that address final product quality/physic-chemical parameters. Altogether, the proposed changes are mainly structural but minor content wise modifications are also proposed to be introduced.

Criterion 5.2. Macroscopic impurities

The current criterion 7 requires that the content of glass, metal and plastic with mesh size of > 2 mm in a final product shall be lower than 0.5%, measured in terms of dry weight (5 g per 1kg). According to the FPR, compost (CMC 3) and digestate (CMC 5) should contain no more than 3 g/kg dry matter of macroscopic impurities above 2 mm of glass, metal or plastics and no more than 5 g/kg dry matter of the sum of these impurities (glass, metal or plastics) . From 16 July 2026 the presence of plastics above 2 mm within the maximum limit value shall be no more than 2,5 g/kg dry matter. The revised EUEL criterion 5.2. on physical contaminants is proposed to apply a stringer approach for plastic impurities content, and thus to go beyond the current regulatory requirements of the FPR.

Criterion 5.3. Organic matter and dry matter in soil improvers

The current requirement on organic matter content (OM) of 25% for the organic constituents is harmonized with the EoW criteria for biodegradable waste and refers to soil improvers. In line with the FPR, the revised criterion introduces the concept of the organic carbon (C_{org}) content and also notify the conversion factor (C_{org}) = organic matter (OM) × 0.56.

- The ambition level of the currently valid criterion is more demanding than that of the FPR by requiring at least 25% of dry matter content (% FW) (FPR: min 20% FW), and at least 15% of organic matter content (% DW) that corresponds to 8.4% of organic carbon (C_{org}) content by mass (FPR: C_{org} min 7.5% DW). This is supposed to maximise the inclusion of bio-waste based input material.

6. CRITERION 6. GROWING MEDIA FEATURES

- The Current requirement on pH specifies that the final product shall be in the range 4 - 7. The restriction of pH of the final product is proposed to be removed. The pH value should however be reported on the product (Criterion 7). In the first place, the incorporation of compost requires enhancing the upper range of pH limit

value. Furthermore, the broad range of the optimum acidity requirements among plants, including acidophilic ones, does not support the pH range restrictions. This proposal accommodates the conclusion from the discussion with the technical sub-group in June 2021.

- Based on stakeholders feedback the threshold values are proposed to be maintained.

7. CRITERION 7: PROVISION OF INFORMATION

No major content wise change of the current criterion is proposed. The key modification refer to the structure of the criterion, and harmonisation of terminology used with the specifications established by the FPR. Having the same layout as the CE marked product could potentially simplify the verification process and increase the uptake of the product group.

Table 18. Comparison and applicability of EU Ecolabel criteria for growing media soil improvers and mulch ((EU) 2015/2099) and proposed revised EU Ecolabel criteria for growing media and soil improvers

EU Ecolabel for growing media, soil improvers and mulch (2015/2099/EC)	Proposed EU Ecolabel for growing media and **soil improvers and mulch (20**22/XXX/**EU)**	Applicability of proposed revised criteria		
		GM	**SI inc. M**	**M**
Criterion 1 - Constituents	Criterion 1 - Components	x	x	x
Criterion 2 - Organic constituents	Criterion 1.1 - Organic components of the product	x	x	x
Criterion 3 - Mineral growing media and mineral constituents	Criterion 2 - Mineral components	x	x	x
Criterion 3.1. - Mineral growing media and mineral constituents: Energy consumption and CO_2 emissions	Criterion 2.1. - Energy consumption and CO_2 emissions during the manufacture of mineral growing media	x		
Criterion 3.2 - Mineral growing media and mineral constituents: Sources of mineral extraction	Criterion 2.2 - Sources of mineral extraction	x	x	x
Criterion 3.3 - Mineral growing media and mineral constituents: Mineral growing media use and after use	Criterion 2.3 - Mineral growing media use and after use	x		
Criterion 4 - Recycled/recovered materials and renewable materials in growing media	Criterion 3 – Organic components and recycled/recovered materials in growing media	x		
Criterion 5 - Limitation of hazardous substances	Criterion 4 - ~~Excluded and r~~Restricted substances	x	x	x
Criterion 5.1 - Heavy metals	Criterion 4.1 – Limits for heavy metals	x	x	x
Criterion 5.2 - Persistent Organic Pollutants	Criterion 4.2 – Limits for polycyclic aromatic hydrocarbons (PAHs)	x	x	x
Criterion 5.3 - Hazardous substances and mixtures	Criterion 4.3 - Restrictions on substances and mixtures classified as hazardous under Regulation (EC) No 1272/2008 of the European Parliament and of the Council	x	x	x
Criterion 5.4 - Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006	Criterion 4.4 - Restrictions on substances of very high concern (SVHCs) as identified under Regulation (EC) No 1907/2006 of the European Parliament and of the Council	x	x	x
Criterion 5.5 - Pathogens	Criterion 4.5 – Microbiological criteria	x	x	x
Criterion 6 - Stability	Criterion 5 – Fitness for use Criterion 5.1 – Stability	x	x	x
Criterion 7 - Physical contaminants	Criterion 5.2 - Macroscopic impurities	x	x	x
Criterion 8 - Organic matter and dry matter	Criterion 5.3 - Organic matter and dry matter in soil improvers		x	x

EU Ecolabel for growing media, soil improvers and mulch (2015/2099/EC)	Proposed EU Ecolabel for growing media and **soil improvers and mulch (20**22/XXX/**EU)**	Applicability of proposed revised criteria		
		GM	**SI inc. M**	**M**
Criterion 9 - Viable weed seeds and plant propagules	Criterion 5.4 - Viable weed seeds and plant propagules	x	x	x
Criterion 10 - Plant response	Criterion 5.5 - Plant response	x	x	x
Criterion 11 - Growing media features	Criterion 6 - Growing media features Criterion 6.1 - Electrical conductivity	x		
	Criterion 6.2 - Sodium content	x		
	Criterion 6.3 - Chloride content	x		
Criterion 12 - Provision of information	Criterion 7 - Provision of information	x	x	x
	Criterion 7.1. - Soil improvers		x	
	Criterion 7.2 - Growing media	x		
Criterion 13 - Information appearing on the EU Ecolabel	Criterion 8 - Information appearing on the EU Ecolabel	x	x	x

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List of abbreviations and definitions

AHWG	Ad-hoc Working Group Meeting
APEOs	Alkylphenol ethoxylates
BAT	Best Available Techniques
BAT-AELs	BAT-associated emission levels
BREF	Best Available Techniques Reference Document
CEN	European Committee for Standardisation
CIC	Consorzio Italiano Compostatori
CMC	Component material category
CLP	Classification, Labelling and Packaging
CO_2	Carbon dioxide
ECAT	The EU Ecolabel Product Catalogue
ECN	European Compost Network
EMAS	Eco Management and Audit Scheme
EN	European Norm
EoW	End of waste
EU	The European Union
EUEB	The European Union Eco-labelling Board
EUEL	EU Ecolabel
FPR	Fertilising Product Regulation
GHG	Greenhouse gas
GM	Growing media
GWP	Global Warming Potential
LCA	Life Cycle Assessment
M	Mulch
NGOs	Non-governmental organisations
PAHs	Polycyclic aromatic hydrocarbons
PBT	Persistent Bioaccumulative Toxic
PFC	Product function category
PTEs	Potentially toxic elements
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
SI	Soil improvers
VPvB	Very persistent, very bioaccumulative

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ANNEXES

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ANNEX I. MARKET ANALYSIS

Data about material production were taken from the "PRODCOM list (NACE Rev. 2) – annual data (DS-066341)"[82], which uses the European Standard Classification of Productive Economic Activities (NACE). PRODCOM provides statistics on the production of manufactured goods carried out by enterprises on the national territory of the reporting countries.

Data about imports and exports of products were taken from the dataset "EU trade since 1988 by HS2,4,6 and CN8 [DS-645593]"[83], whose product codes are based on Harmonised System (HS), run by the World Customs Organisation (WCO), and Combined Nomenclature (CN). The CN is the classification used within the European Union for collecting and processing foreign trade data.

Most of PRODCOM headings correspond to one or more CN codes. As of 2019, components used in growing media, soil improvers and mulches correspond to nine PRODCOM codes and to 60 CN codes. The description of each code revealed the relevance of the product to the current study. The product share used for growing media, soil improvers and mulches was estimated following the analysis performed in the Preliminary Report related to the current criteria (JRC, 2013).

Table 19 reports the products sourced from the list of PRODCOM 2019, alongside with the corresponding codes used in the analysis of the last criteria revision (PRODCOM 2011). Whereas, Table 23 reports all products analysed from the list of CN 2019, alongside with the corresponding codes of PRODCOM 2019.

Data about Gross Domestic Product (GDP) at market price (millions of euro) and data about population were also sourced from Eurostat as reported in Table 27.

Estimates of production, exports and imports related to EU-27 were combined to estimate the apparent EU consumption, using the following formula:

Apparent consumption in EU-27 = Export to countries belonging to EU-27 − Export to countries outside EU-27 + Imports from countries outside EU-27

Table 19. Description of products chosen from the PRODCOM list with the estimated percentages of contribution assigned for mulches (M), growing media (GM) and soil improver (SI).

Code PRODCOM 2011	Code PRODCOM 2019	Description PRODCOM 2019	Unit	Percentage assigned to the product (%)		
				M	GM	SI
16101039	16101138	Coniferous wood sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. spruce "Picea abies Karst.", silver fir "Abies alba Mill." and pine "Pinus sylvestris L.")	m^3	50	0	0
16101050	16101250	Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness > 6 mm (excluding coniferous and tropical woods and oak blocks, strips and friezes)	m^3	21	0	0
16101071	16101271	Tropical wood, sawn or chipped lengthwise, sliced or peeled, end-jointed or planed/sanded, of a thickness > 6 mm	m^3	14	0	0
16102303	16102503	Coniferous wood in chips or particles	kg	100	0	0

[82] PRODCOM list (NACE Rev. 2) – annual data (DS-066341) is available at this link
[83] EU trade since 1988 by HS2,4,6 and CN8 [DS-645593] available at this link

Code PRODCOM 2011	Code PRODCOM 2019	Description PRODCOM 2019	Unit	Percentage assigned to the product (%)		
				M	GM	SI
16102305	16102505	Non-coniferous wood in chips or particles	kg	100	0	0
20153990	20153990	Mineral or chemical fertilisers, nitrogenous, n.e.c.	kg N	0	0	50
20157930	20157930	Fertilisers in tablets or similar forms or in packages of a gross weight of <= 10 kg)	kg	0	25	25
20157980	20157980	Other fertilisers, n.e.c.	kg	0	17	17
20158000	20158000	Animal or vegetable fertilisers	kg	0	50	50

Note:
The following product densities were adopted:
M density = 35 kg/m3 – Source: http://www.concrush.com.au/site/forest-mulch
SI density = 550 kg/m3 – Source: http://www.rolawn.co.uk/soil-improver.html
GM density = 350 kg/m3 – Source: http://www.fao.org/docrep/x5872e/x5872e0b.htm

Results

Table 20 contains information on the general production of mulches, growing media and soil improvers in EU-27 from 2017 to 2019. In terms of mass, the production of mulch (41.85 Mt) was about one order of magnitude higher than the production of growing media (4.36 Mt) and soil improvers (5.29 Mt). Whereas, in terms of value in billions of euro, the production of mulch (72.15 billion euro) was about two orders of magnitude higher than the production of growing media (0.63 billion euro), and about one order of magnitude higher than the production of soil improvers (1.15 billion euro). Table 20 reports also data related to 2011 and provided by JRC (2013). The two analysis report data in the same range for all products and units with exception of the value in billions of euro reported for mulches, which is about 24 times higher the current analysis. The reason of this very large difference is unknown.

Table 20. Production of mulches (M), growing media (GM) and soil improvers (SI) in Europe

Product	Unit	Current analysis				Analysis by JRC (2013)
		2017	2018	2019	Average	2011*
M	Mt (megatonne)	43.95	40.83	40.78	41.85	47.03
GM		4.73	4.02	4.31	4.36	2.73
SI		5.73	5.00	5.12	5.29	3.38
M	Billions of euro	73.73	71.96	70.74	72.15	3.23
GM		0.60	0.59	0.69	0.63	0.48
SI		1.19	1.04	1.20	1.15	1.13

Source: PRODCOM list (NACE Rev. 2) – annual data [DS-066341] is available at this link. Values refer to the reported EU-27 Total.
* Source: JRC (2013). Reported values included the United Kingdom.

Although some countries did not disclose some data in the PRODCOM list, the total value for EU-27 was available (EU-27 Total). Table 24 reports the completeness of data in the PRODCOM list for each country in EU-27. In general, Netherlands and Belgium did not disclose most of the data, whereas Slovenia and Sweden did not report about half of them. Ireland reported a descending number of data over the three investigated years. Nevertheless, the rest of the countries made available most of their data (Table 24). In terms of mass produced, the difference between the reported EU-27 total and the calculated EU-27 sum was very small (1-2%) for mulch, and larger for growing media and soil improvers (16-25%), according to the investigated year (Table 25). *EU-27 Sum* was simply calculated summing up the values reported by all the EU-27 Member States. In terms of value in euro of the production, the difference between the reported *EU-27 Total* and the calculated *EU-27 Sum* was very small (1-5%) for mulch and growing media, and larger for soil improvers (18-28%), according to the investigated year

Detailed production data in mass and value for each country are reported in Table 25 and

These differences provided a quick check of completeness of data used for the market analysis.

Besides analysing the mere production data, an analysis was performed on the GDP and the population of each country. Average values over the three investigated years were calculated for the production, GDP and population of each country. To investigate the most important players in the EU-27 market, six parameters were established:

- Production as Mt
- Production as Mt / GDP
- Production as Mt / population
- Production as billion euro
- Production as billion euro / GDP
- Production as billion euro / population

The production values were normalised by the GDP and population to understand if countries with low GDP and/or little population were relatively important players in the market. Table 21 reports the main players in the EU-27 market of mulches, growing media and soil improvers. Countries reported in red lack data as reported in Table 24.

Since in the calculation a missing datum was substituted by zero production, countries reported in red in Table 21 could play an even more important role in the market. In terms of mass, the largest producers of mulches were Sweden and Germany, whereas the largest producers of growing media and soil improvers were France, Spain and Italy. In terms of values in euro, Germany, France and Finland produced high value mulches, whereas France, Italy, Spain and Germany produced high value growing media and soil improvers. When normalising the production values with GDP and population, other countries covered a relative important share of the market: Estonia, Latvia, Finland, Belgium, Ireland, Greece, Poland and Czech Republic[84] (Table 21).

[84] In the used sources, "Czech Republic" was reported under the name of "Czechia".

Table 21. Main players in the EU-27 market of mulches (M), growing media (GM) and soil improvers (SI), considering average production from 2017 to 2019.

Parameter	M Country (% EU-27 prod.)	GM Country (% EU-27 prod.)	SI Country (% EU-27 prod.)
Production as Mt	Sweden (31%) Germany (14%)	France (31%) Spain (12%) Italy (10%)	France (34%) Spain (11%) Italy (10%)
Production as Mt / GDP	Estonia (35%) Latvia (20%)	Czech Republic (24%) Ireland (19%) Belgium (12%) Poland (11%)	Czech Republic (22%) Ireland (17%) Belgium (11%) Poland (10%)
Production as Mt / population	Estonia (35%) Sweden (19%) Latvia (13%) Finland (10%)	Ireland (39%) Belgium (15%) Czech Republic (14%)	Ireland (36%) Belgium (14%) Czech Republic (13%) France (10%)
Production as billion euro	Germany (17%) France (15%) Finland (14%)	France (25%) Italy (21%) Spain (20%) Germany (11%)	France (27%) Italy (19%) Germany (18%) Spain (15%)
Production as billion euro / GDP	Estonia (20%) Latvia (20%) Finland (12%)	Belgium (13%) Spain (13%) Ireland (12%) Czech Republic (11%)	Greece (17%)
Production as billion euro / population	Finland (23%) Estonia (18%) Latvia (14%)	Belgium (13%) Spain (13%) Ireland (12%) Czech Republic (11%)	Ireland (20%) Belgium (12%) France (11%) Greece (10%)

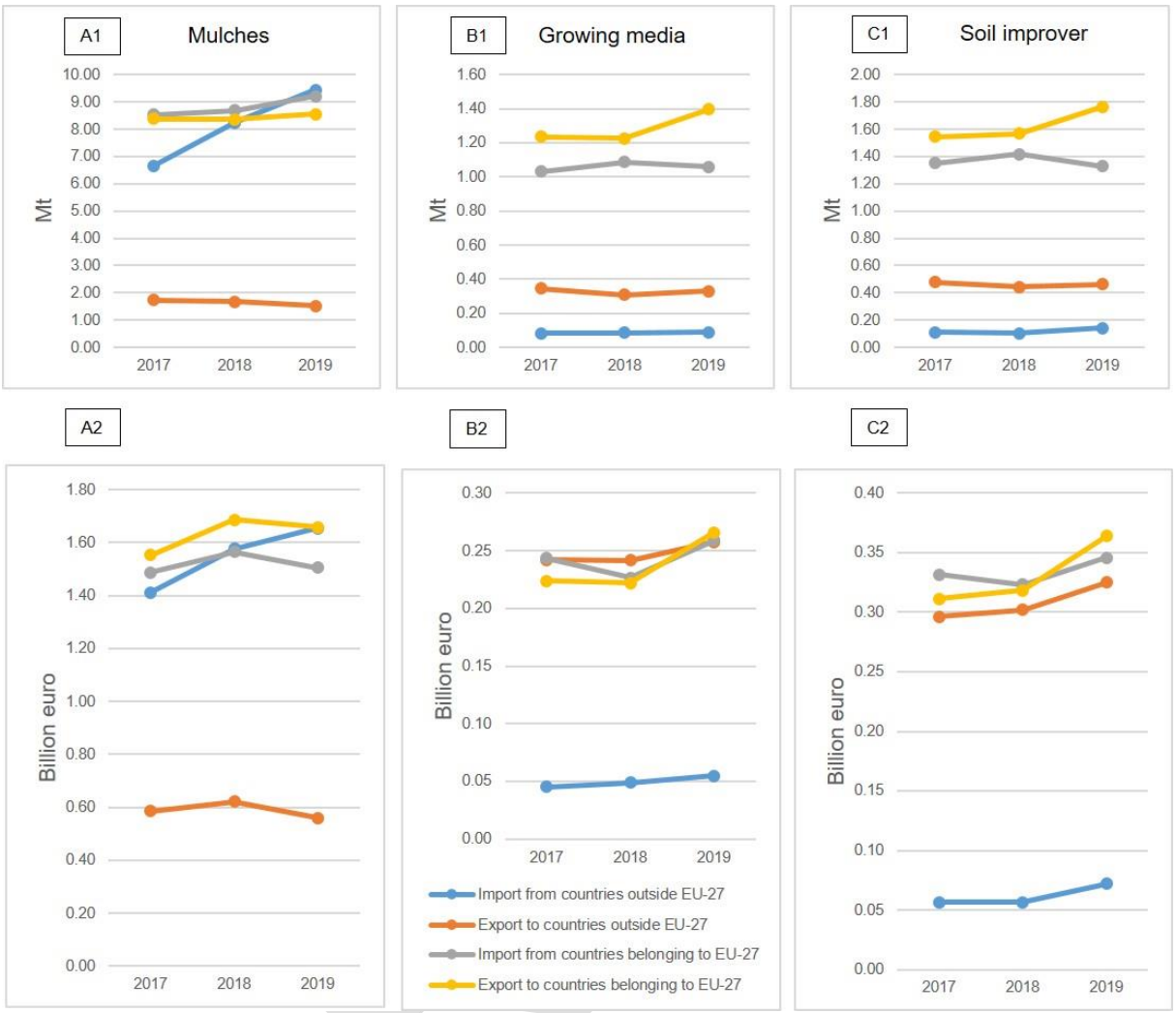
Note:
GDP: Gross Domestic Product
Population and GDP data were sourced from EUROSTAT
Countries reported in red lack of data as reported in Table 24.
The percentages are calculated comparing the production of the specific country with the EU-27 Sum, namely the sum of the reported values for all countries.

The list of CN 2019 contained 22 products useful for the current analysis and based on JRC (2013) (Table 23, Figure 10 shows values of import and export related to EU-27, with the following features:

- Imports and exports within EU-27 were in general higher than imports and exports with countries outside EU-27. This highlights a dynamic internal market among the Member States.
- For mulch (Figure 10 A1 and A2), the quantity and values in euro imported from countries outside EU-27:
    - are comparable with the magnitude of the internal market;
    - have been increasing from 2017 to 2019.
- For growing media and soil improvers, the relative small amount exported to countries outside EU-27 (B1 and C1) corresponded to a relative high value in euro (Figure 10 B2 and C2).

Table 28 reports specific values showed in Figure 10.

Figure 10. Import and export of mulches (as Mt A1 and as billion euro in A2), growing media (as Mt B1 and as billion euro in B2) and soil improvers (as Mt C1 and as billion euro in C2) for EU-27. Table 28



Source: EU trade since 1988 by HS2,4,6 and CN8 [DS-645593] available at this link

Table 22 reports the apparent consumption in EU-27 of mulches, growing media and soil improvers. In terms of mass, on average the apparent consumption of mulches (14.91 Mt) in EU-27 was one order of magnitude higher than the average consumption of growing media (1.05 Mt) and soil improvers (1.28 Mt). In terms of value in euro, the apparent consumption of mulches (2.59 billion of euro) in EU-27 was two orders of magnitude higher than the average consumption of growing media (0.04 billion of euro) and soil improvers (0.09 billion of euro).

Although the performed analysis was affected by important assumptions, the figures on production (Table 20) and apparent consumption (Table 22) were in the same order of magnitude. This feature confirmed also that the investigated products had a strong internal EU-27 market. However, values in euros of mulches reported in Table 22 are very lower than what is reported in Table 20 for the same years.

Table 22. Apparent consumption in EU-27 of mulches (M), growing media (GM) and soil improvers (SI).

Product	Unit	2017	2018	2019	Average
M	Mt (megatonne)	13.32	14.93	16.47	14.91
GM		0.97	1.01	1.16	1.05
SI		1.18	1.23	1.45	1.28
M	Billion euro	2.38	2.64	2.75	2.59
GM		0.03	0.03	0.06	0.04
SI		0.07	0.07	0.11	0.09

Note:
The apparent consumption is defined as: (Export to countries belonging to EU-27) – (Export to countries outside EU-27) + (Imports from countries outside EU-27).

Results of the current market analysis are based on estimations, and need to be treated with caution.

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SUPPLEMENTARY TABLES OF MARKET ANALYSIS

Table 23. Description of products analysed from the list of CN 2019 with percentages assigned for mulch (M), growing media (GM) and soil improver (SI).

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
44071910	16101138	Coniferous wood sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, end-jointed, whether or not planed or sanded (excl. pine "Pinus spp.", fir "Abies spp." and spruce "Picea spp.")	No, it seems to be a highly processed good	NA	NA	NA
44071920	16101138	Coniferous wood sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. pine "Pinus spp.", fir "Abies spp.", spruce "Picea spp." and end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44071990	16101138	Coniferous wood sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. pine "Pinus spp.", fir "Abies spp.", spruce "Picea spp.", end-jointed and planed)	Yes, it could contain mulch-like material	100	0	0
44072996	16101250	Tropical wood sawn or cut lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded (excl. abura, acajou d'Afrique, afrormosia, ako, alan, andiroba, aningré, avodiré, azobé, balau, balsa, bossé clair, bossé foncé, cativo, cedro, dabema, dark red meranti, dibétou, doussié, framiré, freijo, fromager, fuma, geronggang, ilomba, imbuia, ipé, iroko, jaboty, jelutong, jequitiba, jongkong, kapur, kempas, keruing, kosipo, kotibé, koto, light red meranti, limba, louro, maçaranduba, mahogany, makoré, mandioqueira, mansonia, mengkulang, meranti bakau, merawan, merbau, merpauh, mersawa, moabi, niangon, nyatoh, obeche, okoumé, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, palissandre de Para, palissandre de Rio, palissandre de Rose, pau Amarelo, pau marfim, pulai, punah, quaruba, ramin, sapelli, saqui-saqui, sepetir, sipo, sucupira, suren, tauari, teak, tiama, tola, virola, white lauan, white meranti, white seraya and yellow meranti)	No, it seems to be a highly processed good	NA	NA	NA
44072997	16101250	Tropical wood, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. planed, end-jointed, and abura, acajou d'Afrique, afrormosia, ako, alan, andiroba, aningré, avodiré, azobé, balau, balsa, bossé clair, bossé foncé, cativo, cedro, dabema, dark red meranti, dibétou, doussié, framiré, freijo, fromager, fuma, geronggang, ilomba, imbuia, ipé, iroko, jaboty, jelutong, jequitiba, jongkong, kapur, kempas, keruing, kosipo, kotibé, koto, light red meranti, limba, louro, maçaranduba, mahogany, makoré, mandioqueira, mansonia, mengkulang, meranti bakau, merawan, merbau, merpauh, mersawa, moabi, niangon, nyatoh, obeche, okoumé, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, palissandre de Para, palissandre de Rio, palissandre de Rose, pau Amarelo, pau marfim, pulai, punah, quaruba, ramin, sapelli, saqui-saqui, sepetir, sipo, sucupira, suren, tauari, teak, tiama, tola, virola, white lauan, white meranti, white seraya and yellow meranti)	No, it seems to be a highly processed good	NA	NA	NA
44079115	16101250	Oak "Quercus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079139	16101250	Oak "Quercus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed and blocks, strips and friezes for parquet or wood block flooring)	No, it seems to be a highly processed good	NA	NA	NA
44079190	16101250	Oak "Quercus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
44079200	16101250	Beech "Fagus spp.", sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness of > 6 mm	No, it seems to be a highly processed good	NA	NA	NA
44079310	16101250	Maple "Acer spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079391	16101250	Maple "Acer spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44079399	16101250	Maple "Acer spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44079410	16101250	Cherry "Prunus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079491	16101250	Cherry "Prunus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44079499	16101250	Cherry "Prunus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44079510	16101250	Ash "Fraxinus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079591	16101250	Ash "Fraxinus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44079599	16101250	Ash "Fraxinus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44079610	16101250	Birch "Betula spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079691	16101250	Birch "Betula spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44079699	16101250	Birch "Betula spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44079710	16101250	Poplar and aspen "Populus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44079791	16101250	Poplar and aspen "Populus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44079799	16101250	Poplar and aspen "Populus spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44079927	16101250	Wood sawn or cut lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded (excl. tropical wood, coniferous wood, oak "Quercus spp.", beech "Fagus spp.", maple "Acer spp.", cherry "Prunus spp.", ash "Fraxinus spp.", birch "Betula spp.", poplar and aspen "Populus spp.")(2017-2500);Wood sawn or cut lengthwise, sliced or peeled, of a thickness of > 6 mm, planed, or end-jointed, whether or not planed or sanded (excl. tropical wood specified in Subheading Note 2 to this chapter, coniferous wood, oak "Quercus spp.", beech "Fagus spp.", maple "Acer spp.", cherry "Prunus spp." and ash "Fraxinus spp.")(2012-2016)	No, it seems to be a highly processed good	NA	NA	NA

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
44079940	16101250	Wood sawn or cut lengthwise, sliced or peeled, sanded, of a thickness of > 6 mm (excl. end-jointed; tropical wood, coniferous wood, oak "Quercus spp.", beech "Fagus spp.", maple "Acer spp.", cherry "Prunus spp.", ash "Fraxinus spp.", birch "Betula spp.", poplar and aspen "Populus spp.")(2017-2500);Wood sawn or cut lengthwise, sliced or peeled, sanded, of a thickness of > 6 mm (excl. end-jointed; tropical wood specified in Subheading Note 2 to this chapter, coniferous wood, oak "Quercus spp.", beech "Fagus spp.", maple "Acer spp.", cherry "Prunus spp." and ash "Fraxinus spp.")(2007-2016)	No, it seems to be a highly processed good	NA	NA	NA
44079990	16101250	Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed; tropical wood, coniferous wood, oak "Quercus spp.", beech "Fagus spp.", maple "Acer spp.", cherry "Prunus spp.", ash "Fraxinus spp.", birch "Betula spp.", poplar and aspen "Populus spp.")	Yes, it could contain mulch-like material	100	0	0
44072110	16101271	Mahogany "Swietenia spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded, or end-jointed, whether or not planed or sanded(2007-2500);Dark red meranti, light red meranti, meranti bakau, white lauan, white meranti, white seraya, yellow meranti, alen, keruing, ramin, kapur, teak, jongkong, merbau, jelutong and kempas, sawn or cut lengthwise, sliced or barked, with a thickness of > 6 mm, finger-jointed, whether or not planed or sanded(1988-1995)	No, it seems to be a highly processed good	NA	NA	NA
44072191	16101271	Mahogany "Swietenia spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072199	16101271	Mahogany "Swietenia spp.", sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072210	16101271	Virola, imbuia and balsa, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded, or end-jointed, whether or not planed or sanded(2007-2500);Okoumé, obeche, sapele, utile, acajou d'Afrique, makoré, iroko, tiama, mansonia, ilomba, dibetou, limba and azobe, sawn or cut lengthwise, sliced or barked, with a thickness of > 6 mm, finger-jointed, whether or not planed or sanded(1988-1995)	No, it seems to be a highly processed good	NA	NA	NA
44072291	16101271	Virola, imbuia and balsa, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072299	16101271	Virola, imbuia and balsa, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072510	16101271	Dark red meranti, light red meranti and meranti bakau, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44072530	16101271	Dark red meranti, light red meranti and meranti bakau, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072550	16101271	Dark red meranti, light red meranti and meranti bakau, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072590	16101271	Dark red meranti, light red meranti and meranti bakau, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. such products planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072610	16101271	White lauan, white meranti, white seraya, yellow meranti and alan, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44072630	16101271	White lauan, white meranti, white seraya, yellow meranti and alan, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072650	16101271	White lauan, white meranti, white seraya, yellow meranti and alan, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
44072690	16101271	White lauan, white meranti, white seraya, yellow meranti and alan, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072710	16101271	Sapelli, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44072791	16101271	Sapelli, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072799	16101271	Sapelli, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072810	16101271	Iroko, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded, or end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44072891	16101271	Iroko, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072899	16101271	Iroko, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded or end-jointed)	Yes, it could contain mulch-like material	100	0	0
44072915	16101271	Keruing, ramin, kapur, teak, jongkong, merbau, jelutong, kempas, okoumé, obeche, sipo, acajou d'Afrique, makoré, tiama, mansonia, ilomba, dibétou, limba, azobé, palissandre de Rio, palissandre de Para, palissandre de rose, abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, end-jointed, whether or not planed or sanded	No, it seems to be a highly processed good	NA	NA	NA
44072920	16101271	Palissandre de Rio, palissandre de Para and palissandre de Rose, sawn or chipped lengthwise, sliced or peeled, planed, of a thickness of > 6 mm (excl. end-jointed)	No, it seems to be a highly processed good	NA	NA	NA
44072983	16101271	Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari, tola, keruing, ramin, kapur, teak, jongkong, merbau, jelutong, kempas, okoumé, obeche, sipo, acajou d'Afrique, makoré, tiama, mansonia, ilomba, dibétou, limba and azobé, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)(2017-2500);Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, planed (excl. end-jointed)(2002-2016);Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mengkulang, merawan, merpauh,	No, it seems to be a highly processed good	NA	NA	NA

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
		mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau marfim, pulai, punah, saqui-saqui, sepetir, sucupira, suren and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness > 6 mm, planed (excl. finger-jointed)(1996-2001)				
44072985	16101271	Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari, tola, keruing, ramin, kapur, teak, jongkong, merbau, jelutong, kempas, okoumé, obeche, sipo, acajou d'Afrique, makoré, tiama, mansonia, ilomba, dibétou, limba, azobé, palissandre de Rio, palissandre de Para and palissandre de Rose, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed and planed)(2017-2500);Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm, sanded (excl. end-jointed)(2002-2016);Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau marfim, pulai, punah, saqui-saqui, sepetir, sucupira, suren and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness > 6 mm, sanded (excl. finger-jointed)(1996-2001)	No, it seems to be a highly processed good	NA	NA	NA
44072995	16101271	Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari, tola, keruing, ramin, kapur, teak, jongkong, merbau, jelutong, kempas, okoumé, obeche, sipo, acajou d'Afrique, makoré, tiama, mansonia, ilomba, dibétou, limba, azobé, palissandre de Rio, palissandre de Para and palissandre de Rose, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. end-jointed, planed and sanded)(2017-2500);Abura, afrormosia, ako, andiroba, aningré, avodiré, balau, bossé clair, bossé foncé, cativo, cedro, dabema, doussié, framiré, freijo, fromager, fuma, geronggang, ipé, jaboty, jequitiba, kosipo, kotibé, koto, louro, maçaranduba, mahogany (excl. "Swietenia spp."), mandioqueira, mengkulang, merawan, merpauh, mersawa, moabi, niangon, nyatoh, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, pau Amarelo, pau marfim, pulai, punah, quaruba, saqui-saqui, sepetir, sucupira, suren, tauari and tola, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. end-jointed, planed or sanded)(2002-2016)	Yes, it could contain mulch-like material	100	0	0
44072998	16101271	Tropical wood, sawn or chipped lengthwise, sliced or peeled, of a thickness of > 6 mm (excl. planed, sanded, end-jointed, and abura, acajou d'Afrique, afrormosia, ako, alan, andiroba, aningré, avodiré, azobé, balau, balsa, bossé clair, bossé foncé, cativo, cedro, dabema, dark red meranti, dibétou, doussié, framiré, freijo, fromager,	Yes, it could contain mulch-like material	100	0	0

CN 2019 code	PROCOM 2019 code	CN 2019 description	Relevance of product in CN 2019 to the current study	% assigned to products		
				M	GM	SI
		fuma, geronggang, ilomba, imbuia, ipé, iroko, jaboty, jelutong, jequitiba, jongkong, kapur, kempas, keruing, kosipo, kotibé, koto, light red meranti, limba, louro, maçaranduba, mahogany, makoré, mandioqueira, mansonia, mengkulang, meranti bakau, merawan, merbau, merpauh, mersawa, moabi, niangon, nyatoh, obeche, okoumé, onzabili, orey, ovengkol, ozigo, padauk, paldao, palissandre de Guatemala, palissandre de Para, palissandre de Rio, palissandre de Rose, pau Amarelo, pau marfim, pulai, punah, quaruba, ramin, sapelli, saqui-saqui, sepetir, sipo, sucupira, suren, tauari, teak, tiama, tola, virola, white lauan, white meranti, white seraya and yellow meranti)				
44012100	16102503	Coniferous wood in chips or particles (excl. those of a kind used principally for dying or tanning purposes)	Yes, it could contain mulch-like material	100	0	0
44012200	16102505	Wood in chips or particles (excl. those of a kind used principally for dyeing or tanning purposes, and coniferous wood)	Yes, it could contain mulch-like material	100	0	0
31029000	20153990	Mineral or chemical nitrogen fertilisers (excl. urea; ammonium sulphate; ammonium nitrate; sodium nitrate; double salts and mixtures of ammonium nitrate with ammonium sulphate or calcium; mixtures of urea and ammonium nitrate in aqueous or ammoniacal solution; mixtures of ammonium nitrate and calcium carbonate or other non-fertilising inorganic elements; in tablets or similar in packages <= 10 kg)(2007-2500);Mineral or chemical nitrogen fertilisers (excl. urea; ammonium sulphate; ammonium nitrate; sodium nitrate; calcium cyanamide; double salts and mixtures of ammonium nitrate with ammonium sulphate or calcium; mixtures of urea and ammonium nitrate in aqueous or ammoniacal solution; mixtures of ammonium nitrate and calcium carbonate or other non-fertilising inorganic elements; in tablets or similar in packages <= 10 kg)(1988-2006)	Yes, it could include SI	0	0	100
31051000	20157930	Mineral or chemical fertilisers of animal or vegetable origin, in tablets or similar forms, or in packages with a gross weight of <= 10 kg	Yes, it may refer to organic materials, which are generally used directly as fertilisers, e.g. guano, bone meal, seaweed. It may contain products derived from digestate (dried digestate in pellets)	0	50	50
31059020	20157980	Mineral or chemical fertilisers containing the two fertilising elements nitrogen and potassium, or one principal fertilising substance only, incl. mixtures of animal or vegetable fertilisers with chemical or mineral fertilisers, containing > 10% nitrogen by weight (excl. in tablets or similar forms, or in packages with a gross weight of <= 10 kg)	No, it may not refer to GM and SI, because they tend to have a N content by weight at circa 3%.	NA	NA	NA
31059080	20157980	Mineral or chemical fertilisers containing the two fertilising elements nitrogen and potassium, or one main fertilising element, incl. mixtures of animal or vegetable fertilisers with chemical or mineral fertilisers, not containing nitrogen or with a nitrogen content, by weight, of <= 10% (excl. in tablets or similar forms or in packages of a gross weight of <= 10 kg)	Yes, it may refer to GM and SI, which tend to have a N content by weight at circa 3%.	0	50	50
31010000	20158000	Animal or vegetable fertilisers, whether or not mixed together or chemically treated; fertilisers produced by the mixing or chemical treatment of animal or vegetable products (excl. those in tablets or similar forms, or in packages with a gross weight of <= 10 kg)	Yes, it may refer to GM and SI as it contains vegetable fertilisers (i.e. the organic sources)	0	50	50

NA: Not Applicable
Description of products within PRODCOM 2019 can be found in Table 19.
Rows highlighted in green spot products included in the market analysis of mulches, growing media and soil improvers.

Table 24. Number of missing (not reported) data out of nine products in the PRODCOM list.

Country	2017	2018	2019
Austria	1	3	3
Belgium	7	6	3
Bulgaria	2	1	2
Croatia	0	0	0
Cyprus	0	0	0
Czech Republic	2	2	2
Denmark	0	0	0
Estonia	0	0	0
Finland	1	1	0
France	1	0	0
Germany	3	3	2
Greece	0	1	2
Hungary	0	0	1
Ireland	2	4	6
Italy	0	0	0
Latvia	3	2	2
Lithuania	0	0	0
Luxemburg	0	0	0
Malta	0	0	0
Netherlands	9	7	8
Poland	2	1	2
Portugal	3	3	3
Romania	2	1	0
Slovakia	1	3	3
Slovenia	5	5	5
Spain	0	0	0
Sweden	5	4	4
EU-27 Total	0	0	0

The colours highlight the completeness of the data for each country in a scale of green, yellow and red, from the most to the least complete.

Table 25. Annual production of mulches (M), growing media (GM) and soil improvers (SI), expressed as Mt.

Country	Mulch			GM			SI		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Austria	3.32	2.92	2.92	0.04	0.02	0.02	0.04	0.02	0.02
Belgium	0.00	0.00	0.01	0.30	0.30	0.36	0.30	0.30	0.36
Bulgaria	0.21	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Croatia	0.35	0.35	0.28	0.00	0.00	0.00	0.00	0.01	0.00
Cyprus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Czech Republic	1.59	1.39	1.48	0.32	0.29	0.24	0.32	0.29	0.24
Denmark	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Estonia	2.83	2.55	2.57	0.00	0.00	0.00	0.00	0.00	0.00
Finland	3.67	3.75	3.76	0.00	0.06	0.03	0.00	0.06	0.03
France	2.09	2.00	1.88	1.42	0.91	1.06	1.75	1.20	1.28
Germany	6.12	5.26	5.40	0.10	0.00	0.60	0.20	0.11	0.70
Greece	0.00	0.00	0.00	0.01	0.03	0.03	0.06	0.07	0.05
Hungary	1.74	0.99	1.08	0.01	0.02	0.01	0.01	0.02	0.01
Ireland	0.72	0.83	0.92	0.47	0.59	0.00	0.47	0.59	0.00
Italy	0.59	0.19	0.11	0.49	0.15	0.46	0.55	0.20	0.51
Latvia	2.60	1.28	1.04	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.82	1.17	1.37	0.00	0.00	0.00	0.01	0.01	0.01
Luxemburg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00
Poland	1.51	1.81	1.44	0.29	0.31	0.33	0.29	0.32	0.33
Portugal	0.74	0.66	0.57	0.04	0.05	0.06	0.04	0.05	0.06
Romania	0.11	0.12	0.15	0.00	0.00	0.00	0.00	0.00	0.00
Slovakia	0.27	0.63	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Slovenia	0.22	0.56	0.57	0.00	0.00	0.00	0.00	0.00	0.00
Spain	1.07	1.12	1.07	0.42	0.46	0.43	0.43	0.48	0.44
Sweden	12.77	12.40	12.87	0.00	0.00	0.00	0.00	0.00	0.00
EU-27 Total	43.95	40.83	40.78	4.73	4.02	4.31	5.73	5.00	5.12
EU-27 Sum	43.44	40.16	40.22	3.94	3.22	3.63	4.49	3.75	4.03
Diff. between Total and Sum	1%	2%	1%	17%	20%	16%	22%	25%	21%

Source: PRODCOM list (NACE Rev. 2) – annual data [DS-066341]

Note:
Product codes and percentages are reported in Table 19.
The results are affected by some missing data as highlighted in Table 24.
Diff. between Total and Sum is calculated as follows: [(EU-27 Total – EU-27 Sum)/EU-27 Total]*100

Table 26. Annual production of mulches (M), growing media (GM) and soil improvers (SI), expressed as billion euro.

Country	M			GM			SI		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Austria	3.93	3.70	3.40	0.01	0.00	0.00	0.01	0.00	0.00
Belgium	0.02	0.19	0.87	0.04	0.04	0.05	0.04	0.04	0.05
Bulgaria	0.29	0.27	0.19	0.00	0.00	0.00	0.00	0.00	0.00
Croatia	1.73	1.62	1.55	0.00	0.00	0.00	0.00	0.00	0.00
Cyprus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Czech Republic	2.63	2.93	2.49	0.02	0.02	0.02	0.02	0.02	0.02
Denmark	0.43	0.47	0.39	0.00	0.00	0.00	0.00	0.00	0.00
Estonia	2.20	1.74	1.52	0.00	0.00	0.00	0.00	0.00	0.00
Finland	10.90	9.48	9.15	0.00	0.02	0.01	0.00	0.02	0.01
France	10.52	11.01	10.62	0.14	0.16	0.16	0.23	0.24	0.23
Germany	15.17	9.50	10.96	0.07	0.06	0.07	0.15	0.16	0.16
Greece	0.05	0.07	0.07	0.00	0.01	0.01	0.04	0.04	0.02
Hungary	1.09	1.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Ireland	1.98	1.65	1.78	0.03	0.03	0.03	0.03	0.03	0.03
Italy	7.44	5.44	3.83	0.14	0.08	0.16	0.17	0.12	0.20
Latvia	2.55	2.10	1.50	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.99	1.20	1.16	0.00	0.00	0.00	0.00	0.00	0.00
Luxemburg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.00	0.12	0.11	0.00	0.01	0.00	0.00	0.01	0.00
Poland	1.16	5.77	5.75	0.01	0.01	0.01	0.02	0.03	0.03
Portugal	2.22	2.50	2.19	0.01	0.01	0.01	0.01	0.01	0.01
Romania	4.12	4.34	5.83	0.00	0.00	0.00	0.00	0.00	0.00
Slovakia	0.31	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00
Slovenia	0.24	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00
Spain	0.97	0.95	0.89	0.11	0.12	0.13	0.12	0.13	0.14
Sweden	1.80	1.61	1.66	0.00	0.00	0.00	0.00	0.00	0.00
EU-27 Total	73.73	71.96	70.74	0.60	0.59	0.69	1.19	1.04	1.20
EU-27 Sum	72.76	68.41	67.60	0.58	0.58	0.68	0.85	0.86	0.91
Diff. between Total and Sum	1%	5%	4%	3%	2%	2%	28%	18%	25%

Source: PRODCOM list (NACE Rev. 2) – annual data [DS-066341]

Note:

Product codes and percentages are reported in Table 19.

The results are affected by some missing data as highlighted in Table 24.

Diff. between Total and Sum is calculated as follows: [(EU-27 Total – EU-27 Sum)/EU-27 Total]*100

Table 27. Gross Domestic Product (GDP) at market price (millions of euro) and population in countries of EU-27.

Country	GDP				Population			
	2017	2018	2019	Average	2017	2018	2019	Average
Austria	369 341.3	385 361.9	397 575.3	384093	8 797 566	8 840 521	8 879 920	8 839 336
Belgium	445 050.1	460 370.1	476 343.6	460588	11 375 158	11 427 054	11 488 980	11 430 397
Bulgaria	52 329.0	56 111.8	61 239.5	56560	7 075 947	7 025 037	6 975 761	7 025 582
Croatia	49 238.5	51 950.1	54 237.3	51809	4 129 853	4 090 870	4 067 206	4 095 976
Cyprus	20 119.9	21 432.5	22 287.1	21280	859 519	870 068	881 952	870 513
Czech Republic	194 132.9	210 927.8	223 950.3	209670	10 594 438	10 629 928	10 671 870	10 632 079
Denmark	294 808.2	302 361.1	312 747.2	303306	5 764 980	5 793 636	5 814 422	5 791 013
Estonia	23 857.7	25 937.6	28 112.4	25969	1 317 384	1 321 977	1 326 898	1 322 086
Finland	226 301.0	233 696.0	240 261.0	233419	5 508 214	5 515 525	5 521 606	5 515 115
France	2 297 242.0	2 363 306.0	2 437 635.0	2366061	66 918 020	67 101 930	67 248 926	67 089 625
Germany	3 259 860.0	3 356 410.0	3 449 050.0	3355107	82 657 002	82 905 782	83 092 962	82 885 249
Greece	177 151.9	179 727.3	183 413.5	180098	10 754 679	10 732 882	10 721 582	10 736 381
Hungary	126 891.0	135 941.4	146 092.7	136308	9 787 966	9 775 564	9 771 141	9 778 224
Ireland	300 386.9	326 986.1	356 051.2	327808	4 807 388	4 867 316	4 934 340	4 869 681
Italy	1 736 592.8	1 771 565.9	1 790 941.5	1766367	60 536 709	60 421 760	59 729 081	60 229 183
Latvia	26 962.3	29 142.5	30 420.9	28842	1 942 248	1 927 174	1 913 822	1 927 748
Lithuania	42 276.3	45 491.1	48 808.6	45525	2 828 403	2 801 543	2 794 137	2 808 028
Luxembourg	56 814.2	60 053.1	63 516.3	60128	596 336	607 950	620 001	608 096
Malta	11 716.5	12 594.8	13 589.6	12634	467 999	484 630	504 062	485 564
Netherlands	738 146.0	773 987.0	813 055.0	775063	17 131 296	17 231 624	17 344 874	17 235 931
Poland	467 426.6	497 842.3	533 599.9	499623	37 974 826	37 974 750	37 965 475	37 971 684
Portugal	195 947.2	205 184.1	213 949.3	205027	10 300 300	10 283 822	10 286 263	10 290 128
Romania	187 772.7	204 496.9	222 997.6	205089	19 588 715	19 473 970	19 371 648	19 478 111
Slovakia	84 488.6	89 356.7	93 900.5	89249	5 439 232	5 446 771	5 454 147	5 446 717
Slovenia	43 009.1	45 862.6	48 392.6	45755	2 066 388	2 073 894	2 088 385	2 076 222
Spain	1 161 867.0	1 204 241.0	1 244 772.0	1203627	46 593 236	46 797 754	47 134 837	46 841 942
Sweden	480 025.5	470 673.1	476 869.5	475856	10 057 698	10 175 214	10 278 887	10 170 600

Source: EUROSTAT

EUROSTAT GDP at https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_GDP$DEFAULTVIEW/default/table
EUROSTAT Population at https://ec.europa.eu/eurostat/databrowser/view/DEMO_GIND$DEFAULTVIEW/default/table

Table 28. Import and export of mulches, growing media and soil improvers for EU-27.

Parameters	Unit	Mulches			Growing media			Soil improvers		
		2017	2018	2019	2017	2018	2019	2017	2018	2019
Import from countries outside EU-27	Mt (megatonne)	6.67	8.25	9.44	0.08	0.09	0.09	0.11	0.10	0.14
Export to countries outside EU-27		1.74	1.68	1.53	0.35	0.31	0.33	0.48	0.44	0.46
Import from countries belonging to EU-27		8.54	8.70	9.21	1.03	1.09	1.06	1.35	1.42	1.33
Export to countries belonging to EU-27		8.39	8.36	8.56	1.24	1.23	1.40	1.54	1.57	1.77
Import from countries outside EU-27	Billion euro	1.41	1.58	1.65	0.05	0.05	0.05	0.06	0.06	0.07
Export to countries outside EU-27		0.58	0.62	0.56	0.24	0.24	0.26	0.30	0.30	0.32
Import from countries belonging to EU-27		1.49	1.57	1.51	0.24	0.23	0.26	0.33	0.32	0.35
Export to countries belonging to EU-27		1.55	1.69	1.66	0.22	0.22	0.27	0.31	0.32	0.36

Note: Figure 10 shows the corresponding plots.

ANNEX II. SAMPLING AND TESTING FREQUENCY

The User manual will contain practical information and additional clarification and on sampling frequency.

Table 29. Sampling and test frequency for the application year

Type of plant	Criterion	Annual input / output	Test frequency
Type 1: Waste/animal –by-product treatment plants	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Input (t) ≤ 3000	1 every 1000 tonnes input material rounded to the next integer
		3000 < input (t) < 20000	4 (one sample every season)
		Input (t) ≥ 20000	number of analyses per year = amount of annual input material (in tonnes)/10000 tonne + 1
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Input (t) ≤ 3000	1
		3001 < input (t) < 10000	2
		10001 < input (t) < - 20000	3
		20001 < input (t) < 40000	4
		40001 < input (t) < 60000	5
		60001 < input (t) < 80000	6
		80001 < input (t) < 100000	7
		100001 < input (t) < 120000	8
		120001 < input (t) < 140000	9

		140001 < input (t) < 160000	10
		160001 < input (t) < 180000	11
		Input (t) ≥ 180000	12
Type 2: Product manufacture plants using waste/animal by-product-derived materials, except those that are waste treatment plants	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Output (m^3) ≤ 5000	Representative combined samples from 2 different batches according EN 12579[85]
		Output (m^3) > 5000	Representative combined samples from 4 different batches according EN 12579
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Output (m^3) ≤ 5000	Representative combined samples from 1 different batches according EN 12579.
		Output (m^3) > 5000	Representative combined samples from 2 different batches EN 12579
Type 3: Product manufacture plants NOT using waste/animal by-product-derived materials	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Output (m^3) ≤ 5000	Representative combined samples from 1 batch according EN 12579
		Output (m^3) > 5000	Representative combined samples from 2 different batches according EN 12579
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Regardless the input / output	Representative combined samples from 1 batch according EN 12579

[85] EN 12579 Soil improvers and growing media. Sampling

Table 30. Sampling and test frequency for the following years

Type of plant	Criteria	Annual input / output	Test frequency
Type 1: Waste/animal –by-product treatment plants	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Input (t) ≤ 1000	1
		Input (t)> 1000	number of analyses per year = amount of annual input material (in tonnes)/10000 tonne + 1
			Minimum 2 and maximum 12
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Input (t) ≤ 10000	0.25 (once per 4 years)
		10001 < input (t) < 25000	0.5 (once per 2 years)
		25001 < input (t) < 50000	1
		50001 < input (t) < 100000	2
		100001 < input (t) < 150000	3
		150001 < input (t) < 200000	4
		200001 < input (t) < 250000	5
		250001 < input (t) < 300000	6
		300001 < input (t) < 350000	7
		350001 < input (t) < 400000	8
		400001 < input (t) < 450000	9
		450001 < input (t) < 500000	10
		500001 < input (t) < 550000	11
		Input (t) ≥ 550000	12

Type of plant	Criteria	Annual input / output	Test frequency
Type 2: Product manufacture plants using waste/animal by-product-derived materials, except those that are waste treatment plants	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Output (m^3) ≤ 5000	Representative combined samples from 1 different batches according EN 12579
		Output (m^3) > 5000	Representative combined samples from 2 different batches according EN 12579
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Output (m^3) ≤ 15000	Representative combined samples from 1 batch according EN 12579, once each 4 years
		15000 < Output (m^3) < 40000	Representative combined samples from 1 batch according EN 12579, each two years
		Output (m^3) ≥ 40000	Representative combined samples from 1 batch according EN 12579, each year
Type 3: Product manufacture plants NOT using waste/animal by-product-derived materials	4.1 – Limits for heavy metals 4.5 - Pathogens 5.1 - Stability 5.2 - Macroscopic impurities 5.3- Organic matter and dry matter in soil improvers 5.4 - Viable seeds and plant propagules 5.5 - Plant response 6 - Growing media features	Regardless the input / output	Representative combined samples from 1 batch according EN 12579
	4.2 - Limits for polycyclic aromatic hydrocarbons (PAHs)	Regardless the input / output	Representative combined samples from 1 batch according EN 12579, once each 4 years

ANNEX III. COMPONENT MATERIAL CATEGORIES (CMCS) BASED ON FERTILISING PRODUCT REGULATION

Table 31. Component material categories (CMCs) (*Source:* EC, 2019a)

The component materials categories (CMCs) of which EU fertilising products shall solely consist	Summarised definition and requirements[86]
CMC 1: Virgin material substances and mixtures	An EU fertilising product may contain substances and mixtures, except (a) waste within the meaning of Directive 2008/98/EC, (b) substances or mixtures which have ceased to be waste in one or more Member States by virtue of the national measures transposing Article 6 of Directive 2008/98/EC, (c) substances formed from precursors which have ceased to be waste in one or more Member States by virtue of the national measures transposing Article 6 of Directive 2008/98/EC, or mixtures containing such substances, (d) by-products within the meaning of Directive 2008/98/EC, (e) animal by-products or derived products within the meaning of Regulation (EC) No 1069/2009, (f) polymers, (g) compost, or (h) digestate. The substance or one of the substances in the mixture shall according to their intended use meet the rules specified under CMC 1 in Part II of Annex II to Fertilising Product Regulation The exclusion of a material from CMC 1 does not prevent it from being an eligible component material by virtue of another CMC stipulating different requirements.
CMC 2: Plants, plant parts or plant extracts	Plants, plant parts or plant extracts having undergone no other processing than cutting, grinding, milling, sieving, sifting, centrifugation, pressing, drying, frost treatment, freeze-drying or extraction with water or supercritical CO2 extraction. Plants include mushrooms and algae and exclude blue-green algae (cyanobacteria).
CMC 3: Compost	Compost shall be obtained through aerobic composting of exclusively one or more of the following input materials: (a) bio-waste within the meaning of Directive 2008/98/EC resulting from separate bio-waste collection at source; (b) derived products referred to in Article 32 of Regulation (EC) No 1069/2009 for which the end point in the manufacturing chain has been determined in accordance with the third subparagraph of Article 5(2) of that Regulation; (c) living or dead organisms or parts thereof, which are unprocessed or processed only by manual, mechanical or gravitational means, by dissolution in water, by flotation, by extraction with water, by steam distillation or by heating solely to remove water, or which are extracted from air by any means, except: *—the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment,* *—sewage sludge, industrial sludge or dredging sludge, and* *—animal by-products or derived products falling within the scope of Regulation (EC) No 1069/2009 for which no end point in the manufacturing chain has been determined in accordance with the third subparagraph of Article 5(2) of that Regulation;*
CMC 4: Fresh crop digestate	Digestate shall be obtained through anaerobic digestion of exclusively one or more of the following input materials:

[86] For detailed description and required process conditions please see Annex II Part II to FPR.

The component materials categories (CMCs) of which EU fertilising products shall solely consist	Summarised definition and requirements[86]
	(a) plants or plant parts grown for the production of biogas. Plants include algae and exclude blue-green algae (cyanobacteria); (b) digestion additives which are needed to improve the process performance or the environmental performance of the digestion process provided that: (i) the additive is registered pursuant to Regulation (EC) No 1907/2006, with a dossier containing: —the information provided for by Annexes VI, VII and VIII to Regulation (EC) No 1907/2006, and —a chemical safety report pursuant to Article 14 of Regulation (EC) No 1907/2006 covering the use as a fertilising product, unless explicitly covered by one of the registration obligation exemptions provided for by Annex IV to Regulation (EC) No 1907/2006 or by point 6, 7, 8 or 9 of Annex V to that Regulation, and (ii) the total concentration of all additives does not exceed 5 % of the total input material weight; or (c) any material referred to in point (a) that has previously been digested.
CMC 5: Digestate other than fresh crop digestate	Digestate shall be obtained through anaerobic digestion of exclusively one or more of the following input materials: (a) bio-waste within the meaning of Directive 2008/98/EC resulting from separate bio-waste collection at source; (b)derived products referred to in Article 32 of Regulation (EC) No 1069/2009 for which the end point in the manufacturing chain has been determined in accordance with the third subparagraph of Article 5(2) of that Regulation; (c)living or dead organisms or parts thereof which are unprocessed or processed only by manual, mechanical or gravitational means, by dissolution in water, by flotation, by extraction with water, by steam distillation or by heating solely to remove water, or which are extracted from air by any means, except: (i)the organic fraction of mixed municipal household waste separated through mechanical, physicochemical, biological and/or manual treatment, (ii)sewage sludge, industrial sludge or dredging sludge, (iii)animal by-products or derived products falling within the scope of Regulation (EC) No 1069/2009 for which no end point in the manufacturing chain has been determined in accordance with the third subparagraph of Article 5(2) of that Regulation;
CMC 6: Food industry by-products	Component material consisting of one of the following substances: (a) food industry factory lime, i.e. a material from the food processing industry obtained by carbonation of organic matter, using exclusively burnt lime from natural sources; (b) molasses, i.e. a viscous by-product of the refining of sugarcane or sugar beets into sugar; (c) vinasse, i.e. a viscous by-product of the fermentation process of molasses into ethanol, ascorbic acid or other products; (d) distillers grains, i.e. by-products resulting from the production of alcoholic beverages; (e) plants, plant parts or plant extracts having undergone only heat treatment or heat treatment in addition to processing methods referred to in CMC 2; or (f) lime from drinking water production, i.e. residue which is released by production of drinking water from groundwater or surface water and consists, mainly, of calcium carbonate.
CMC 7: Micro-organisms	Product belonging to PFC 6(A) may contain micro-organisms, including dead or empty-cell micro-organisms and non-harmful residual elements of the media on which they were produced, which have undergone no other processing than drying or freeze-drying; and are listed below: • *Azotobacter spp.* • *Mycorrhizal fungi* • *Rhizobium spp.* • *Azospirillum spp.*
CMC 8: Nutrient polymers	Polymers exclusively made up of monomer substances complying with the criteria set out in points 1 and 2 of CMC 1, where the purpose of the polymerisation is to control the release of nutrients from one or more of the monomer substances. At least 60 % of the polymers shall be soluble in a phosphate buffer solution with a pH of 7,5 at 100 °C. The final degradation products shall be only ammonia (NH3), water and carbon dioxide (CO2), and the polymers shall not contain more than 600 ppm of free formaldehyde.

The component materials categories (CMCs) of which EU fertilising products shall solely consist	Summarised definition and requirements[86]
CMC 9: Polymers other than nutrient polymers	A product may contain polymers other than nutrient polymers only in cases where the purpose of the polymer is: (a)to control the water penetration into nutrient particles and thus the release of nutrients (in which case the polymer is commonly referred to as a 'coating agent'), (b)to increase the water retention capacity or wettability of the EU fertilising product, or (c) to bind material in an EU fertilising product belonging to PFC 4. From 16 July 2026, the polymers referred to in point 1(a) and (b) shall comply with the biodegradability criteria established by delegated acts referred to in Article 42(6). In the absence of such criteria, an EU fertilising product placed on the market after that date shall not contain such polymers. For the polymers referred to in point 1(a) and (b), neither the polymer, nor its degradation by-products, shall show any overall adverse effect on animal or plant health, or on the environment, under reasonably foreseeable conditions of use in the EU fertilising product. The polymer shall pass a plant growth acute toxicity test, an earthworm acute toxicity test and a nitrification inhibition test with soil micro-organisms.
CMC 10: Derived products within the meaning of Regulation (EC) No 1069/2009	An EU fertilising product may contain derived products within the meaning of Regulation (EC) No 1069/2009 having reached the end point in the manufacturing chain as determined in accordance with that Regulation, and which are listed in the following table and as specified therein: *Note: The table will be established by delegated acts referred to in Article 42(5).*
CMC 11: By-products within the meaning of Directive 2008/98/EC	An EU fertilising product may contain by-products within the meaning of Directive 2008/98/EC, except: (a)animal by-products or derived products within the meaning of Regulation (EC) No 1069/2009, (b)polymers, (c)compost, or (d)digestate. 2. The by-products shall have been registered pursuant to Regulation (EC) No 1907/2006, with a dossier containing: (a)the information provided for by Annexes VI, VII and VIII to Regulation (EC) No 1907/2006, and (b)a chemical safety report pursuant to Article 14 of Regulation (EC) No 1907/2006 covering the use as a fertilising product, unless explicitly covered by one of the registration obligation exemptions provided for by Annex IV to Regulation (EC) No 1907/2006 or by point 6, 7, 8 or 9 of Annex V to that Regulation. From 16 July 2022, the by-products shall comply with the criteria established by delegated act referred to in Article 42(7)of Fertilising Product Regulation A product placed on the market after that date shall not contain by-products do not comply with such criteria.

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