

Technical proposals for by-products as component materials for EU Fertilising Products

Background document

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1. PROJECT OBJECTIVE

- Article 42(7) of the Fertilising Products regulation (EC) 2019/1009 (FPR) indicates that "the
- 59 Commission shall adopt delegated acts [...] of component material category 11 in Part II of Annex
- 60 II to this Regulation by laying down criteria on agronomic efficiency and safety for the use of by-
- 61 **products within the meaning of Directive 2008/98/EC** in EU fertilising products. Such criteria
- shall reflect present product manufacturing practices, technological developments and the latest
- 63 scientific evidence."
- DG GROW has requested DG JRC to formulate proposals that could serve as a technical basis
- 65 **for the implementation of Article 42(7)**, thus on agronomic efficiency and safety for by-products
- within the meaning of Directive 2008/98/EC as a Component Material Category (CMC 11-Annex
- 67 II).

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- 68 Although the use of substances and chemicals in manufacturing and products is cautiously
- 69 regulated within the EU, production process by-products to be used in sensible applications like
- 70 the food chain may require additional controls compared to intentionally manufactured products.
- By-products may also be affected by incidental contamination throughout their lifecycle, and firms
- may not have access to information on the composition of goods other than the primary product.
- 73 The general objective of this project is the task of analysing, developing and proposing criteria
- in line with the objective of enabling the use of **by-products as value-added components** for the
- 75 EU agricultural sector, at the interface between chemicals, products and waste legislation.

2. AIM OF REPORT VERSION 1, DATED 24 APRIL 2020

- 77 The aim of this draft is following:
 - Provide an overview of the materials falling within the scope of this work (section 3) and their link to policy objectives that form part of the FPR and other EU initiatives (section 4):
 - Share an initial proposal for a directional framework of this project, taking into account a set of challenges and relevant issues in line with the objectives of the work (section 5);
 - Present a preliminary evaluation of some candidate by-products taking into consideration the scope of this work (section 6);
 - Inform stakeholders on the next project steps, tentative project timeline and mode of interaction (section 7);
 - Request feedback from the stakeholders on the directional framework proposed, and invite stakeholders to deliver further input on potential by-product candidate materials for assessment (section 8).

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3. Scope

The scope of this project is determined by the interplay between Waste Framework Directive (WFD, 2008/98/EC) and FPR (Figure 1). Actually, **by-products used as a component material in EU fertilising products also have to comply with the national legislations setting criteria on the application of the conditions laid down in Article 5(1) of Directive 2008/98/CE.** The FPR will, however, enable free movement on the internal market for products containing CMC 11 by-products that comply with national legislation settings in one or more EU Member States. Article 5(1) of this Directive sets cumulative conditions under which a substance resulting from a production process, other than the primary product, is to be considered a by-product and not a waste.



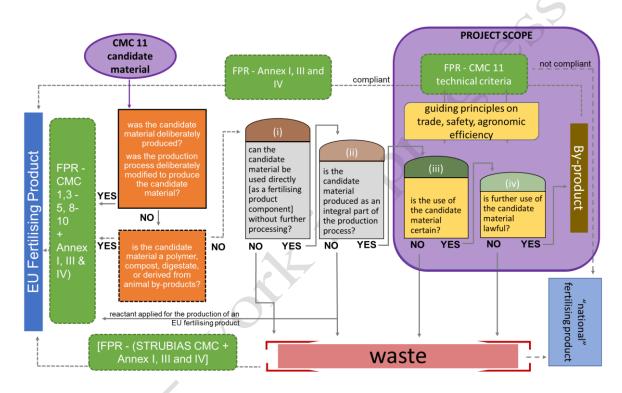


Figure 1: Schematic overview of the scope of this project (purple rectangle on the top of the right hand side) as well as possible routes for CMC 11 candidate materials (purple circle on the top of the hand left side) to become a fertilising product, either through the Fertilising Products Regulation (FPR) (blue rectangle on the left hand side) or through national provisions (blue rectangle on the bottom of the right hand side). The full arrows indicate a reclassification dependent on the rules of the Waste Framework Directive (2008/98/EC), the dotted arrows indicate a possible reclassification dependent on criteria of the FPR, dashed lines indicate a possible reclassification dependent on national rules.

It is important to take into consideration that compliance with harmonised rules of the FPR is optional. The FPR does not prevent by-products **from being made available on the market as non-harmonised fertilisers** in accordance with national law and the general free movement rules of the Treaty on the Functioning of the European Union (TFEU) (Figure 1, "optional harmonisation principle").

3.1. Product versus production residue

In first instance, a candidate CMC 11 material should classify as a **production residue** (Figure 1). The WFD guidance document^{1,2} defines them as something other than the end product that the manufacturing process directly seeks to produce³. In many production processes, it is possibly to identify one or more "primary" products, this or these being principal materials(s) produced. Where the production of the material concerned is 'the result of a technical choice', it cannot be a production residue and is considered a product⁴. If the manufacturer could have produced the primary product without producing a material concerned but chose not to do so, this can be evidence that the material concerned is a product and not a production residue. Also, a modification of the production process in order to give the material concerned specific technical characteristics could indicate that the production of the material concerned was a technical choice. Primary products could fall under the scope of other CMCs, notably CMC 1 (virgin material substances and mixtures), CMC 2 (plants, plant parts or plant extracts), CMC 8 (nutrient polymers) and CMC 9 (polymers other than nutrient polymers).

Box 1: Ammonium sulphate as a by-product from coke gas versus synthesis of ammonium sulphate

Ammonium sulphate is, amongst other routes, produced as a by-product during the removal of ammonia (NH₃) from the raw coke oven gas generated during the coking of the metallurgical coal. This process consists of absorption of ammonia in the coke oven gas in a solution of ammonium sulphate and sulphuric acid. The absorption reaction is $2NH_3 + H_2SO_4 = (NH_4)_2SO_4$. The ammonium sulphate produced by the reaction of NH_3 with H_2SO_4 is recovered by crystallization. The crystals are then centrifuged, washed and dried.

A second production route for ammonium sulphate involves the intentional synthesis by reacting Haber-Bosch derived anhydrous ammonia and sulphuric acid in a reactor of a fertiliser production plant.

In the first case, the end product that the manufacturing process directly seeks to produce is coke, and the production process has not been modified with the intention of producing the ammonium sulphate. The produced ammonium sulphate could here be considered as a production residue, thus possibly be included under CMC 11 of the FPR. This stands in contrast with the second process in the fertiliser plant, where the ammonium sulphate is deliberately created in a production process to be sold on the internal market as a product. The latter material will be assessed against the criteria of CMC 1 in the FPR. Note that the contaminant profile between both types of ammonium sulphate (i.e. CMC 1 and CMC 11 candidate materials) may differ because ammonium sulphate produced as a by-product during the recovery of ammonia from coke oven gas may contain greater concentrations of organic and inorganic impurities (e.g. HCN).

¹ Available at: https://ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf

² The guidance document refers to a number of Court of Justice of the European Union (CJEU) rulings related to previous Directives on waste 75/442/EEC or 2006/12/EC, respectively, where the impact of the rulings cited may still be applicable. The content of the guidance, including examples, reflects the views of Directorate-General Environment of the European Commission and as such is not legally binding. The binding interpretation of EU legislation is the exclusive competence of the CJEU. The views expressed in this guidance document cannot prejudge the position that the Commission might take before the CJEU.

³ Case C-9/00 Palin Granit Oy (2002), para 32.

⁴ Case C-235/02 Saetti (2004), para 45.

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- 154 According to Article 5(1) of Directive 2008/98/EC, a production residue may be regarded as being a by-product only if the following conditions are met (Figure 1 & sections 3.3 - 3.5): 155
- 156 (i) the substance or object can be **used directly** without any further processing other than 157 normal industrial practice; 158
 - (ii) the substance or object is produced as an integral part of a production process;
 - (iii) further **use** of the substance or object **is certain**; and
 - (iv) further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

163 The Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste further 164 specifies the interpretation of the concept of by-product as well as on the terminology applied in 165 the definition.

3.2. Fertilising Product Regulation framework

- Component materials for EU fertilising products are divided into different categories in the FPR. 167
- Differentiating requirements for each of the CMCs apply because different component materials 168
- 169 warrant different process requirements and control mechanisms adapted to their different potential
- hazardousness and variability, in turn dependent on the quality of the input materials applied, 170
- production process conditions, etc. This principle is exemplified in Box 1, where different criteria 171
- could apply to ammonium sulphate derived as a product or as a by-product. 172
- 173 Point 1 of CMC 11 of Annex II of the FPR indicates that an EU fertilising product may contain by-174 products within the meaning of Directive 2008/98/EC, except:
- (a) animal by-products or derived products within the meaning of Regulation (EC) No 175 176 1069/2009,
- 177 (b) polymers,
- 178 (c) compost, or
- 179 (d) digestate.
 - Hence, the current provisions of the CMC 11 of the FPR indicates that materials derived from animal by-products (as defined in Regulation (EC) No. 1069/2009), polymers, compost and digestates are excluded from the scope because they have to meet the requirements in the designated CMCs (CMC 3-5, 8-10) (Figure 1). In this respect, a clear definition of how polymers have to be interpreted may be required as differences in properties (e.g. biodegradability and risk
- profiles) may occur between plant-derived polymers (e.g. starch and other biodegradable proteins 185
- 186 like those obtained after seaweed extraction) and petroleum-derived synthetic polymers.
- The provisions of Component Material Category 6 (Food industry by-products) indicate that an 187
- 188 EU fertilising product may contain component material consisting of one of the following
- 189 substances:
- 190 (a) food industry factory lime, i.e. a material from the food processing industry obtained 191 by carbonation of organic matter, using exclusively burnt lime from natural sources;
- 192 (b) molasses, i.e. a viscous by-product of the refining of sugarcane or sugar beets into 193 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;
- 197 (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.

The sole requirement associated to these materials is that they are registered pursuant to Regulation (EC) No 1907/2006 (concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals - REACH), covering the use as a fertilising product. Hence, only specific materials with a **low risk profile that received a large and undisputed support** from the Commission expert group for Fertilising Products and the co-legislators have been included in this CMC 6 The scope of CMC 11 on by-products will complement these materials, and **also other food industry by-products**, possibly associated to supplementary environmental and health safeguard criteria, **could be covered under CMC 11**.

- It is also clarified that some fertilising product components could possibly be covered in different
- 212 CMCs. In such case, a manufacturer that places a fertilising product on the market will have to
- 213 ensure that all its components are **compliant with the provisions of at least one selected CMC**.
- 214 This should, however, not lead to the re-opening of discussions that were finalised during the
- evaluation of materials (also) covered under other CMCs (e.g. "STRUBIAS" CMCs).

3.3. Materials to be used directly [as a fertilising product component] without further processing

The scope of this CMC is limited to materials to be used directly as a fertilising product component without further processing, due to the following provisions from the WFD and the FPR (Figure 1, Box 2):

- According to Article 5(1) of **Directive 2008/98/EC**, a production residue may be regarded as being a by-product only if, amongst other conditions, **the substance or object can be used directly without any further processing other than normal industrial practice** (Figure 1). Normal industrial practice can include all steps which a producer would take for a product, such as the material being screened, sized, agglomerated, pelletised, dried solely to remove free water, or adding materials necessary for further use through physical mixing without intentionally changing the chemical composition of the material contained in the mixture. Treatments usually considered as a recovery operation cannot, in principle, be considered as normal industrial practice in this sense. The title of this CMC "by-products within the meaning of Directive 2008/98/EC" implies that all materials should enable their direct use as a fertilising product component.
- According to the FPR, the provisions on product criteria for EU fertilising products contain requirements for the categories of end-products in accordance with their intended function (PFC), as well for the categories of component materials (CMCs). A fertiliser manufacturer can place an EU fertilising product that is composed of one single ingredient, belonging to a specific CMC, on the market. A possible example is, for instance, ammonium sulphate as a by-product from coke production, compliant with all CMC 11 criteria. It is also possible to put an EU fertilising product on the market 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 component materials that are contained in the EU fertiliser. Hence, an EU fertiliser producer may start from two or more substances or mixtures, provided that each of them complies with the description in one or more of the CMCs, and mix them into a final product without any intentional chemical reaction taking place. The component materials are then 'contained' as such in the final EU fertilising product. This follows the presumption that if different component materials do not show unacceptable risks for human health and the environment, a physical mix of them constituting the final CE marked product will also be safe, subject to compliance with certain limit values defined in Annex I (i.e. PFC level) for the final product. An example of such route occurs when a fertiliser company mixes (e.g. combined in a 1:1 ratio in the same fertiliser bag) urea derived through the Haber-Bosh process (CMC 1) with ammonium sulphate as a by-product from caprolactam production (CMC 11).

Box 2: Blast furnace slag versus calcium sulphite from flue-gas desulphurisation

Blast furnace slag is produced in parallel with hot iron in a blast furnace. Blast furnace slag can be used directly as a fertilising product at the end of the production process, without further processing that is not an integral part of this production process (such as crushing to get the appropriate particle size). This material can therefore be considered a by-product, and thus falls within the scope of this CMC 11 (subject to further assessment of safety and agronomic impacts).

Flue gas desulphurisation from facility A removes sulphur from the flue gases that are produced when sulphurous fossil fuels are burnt in power plants, in order to prevent these emissions contributing to air pollution and acid rain. The wet limestone flue-gas desulphurisation system generates a calcium sulphite sludge, which need to be processed via a recycling operation to turn the (largely insoluble) calcium sulphite sludge into gypsum as a fertilising product component. Hence, the viscous sludge obtained cannot be used directly as a fertilising product component when not further processed using techniques (e.g. oxidation to induce further chemical reactions) that do not classify as "normal industrial processing". Here, the calcium sulphite sludge is not considered a by-product for assessment under CMC 11, but a waste material.

3.4. Materials produced as an integral part of a production process

The wording of Article 5(1)(c) WFD requires that the substance or object 'is produced' as an integral part of a production process (Figure 1, Box 3 and Box 4). It can be taken from this that the process where the by-product is generated has to be an integral part of a production process. If a material leaves the site or factory where it is produced in order to undergo further processing, this may be evidence that such tasks are no longer part of the same production process, thus disqualifying it as a by-product. Specific manufacturing steps, that occur independent from the main product manufacturing line, and address typical waste-related characteristics of the production residue, such as its contamination with components which are hazardous or not useful, would prevent classification of the residue as a by-product. Materials obtained from the recycling facilities for waste materials fall beyond the scope of this project (Figure 1).

Box 3: gypsum from forced oxidation scrubbers versus gypsum recovered from calcium sulphite

Plant B has an integrated desulphurisation system that is based on forced oxidation techniques, pushing the chemical reaction towards producing gypsum (calcium sulphate dihydrate) that has the same properties as natural, mined gypsum (a product used in ameliorating high-sodium soils). The generation of gypsum from the residues from flue gas cleaning on the site of the power plant can be regarded as an integral part of a production process (energy generation), and the resulting flue gas desulphurisation gypsum as a by-product that falls under the scope of this project.

The viscous calcium sulphite sludge from wet limestone flue-gas desulphurisation system of plant A (see Box 2) is isolated and further subject to a recovery operation that has gypsum as a final product of the recovery process. The recovery operation is not considered an integral part of the (energy) production process. Therefore, the corresponding gypsum, derived from the calcium sulphite sludge of the desulphurisation system of plant A, cannot be considered as a by-product, and falls beyond the scope of this project.

In combination with the "direct use as a fertilising product component" requirement (section 3.3), it also becomes clear that by-products that are used as reactants to produce EU fertilising products fall beyond the scope of CMC 11 and thus this project.

Nonetheless, by-products could be used as reactants in production processes for other fertilising product component materials (e.g. CMC 1 production processes that use by-products as precursors, exemplified in Box 4)

Box 4: By-products as reactants for EU fertilising products

A fertiliser company would like to make continued **use of spent sulphuric acid from the food industry to produce single super phosphate** as an EU fertilising product under the FPR. The spent sulphuric acid meets all requirements of the WFD (Article 5(1) of Directive 2008/98/EC) to be used as *a reactant for the production of fertilising products* (exemplified here to be single super phosphate as a CMC 1 material). In the production process of the fertiliser production plant, it is chemically reacted with rock phosphate, dried and granulated to be placed on the EU market.

The spent sulphuric acid is not "directly used as a fertilising product component", so it cannot be considered as a CMC 11 material. On the other hand, whereas the single super phosphate can be directly used as a fertilising component, it is not a by-product, but a newly formed CMC 1 substance derived from reacting a by-product (spent sulphuric acid) with another substance (phosphate rock). For this reason, the single super phosphate should not be evaluated against the criteria for CMC 11, but it is eligible to be considered under CMC 1 when registered pursuant to the REACH Regulation for use as a fertilising product.

3.5. Materials with "certainty" of further "lawful" use

- Article 5(1)(a) of the WFD requires that "further use of the substance or object is certain" in order
- 320 to classify as a by-product (Figure 1). 'Further use is certain' means that it is not a mere possibility
- but a certainty; there should thus be solid evidence or an assurance that the material will be used.
- 322 The purpose of this criterion is that if further use were not certain, there would be a risk of the
- 323 material being disposed of as waste.
- 324 Certainty of further use can, of course, be difficult to prove definitively in advance. However,
- 325 following criteria may provide guidance elements for the assessment of 'certainty of further use'
- may, amongst others, be indicated through:

- Existence of contracts between the material producer and subsequent user;
- A financial gain for the material producer from the sales of the material;
- A solid market (sound supply and demand) existing for this further use;
- Evidence that the material fulfils the same specifications as other products on the market.
- On the other hand, the following may be indications that future use is uncertain:
 - There is no market for the material. Low sales volumes and/or long-term storage of the material may hint at this;
 - Only part of the material is to be used, with the rest to be disposed of;
 - The financial gain for the material holder does not arise from selling the by-product, but from avoiding substantial expenses due to treatment and disposal if the material were to be discarded as waste. Low sale prices, combined with free transport offered by the material holder, may hint at this.
- These criteria are aligned to the need to limit CMC 11 materials to **materials of added value** for the extensive European agricultural sector. As a matter of fact, **Article 42(1)(a) of the FPR** mentions the "potential to be the subject of significant trade on the internal market" as one of the conditions for the adoption of delegated acts by the Commission.
- Article 5(1)(d) WFD clarifies that the further use of the material **must be lawful**, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements at EU and at Member States' level for the specific use (Figure 1). It ought to be demonstrated that it will not lead to overall adverse environmental or human health impacts, supplementary to those possibly associated to their primary raw materials equivalents. This is fully **aligned to the conditions of Article 42(1)(b) of the FPR** that mention the need for scientific evidence indicating that EU fertilising products:
- (i) do not present a risk to human, animal or plant health, to safety or to the environment;
- 351 (ii) ensure agronomic efficiency.

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These conditions are particularly relevant for CMC 11 due to concerns that inappropriate or low-quality by-products will enter the market. It has been brought forward that some recycling companies, which are not fertilising products producers, may try to put low quality products (in terms of agronomic efficacy and contaminants levels) on the market to get rid of ineffective by-products as fertilising products.

3.6. Implications for project scope

- Based on the information provided in sections 3.1 to 3.5, the scope of this project (Figure 1) is thus:
 - <u>limited to</u> industrial or plant-derived **production residues** that can be **used directly** as fertilising product component, and that are **produced as an integral part of a production process**, thus excluding any waste-based derived materials; and
 - <u>focussed on</u> developing and proposing safety and agronomic criteria for CMC 11 materials.
- In this respect, broadly accepted material criteria proposals will be developed to ensure similar specifications as for other CMCs within the FPR, clearly segregated from materials being perceived as waste within the different EU Member States.
- For materials not fulfilling these principles, the FPR does not prevent by-products **from being**made available on the market as non-harmonised fertilisers in accordance with national law

(Figure 1, "optional harmonisation principle"). Hence, compliance with harmonised rules is therefore optional.

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4. LINK TO POLICY OBJECTIVES

4.1. By-products as an opportunity for the EU Circular Economy

- 374 Circular Economy initiatives and actions aim at contributing to "closing the loop" of product
- 375 lifecycles and manufacturing processes through greater recycling and re-use to the benefit of both
- the environment and the economy. The aim is to **extract the maximum value** and use from all raw
- materials, products, by-products and waste, fostering resource efficiency and energy savings, and
- 378 reducing greenhouse gas emissions.
- 379 The European Commission's 2015 Circular Economy Action Plan stressed the importance of
- developing a well-functioning single market for secondary raw materials, including those derived
- from by-products. One of the objectives is enabling recycling and improving the uptake of
- 382 secondary raw materials by limiting unnecessary burdens and facilitating the cross-border
- 383 circulation of secondary raw materials while ensuring their performance and safety in a toxic-free
- environment. The new 2020 Circular Economy Action Plan one of the main blocks of the
- 385 European Green Deal explicitly refers to the need to create a well-functioning EU market for
- secondary raw materials, support cross-border initiatives for cooperation to harmonise by-products,
- and to restrict on the use of substances of very high concern in articles.
- 388 This is consistent with the priorities of the waste hierarchy that encourages re-use practices in an
- 389 environmentally sound way while ensuring high standards of protection of the environment and
- 390 health.

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4.2. By-products as a risk to the EU Circular Economy

- Friction at the interface between two policy objectives circular economy and the protection of the
- environment and human health may occur due to the **presence of certain substances that pose**
- a risk to the environment and/or human health in by-products. This holds particularly true for
- by-products as components for EU fertilising products since they are not the end product that a
- 396 manufacturing process directly seeks to produce. Therefore, the control on the possible hazardous
- 397 substances and other substances associated to a risk for the environment and health is intrinsically
- low. Moreover, the intended use of the primary product (e.g. intended use as a construction
- material) may possibly require less stringent controls and restrictions on contaminants than a by-
- 400 product produced through the same production process but to be used for more sensitive
- 401 **applications** (in the food chain). As our knowledge about the properties of many chemicals
- 402 increases, more substantial concerns arise about the negative impacts that specific elements,
- 403 chemicals and substances used in industrial processes may have on human health and the
- 404 environment. Concerns for some substances such as lead and arsenic have been known or suspected
- for centuries, whereas for other substances, concerns are much more recent. Some substances, such
- as perfluorinated compounds, endocrine disrupting chemicals and rare earth metals, have only been
- 407 coming under scrutiny in the last few years.
- Hence, this study will assess the risk that by-products could pose to the environment and human
- 409 health and propose correspondingly criteria to promote a toxic-free EU environment and circular
- 410 economy.

411 5. PROPOSAL FOR A DIRECTIONAL FRAMEWORK

- The JRC has developed a proposal for the directional framework of CMC 11. The JRC has listed
- and assessed the **main challenges and issues to consider** in this project, and proposed directional
- approaches to address those in view of the advantages and drawbacks of possible options.

5.1. Challenge A – Ensuring material safety

416 **5.1.1. Overview**

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- 417 By-products to be used in the agri-food and environmental chain could contain contaminants that
- lead to environmental and health risks for food consumers. Whereas the boundary between by-
- 419 products and waste is case-dependent and at times fuzzy, material holders might benefit from a
- 420 financial gain when materials can be classified as a by-product due to the avoided cost of waste
- 421 treatment. Therefore, a main challenge is to limit the CMC to value-added materials that have
- been proven safe to the environment and to health when used as a fertilising product
- component. Should the techno-scientific knowledge base be incomplete or divergence exists
- 424 amongst techno-scientific opinions, the precautionary principle should apply.

425 **5.1.2. Issue #1: listing approach**

426 **5.1.2.1.** Background and options

- When using a **positive list**, the proposals will explicitly ("positively") list materials, and possibly
- 428 their production processes, that are eligible to be considered as a by-product. Additionally,
- 429 exceptions or conditions (e.g. limits for contaminants) to these materials may apply. A **negative**
- 430 **list** does not list materials, implying that all by-products are by default considered. In such case,
- 431 the proposals only incur exceptions (e.g. materials from nuclear industries are not considered) or
- excluding conditions (e.g. contents of specific contaminants of concern exceeding a certain limit
- 433 value).

434 **5.1.2.2.** Proposal

- The proposal is to rely on a **positive list of selected materials for this CMC**. It shall, however, be
- intended to formulate the criteria in order to account for safe innovation (see section 5.4.2). The
- main advantage of a positive list approach is that it ensures a higher level of protection because
- 438 the screening on contaminants is limited to a set of identified materials. This may be particularly
- pertinent for this CMC, covering production residues from very different industries, with different
- sorts and levels of contaminants, under the single umbrella "by-products". Since the materials and
- associated risks are clearly identified when using a positive list, analysis schemes can be limited to
- the most relevant parameters and hence **compliance costs can be kept to a minimum** (see section
- 5.4.4). A negative list approach involves a substantial risk for overlooking recognised or non-
- 444 identified contaminants in material streams due to a lack of available information on the different
- possible materials, attention gaps during screening, and/or lack of information on use history as a
- 446 fertilising product component within the EU. Such option may therefore open a backdoor for the
- marketing of unsafe by-products as CE marked products when contained in EU fertilising products.
- In addition, the way to address risks in a negative list approach would be through extensive, and
- therefore expensive, material analysis schemes. Moreover, it remains uncertain if risk assessment
- data would be available to derive "safe limit values" for all identified contaminants. Altogether, it

- 451 would be largely impossible to develop criteria to exclude all possible contaminant loads in a
- 452 material on the one hand and to limit the cost of analysing the candidate by-product at an
- economically acceptable level in the compliance scheme on the other hand.

5.1.3. Issue #2: screening of contaminants for evaluation

455 **5.1.3.1. Background**

- 456 Screening helps to identify contaminants for which data need to be collected and assessed. A
- 457 difficulty lies in identifying information sources for screening and possible risk management
- evaluation. A well-defined list of potential contaminants of concern will, however, ensure that
- appropriate information on contaminants can be collected for candidate materials.

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Contaminants are substances that have not been intentionally added to the by-product as a fertilising production component. General safety criteria in the Fertilising Products Regulation will apply to all EU fertilising products, depending on their product function category. Hence, the assessment of any additional or complementary safety criteria shall result from the identification of specific risks linked directly to the fact that the component materials are by-products, as opposed to intentionally manufactured products from virgin substances. Specific substances, of concern upon entering into the environment, might have been introduced unintentionally to by-products due to the complexities of the primary product supply chain and manufacturing process.

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Point 3 of CMC 11 of the FPR requires in parallel that by-products are registered according to the 470 471 REACH Regulation ((EC) No 1907/2006) for the use as a fertilising product. In order to avoid 472 overlaps, the risk management in this report shall mainly focus on issues not addressed in the 473 REACH registration, relevant for by-products in particular. This is particularly relevant as 474 companies manufacturing and importing the same substance can register jointly, based on the 475 "sameness" principle. For REACH registration, technical grades, analytical grades or pure 476 substances are the same as long as they consist of the same main constituent(s). Hence, a product 477 and its by-product equivalent, with different impurity profiles resulting from the production process 478 (see Box 1 for example), may register jointly. This brings along a challenge as 479 impurities/contaminants present at trace (ppm or lower) level in fertilising products could induce a 480 significant risk for the food chain.

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The assessment shall cover both short-term effects (e.g. metal accumulation in soil) and longerterm effects (e.g. changes in soil quality, contamination of the food chain) of contaminants. The screening of possible contaminants may require a broader screening than for intentionally manufactured products, taking into consideration that by-products may be derived e.g. from intermediate processing steps as well as from industrial process streams or air cleaning systems.

5.1.3.2. Proposal

488 It is proposed to collect information on possible contaminants from different sources. Depending 489 on the sector of origin and type of production process, the contaminant list could then be refined 490 and grouped for similar materials (see section 5.3.3).

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In first instance, technical experts from the private sector, and national and EU bodies will be consulted to provide information and expert judgement on risks (source 1). A second source of

information are relevant contaminants in food and environmental legislation and national quality standards (source 2). Thirdly, sector specific contaminants are reviewed through revising sources such as the Best Available Techniques (BAT) reference documents (BREFs) and the European Pollutant Release and Transfer Register (E-PRTR)⁵, a potentially important tool for tracking industrial pollutants (source 3). Finally, contaminants and substances taken up in the Stockholm convention on persistent organic compounds (POPs) and with particular provisions due to environmental or health concern in the REACH regulation will be screened (source 4). The information derived from those different sources should provide an extensive checklist as a starting point, which can then be narrowed further down to the elements relevant for every type of material.

Source 1: Expert knowledge from experts in the field

Experts' knowledge from experts from the Commission expert group for Fertilising Products (consisting of Member State authorities, EU industry associations and environmental NGOs), and other Commission departments will be sought to provide supplementary information on materials that have been identified as candidate by-products (see section 6 and section 8). Any expert information can be communicated to the JRC through oral and/or written feedback consultation rounds (see section 7).

Material criteria may also build upon Member States' implementation of the requirements for safe use, and any specific safety criteria adopted by Member States under Directive 2008/98/EC Furthermore, to identify possible contaminants of concern, a screening is proposed for substances regulated under specific sectorial/product legislation on food safety, water quality, air quality, and other national and EU environmental quality standards, including those for soils. A focus on water

Source 2: contaminants from food and environmental legislation and national quality standards

and air pollutants may also be relevant as some by-products may be produced from processing steps that aim to avoid pollutant emissions. Note that not necessarily all the contaminants taken up in these references may be relevant for all materials in this project. For instance, food contaminants

that may be introduced through food contact with packaging may not be a relevant contamination route for many materials, whereas other food contaminants can be toxic for humans, but not for

523 plants (e.g. nitrate).

Maximum levels for certain **contaminants in food** are set in Commission Regulation (EC) No 1881/2006. The food contaminant catalogue includes other substances (https://ec.europa.eu/food/safety/chemical_safety/contaminants/catalogue_en). Relevant substances are, for instance, metals, dioxins, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAH).

Directive 2008/105/EC of the European Parliament and the Council on Environmental Quality Standards in the field of water policy (EQSD) established limits on concentrations of the **priority substances in surface waters** of 33 priority substances and 8 other pollutants (in its Annex I). The list includes selected existing chemicals and solvents (finding various applications in chemical, pharmaceutical, oil, and gas industries, including in chemical syntheses and purification processes), plant protection products, biocides, metals and other groups like Polyaromatic Hydrocarbons (PAH) that are mainly incineration by-products and Polybrominated Biphenylethers (PBDE) that are used as flame retardants.

Regulations and conventions related to **air quality** focus on reducing emissions from e.g. metals, persistent organic pollutants, and non-methane volatile organic compounds (e.g. benzene). The

⁵ https://prtr.eea.europa.eu/

European Union has developed an extensive body of legislation which establishes health-based standards and objectives for a number of pollutants present in the air. These standards and objectives are summarised at https://ec.europa.eu/environment/air/quality/standards.htm.

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Soil is not subject to a comprehensive and coherent set of rules in the Union. There is no EU-wide legislation on **soil protection**. However, soil screening values are generic quality standards that are used to regulate land contamination⁶. Soil screening values adopted in European countries are widely variable in multiple aspects. The use of screening values varies from setting long-term quality objectives, via triggering further investigations, to enforcing remedial actions. Derivation methods of screening values have scientific and political bases; they also differ from country to country, and, as a result, screening values display substantial variation across Member States. The number of substances for which soil screening values are provided widely vary across EU Member States, ranging from less than 20 to 234 substances, with about 60 as the most common substances. They include heavy metals and metalloids (e.g. As, Be, Cd, Co, Cr, Cu, Hg, Pb, Ni, Se, Tl, V, Zn), aromatic hydrocarbons (e.g., benzene, ethyl benzene, toluene), polycyclic aromatic hydrocarbons, chlorinated aliphatic hydrocarbons (e.g. dichloromethane, trichloroethylene, tetrachloromethane), chlorinated aromatic hydrocarbons (e.g. chlorobenzene, hexachlorobenzene), pesticides (atrazine, dieldrin), dioxins and dioxin like PCBs.

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Source 3: sectorial reference documents

Information on sector specific contaminants may possibly be listed in the Best Available Techniques (BAT) reference documents, known as BREFs (as well as a few other reference documents) that have been adopted under the Industrial Emissions Directive (IED, 2010/75/EU). Amongst others, each document generally gives information on a specific industrial/agricultural sector in the EU, on the techniques and processes used in this sector, current emission and consumption levels, techniques to consider in the determination of the best available techniques (BAT) and emerging techniques. The IED has introduced provisions to ensure that the operation of an installation does not lead to a deterioration in the quality of soil (and groundwater). However, a large number of potentially polluting activities are not within the scope of the IED, which in any event only covers larger industrial installations. As well the European Pollutant Release and Transfer Register (E-PRTR) includes a list of sector-specific pollutants. It contains key environmental data from industrial facilities in European Union Member States. The new register covers 65 economic activities across Europe. Information is provided concerning the amounts of pollutant releases to air, water and land as well as off-site transfers of waste and of pollutants in wastewater from a list of 91 key pollutants including heavy metals, pesticides, greenhouse gases and dioxins for years 2007 onwards.

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Source 4: other contaminants listed as POPs in the Stockholm Convention and substances of very high concern and restricted substances from the REACH Regulation

Other substances of concern could be present in the candidate fertilising product component. In this respect, following lists are relevant:

583 584 i. Persistent Organic Pollutants (POPs) are organic chemical substances, that is, they are carbon-based. They possess a particular combination of physical and chemical properties such that, once released into the environment, they:

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remain intact for exceptionally long periods of time (many years);

⁶ https://esdac.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/EUR22805.pdf

- become widely distributed throughout the environment as a result of natural processes involving soil, water and, most notably, air;
 - accumulate in the fatty tissue of living organisms including humans, and are found at higher concentrations at higher levels in the food chain; and
 - are toxic to both humans and wildlife.

The list contains over 30 chemicals, distributed over three categories in the annexes (Annex A - elimination, Annex B - restriction, Annex C - unintentional production) (http://chm.pops.int/TheConvention/ThePOPs/ListingofPOPs/tabid/2509/Default.aspx)

- ii. the list of substances of very high concern from REACH (SVHC list, including roughly 200 substances, https://echa.europa.eu/candidate-list-table). This list covers substances meeting the criteria for classification as carcinogenic, mutagenic or reprotoxic (CMR) category 1 or 2; persistent, bio-accumulative and toxic (PBT) substances; or very persistent and very bio-accumulative (vPvB) substances; substances for which there is evidence for similar concern, such as endocrine disruptors.

 EU producers or importers of articles which contain substances on the SVHC list in a
 - EU producers or importers of articles which contain substances on the SVHC list in a concentration above 0.1% (w/w) have a duty to communicate information of substances in articles (as per Article 33 of REACH) and have to notify ECHA (Article 7(2)). For specific contaminants, the threshold of 0.1% (10 000 mg kg⁻¹) for notification may, however, be unacceptably high for applications in fertilising products.
- iii. Annex XVII of REACH regulation contains the list of restrictions of certain hazardous substances, mixtures and articles for their marketing and use on the European market (https://echa.europa.eu/substances-restricted-under-reach). There are 70 valid entries on REACH Annex XVII (updated on 19 Nov 2019), including for instance phthalates and Bisphenol A, but also by-products of refining lead ores obtained from cleaning systems and slurry from scrubbers, calcines (i.e. product of the roasting of cadmium-enriched lead smelting dusts to remove cadmium consists primarily of oxides and sulphates of lead and zinc). The list is often known as REACH restricted substances list or simply as REACH annex XVII.

Many of the substances identified from sources 1-3 are also taken up as in source 4 (e.g. lead and its compounds). Contaminants that exclusively form part of source 4 may be originating from unintentional contamination (e.g. food industry by-product contaminated with pentachlorophenol and its salts and esters (PCP) as disinfectant) or containing degradation products of anthropogenic chemicals like perfluorooctanoic acid (PFOA) from food processing equipment. Moreover, it is noted that the Stockholm convention and the REACH Regulation provide additional guidance to phase out and restrict the use of particular substances. In general, this implies that a manufacturer has a high degree of control over the addition and presence of such substances in the production process, and can thus effectively ensure its absence in a corresponding candidate CMC 11 by-product.

Based on the information collected from the different sources, Table 1 provides a non-exhaustive list of selected substances that may be relevant for the screening of contaminants in specific candidate by-products. Main sources of material contamination could include solvents, disinfectants, oil-derived substances, ores, combustion, metal working fluids, pathogens and pests, degreasing agents, plasticizers, and flame retardants.

| Examples of contamination sources | Contaminant group | Example of contaminant |
|--|--------------------------------|---|
| solvents disinfectants oil-derived substances combustion ores pathogens and pests metal working fluids plasticizers degreasing agents biocides and pesticides flame retardants | Metals and metalloids | Arsenic and compounds (as As) Cadmium and compounds (as Cd) Copper and compounds (as Cu) Cobalt and compounds (as Co) Mercury and compounds (as Hg) Nickel and compounds (as Ni) Lead and compounds (as Pb) Thallium and compounds (as Tl) Vanadium and compounds (as V) Zinc and compounds (as Zn) |
| | Inorganic | Chlorides (as total CI) Cyanides (as total CN) Fluorides (as total F) |
| | Hydrocarbons | Polyaromatic hydrocarbons (PAH) Benzene |
| | Chlorinated organic substances | Brominated diphenylether Chloroalkanes, C10-13 Dichloromethane Pentachlorobenzene PCDD/F Pentachlorophenol Tetrachloro-ethylene Per/polyfluoroalkyl substances (PFAS) |
| 312 | Others | Linear alkylbenzene sulfonates (LAS) Di(2-ethylhexyl)phthalate (DEHP) Organotin compounds (as total Sn) Plant pests Plastics < 2 mm Biological pathogens Octylphenol |
| | Biocides/ pesticides | Trifluralin Hexachlorobenzene |

634 **5.1.4.** Issue #3: bioavailability of contaminants

5.1.4.1. Background

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- 636 Like some primary materials, the constituent substances of some types of materials may be
- retained, to a greater or lesser extent, in a matrix. It may therefore be claimed that similar to e.g.
- nutrients (see section 5.2.2) the bioavailability of the elements and substances of concern within
- this matrix is a relevant issue that is related to its actual risk.

5.1.4.2. Proposal

641 It is proposed that the absolute concentration of contaminants, without further consideration of 642 bioavailability or bioaccessibility, shall be considered for the by-products. The "worst-case-643 scenario" is thus proposed to be considered to ensure environmental protection based on the precautionary principle. The underlying principle is that the "storage" of contaminants in 644 645 agricultural soils as an everlasting sink is not good practice. After all, sooner or later the 646 contaminants may become available again, thus posing a threat to sustainability in the long-term 647 and for future generations. This may be particularly relevant as the agricultural soil environment 648 may become subject to a different use (e.g. restoration of natural vegetation) and/or a different abiotic environment (e.g. due to climate change). In addition, it should be avoided that elements 649 and substances of industrial origin - without a direct contribution to agronomic interests - build up 650 to levels beyond the natural background levels observed in soils. This is particularly relevant as 651 652 our techno-scientific understanding of the substance dynamics in soils and risks to different types of organisms may be incomplete. Moreover, no harmonised methodologies are available for the 653 654 evaluation of contaminant bioavailability, and its potential changes in time during soil storage.

5.2. Challenge B – Ensuring agronomic value

656 **5.2.1. Overview**

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- A by-product is not the primary product a manufacturer seeks to place on the market and therefore its added value to enhance plant growth is not necessarily certain. A main challenge is to limit the CMC to value-added materials that have been proven agronomically beneficial for the EU agricultural sector. The competitive position of any by-product in the market, vis-à-vis the primary material it replaces, is strongest when it is as close as possible to the primary material in its performance and quality, ensuring that the recovered material may be suitable for a broad range of uses. This, however, does not necessarily mean direct equivalence to primary materials rather,
- by-products, just like primary materials, can be marketed under different grades or qualities.

The framework of the FPR has minimal conditions for agronomic value at Product Function Category (PFC) level that vary as a function of the class or intended use. Hence, agronomic value shall be understood in the broad concept, securing that criteria-compliant by-products are incorporated in fertilising products for a useful purpose, i.e. as a nutrient source (fertiliser), a liming material, a soil improver, a growing medium, an inhibitor, a plant biostimulant or a blend of those.

5.2.2. Issue #4: effectiveness of fertilising claims

5.2.2.1. Background

- This section only focuses on materials that have a direct, intended function to sustain plant growth
- 674 (i.e. as fertiliser, a liming material, a soil improver, a growing medium, an inhibitor, a plant
- biostimulant or a blend of those), and thus excludes by-products that are used to facilitate product
- handling, use and management (covered in section 5.2.3).
- The possible lack of effectiveness of fertilising value through the minimum PFC requirements
- 678 requires a detailed evaluation per category. For PFC 1, for instance, minimum total nutrient values
- have been listed as a criterion, regardless of the form in which the nutrient occurs. By-products
- may contain, for instance, a mixture of calcium sulphite and calcium sulphate (see for instance box
- 2, example of materials obtained from flue gas desulphurisation), with the former being a low-
- value insoluble compound and the latter a fertilising product that can serve as a calcium and sulphur
- source for plants. However, in spite of their difference in agronomic value, both may meet the
- 684 minimum nutrients requirements of PFC 1(C)(I)(a)(i) (straight solid inorganic macronutrient
- 685 fertiliser, minimum 12% CaO). Therefore, additional criteria (e.g. water-soluble or extractable
- nutrient content) for this material group could be considered. Also, the agronomic requirements for
- candidate by-products that could become part of other PFCs (e.g. PFC 3(B); inorganic soil
- candidate by-products that could become part of other FPCs (e.g. FPC 5(B), morganic son
- improver) may possibly require re-evaluation in the light of the material proposed. Similar to the
- safety criteria, the agronomic efficiency criteria are to reflect present product manufacturing
- practices, technological development and the latest scientific evidence.
- It should also be avoided that by-products are mixed together with other CMCs into a new PFC
- 692 material with the sole intention of meeting the PFC limit values on agronomic efficiency (mixing
- and dilution as an untruthful practice).

694 **5.2.2.2. Proposal**

- Although the FPR enables that physical mixing, without intentional chemical reaction, between
- 696 by-products (CMC 11) and other CMCs may occur (see section 3.3), it is proposed that the added
- value in terms of agronomic value should be evident. This is in line with the by-product condition
- of materials to be used directly without further processing laid down in the WFD (see section 3.3).
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- 700 It is proposed to verify for each of the candidate by-products (or groups of similar materials, see
- section 5.3.3) the intended use envisaged. This information should provide an indication of its
- 702 corresponding PFC. Additional criteria may be proposed in the CMC 11 criteria to ensure
- agronomic value, if the agricultural value of the material is unclear or debated.

5.2.3. Issue #5: materials to facilitate product handling, use and management

5.2.3.1. Background

- The added-value of a by-product may relate to the direct role in improving plant nutrition, or to an
- 707 indirect role related to facilitate the handling, use and management of fertilising products. By-
- products could, for instance, play a role as filling agents or to promote a specific material hardness
- 709 for fertiliser broadcasting.

710 **5.2.3.2. Proposal**

- 711 It shall be recognised that components may be added for technical, not agronomic, reasons.
- Fertilising products may be of higher quality (e.g. less clumping), safer for the handle, etc. due to
- 713 specific by-products being present, although they may not directly affect the agronomic
- 714 performance. In case the intended function relates to facilitating product handling, use and
- 715 management, additional criteria will be evaluated to ensure the added-value for EU fertilising
- products at a later project stage. These may consist, for instance, in proposing a maximum relative
- 717 concentration for the materials in the PFC material, or a REACH registration for this specific use.

5.3. Challenge C – Selection and prioritisation of materials for assessment

719 **5.3.1. Overview**

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- The starting point for the present study is the wide range of by-products and candidate by-products
- available for the fertiliser markets of the EU territory. However, the mandate of the JRC is limited
- 722 in time as Article 42(7) of the FPR sets the obligation for the Commission to adopt, by 16 July
- 723 2022, a delegated act for CMC 11. The proposal to rely on a positive list for CMC 11 materials
- 724 involves that the JRC will evaluate candidate materials on a case-by-case basis, implying a final
- selection and prioritisation of candidate materials in an early stage of the project, followed by
- possible elaboration of criteria for the selected candidate materials.

727 5.3.2. Issue #6: selection of materials for assessment by the JRC

728 **5.3.2.1.** Background

- 729 Depending on the number of candidate by-product materials, JRC may have to prioritise specific
- materials of interest based on objective conditions.

731 **5.3.2.2. Proposal**

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- 732 It is proposed that the following issues will be taken into consideration when selecting candidate
- by-products for assessment:
 - Alignment to the scope of this project as outlined in section 3. This implies that by-products should be a production residue, not be part of one of the material types excluded under point 1 of CMC 11 of Annex II of the FPR, can be used directly as a fertilising product component, and are the result of an integral part of a production process.
 - Current situation and possible inclusion under Regulation (EC) No. 2003/2003 (outgoing legislation relating to fertilisers) and national markets in EU Member States (by-products used directly as fertilising materials on agricultural land, including products of PFC 2-6 of the FPR such as liming materials, soil improvers, etc.). By-products already placed in the market could be associated to more readily available techno-scientific database and use experience in the EU. Experiences observed by EU Member States from this current framework will be taken into consideration (e.g. positive track-record). Due attention will also be paid to current limitations and restrictions to mutual recognition of by-products by Member States, as well as differences in recognition of materials as by-products or not across Member States. This will be important, given the fact that individual

- Member States will not be able to override the product status of materials compliant with the FPR.
 - Market potential and future outlook of candidate by-products materials on the EU-market and trade on the EU single market. Article 42(1)(a) of the FPR mentions the "potential to be the subject of significant trade on the internal market" as one of the conditions for the adoption of delegated acts by the Commission. The draft criteria shall reflect present product manufacturing practices and technological developments. Hence, a primary focus will be given to by-products that are produced in larger volumes (e.g. in terms of intentionally synthesised fertilising products they can replace, or in terms of alternative management that can be avoided if included under the FPR). Possibly, it is also relevant to consider the future market outlook of the technologies applied ("future-proofness") in view of any Commission priorities and action plans (e.g. Circular Economy action plan and EU Green Deal, focussing on (hazardous) waste prevention and reduced pollution, safe chemical use and design, increased resource efficiency, greenhouse gas emission reductions etc.).
 - Data availability. A prerequisite for the evaluation of candidate by-products is that a sufficient amount of data is available to judge material safety and agronomic performance. This may involve a clear production process description, knowledge on the chemicals and reactants applied during the production process and their partitions during manufacturing steps, chemical characterisation of the candidate materials, a full contaminant profile of the candidate material, etc. Information can be obtained from techno-scientific literature sources, site visits and/or inputs provided by members of the Commission expert group for Fertilising Products consisting of Member State authorities, EU industry associations and environmental NGOs (see section 5.1.3).
 - Straightforwardness for criteria settings. Some candidate materials and candidate material groups may enable a more straightforward assessment and be associated to lesser challenges during criteria setting (e.g. determination of limit values). This could be materials for which already (industry) standards are available or those associated to intrinsically low risks (e.g. from production processed having applied chemicals of little or no toxicity).
- Hence, the JRC would appreciate receiving any information that demonstrates compliance with one or more of the abovementioned aspects for candidate by-products (see questionnaire, section 8).

5.3.3. Issue #7: grouping of materials

5.3.3.1. Background

- 783 The JRC shall strive to propose a generic set of agronomic efficiency and safety criteria for the by-
- 784 products considered. However, based on preliminary evidence it seems reasonable to assume that
- the technical (composition, mainly impurity profiles) and agronomic characteristics of by-products
- 786 diverge to the extent that such overall criteria would become irrelevant. Therefore, a grouping
- 787 could be evaluated based either (i) on the similarity of the hazardousness profile, or (ii) on the
- 788 chemical composition (presence of main elements, closely related to intended use and agronomic
- 789 performance).

790 **5.3.3.2.** Proposal

791 Should the characteristics of candidate by-products diverge to the extent that such overall criteria 792 would become irrelevant, then the JRC will define subcategories of by-products that each 793 comprise materials with a similar hazardousness profile. This proposal will enable (i) a fair 794 assessment of the material risks, and (ii) favour safe innovation within the respective material 795 groups as long as the main risks are controlled and agronomic value is demonstrated (see section 796 5.4.2). After all, a material with the "same" chemical composition may show substantial differences 797 in its contaminant profile, depending on the production process from which it is derived (e.g. lime 798 as a residue from alkaline seaweed extraction versus lime as a residue of the production of aerated 799 concrete). It is also important to note that a materials registration in REACH, in principle, already 800 covers the impacts, hazards and risks originating from the main constituents present in the by-801 product material, but may not be extensive enough to cover the impacts from the contaminants 802 present at trace level (see section 5.1.3, impurities resulting from the production process may differ 803 for "same" substances). Additionally, focussing exclusively on by-product materials with a specific 804 and narrow chemical composition (e.g. ammonium sulphate, lime, gypsum) may hinder safe 805 innovation that generates by-products of a different chemical composition than the ones that are 806 taken up in a positive CMC 11 material list. The proposal thus involves a significant change relative 807 to the EC 2003/3003 legislative framework that listed by-products based on their chemical 808 composition and main elements, without consideration of the contaminant profile. One of the 809 intentions of the FPR (EU) 2019/1009 is, however, to the address the identified weakness related 810 to the lack of consideration of environmental and public health concerns in the EC 2003/2003 Fertilisers Regulation⁷. This proposal does, however, not imply that the agronomic value of the 811 812 materials is of a lesser importance. As indicated in section 5.2, criteria will be proposed to ensure 813 the added value of the materials in terms of agronomic performance.

5.4. Challenge D – Ensure a well-functioning market

5.4.1. Overview 815

- The harmonisation of criteria for by-products is expected to promote a greater level playing field 816
- 817 with intentionally manufactured fertilising products by increasing legal certainty and opportunity
- 818 to use harmonised rules in a cost-effective manner for access to the single market. Stakeholders
- 819 request simple and cost-effective regulatory processes to enable sector innovation, to incentivise
- 820 investment, and to demonstrate compliance for by-product materials.

5.4.2. Issue #8: safe innovation

822 5.4.2.1. Background

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In the best possible scenario, the FPR shall apply a reasonable neutral stance towards all existing

- 824 and future technological systems operating on the market. However, this technological neutrality
- 825 principle may to a certain degree be restricted for CMC 11 due to the wide scope and possible
- 826 contaminants that may be present in by-product materials. At the same time, it is important to point
- 827 out that the FPR has been envisaged as a "living document", thus providing already intrinsic

⁷ See Commission staff working document impact assessment accompanying the proposal for the FPR, http://ec.europa.eu/DocsRoom/documents/15949/attachments/4/translations/en/renditions/native

opportunities for safe innovation based on the possibility to adapt the Annexes through delegated

829 Commission acts.

5.4.2.2. Proposal

The already proposed reliance on a combination of a **positive list** (section 5.1.2) combined with a possible grouping of materials (section 5.3.3) provides opportunities to formulate the group-specific criteria as generically as possible in order to accommodate for safe innovation. After all, materials within the same group may be derived from alike input materials and/or may have similar primary products as an objective (e.g. by-products resulting from air cleaning systems after material combustion/smelting). Therefore, innovation during specific manufacturing steps may not induce supplementary risk as long as criteria have been proposed that account for risks associated to the input material and/or prior processing steps (e.g. specific metals in input materials, combustion-specific contaminants). Prior to proposing more generic criteria, an overview of the possible by-product candidate materials that could form part of each group is required so as to have a better view on the characteristics and risks for the grouped materials.

For completely new kinds of materials, it is important to recall the "optional harmonisation" principle of the FPR. Therefore, innovative products could still be placed on national markets that could serve to build up a track record on safety and agronomic efficiency. At a later stage, these materials can then be evaluated for inclusion under CMC 11. After all, Article 42(b) of the FPR indicates that the Commission has been given the possibility to adapt the Annexes to technical progress over time so as to facilitate coverage of EU fertilising products on condition that there is available **scientific evidence** to support their inclusion.

5.4.3. Issue #9: legal certainty

5.4.3.1. Background

The decision on whether or not a particular substance or object is a by-product must in the first instance be made by the producer of the substance or object, together with the competent national authorities, based on the applicable national legislation transposing the Waste Framework Directive. Production residues may be classified dissimilarly in different Member States or in different regions of the same Member State, ultimately leading to uncertainty about the legality of management practices for certain by-product streams. The situation may also lead to uncertainty for operators and authorities in possible cross-border movement of by-products, resulting in delays or even refusal of entry and thereby resulting in an inefficient internal market in the EU. Furthermore, in some cases, inconsistent classification of materials (waste versus by-product) could lead to poor management of risks and to potential risks to human health and to the environment.

As already explained, by-products used as a component material in EU fertilising products have also to comply with the national legislations setting criteria on the application of the conditions laid down in Article 5(1) of Directive 2008/98/CE, i.e. under the waste legislation. The CMC 11 criteria will thus not replace the WFD requirements. The criteria can, however, **aid to demonstrate that** further use of the materials identified in the criteria is "lawful" as they do not present a risk to human, animal or plant health, to safety or to the environment, and that "further use of the **substance or object is certain**" (see section 3.5).

870 **5.4.3.2. Proposal**

871 The elaboration of EU-wide criteria for by-products targets to create a level playing field for 872 fertilising products by increasing legal certainty for access to the single market. Therefore, it is 873 required that the JRC evaluation and the proposed CMC 11 criteria inspire trust by national 874 competent authorities, food safety authorities, European fertilising products manufacturers, EU 875 farmers, and the general public. To this end, it is proposed that this work shall be based on solid 876 and widely accepted principles that depart from a high level of ambition with respect to safety 877 standards and agronomic efficiency (as outlined in section 5.1 and 5.2). Such evaluation - based 878 on transparently available data - may promote a true level playing field for those materials, 879 regardless of the Member State in which they are produced. This, however, does not imply that 880 by-products that do not meet the FPR criteria will be excluded from the market. In any case, the 881 FPR relies on the principal of optional harmonisation and is therefore parallel to EU Member State 882 legislation (see section 3). Finally, the fact that by-products meeting the FPR criteria will 883 automatically have access to the EU market also requires a sufficient support base across Member 884 States for any materials selected for inclusion on the proposed FPR positive list.

5.4.4. Issue #10: limiting compliance costs

5.4.4.1. Background

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- The CMC criteria may limit the introduction of unnecessary regulatory burden and cost to demonstrate compliance when fewer parameters have to be measured and reported by the responsible fertilising product manufacturer as responsible economic operator. In the best possible scenario, the CMC 11 criteria shall be simple and practical, associated to reasonable compliance costs, and facilitate a straightforward verification and monitoring system.
- 892 **5.4.4.2. Proposal**
- Depending on the criteria development process, it may be an option to divide the materials within different groups so as to enable the development of a more targeted compliance scheme (see also section 5.3.3). The use of a positive list, will furthermore limit the possible parameters to test and hence limit compliance costs (see also section 5.1.2.2).
- 897 Regardless, manufacturers may have to carry out sample testing for a to-be-determined number of 898 parameters. Since compliance is a of the economic operators, benefits may be obtained from 899 omitting measurements when risks are absent so as to reduce the time and resource costs of 900 compliance. Where (i) compliance with a given requirement (such as absence of a given 901 contaminant or contaminant list, see section 5.1.3) follows certainly and uncontestably from the 902 nature or manufacturing process of an EU fertilising product, and (ii) a manufacturer wishes to take 903 responsibility for compliance, it may be evaluated if the frequency of compliance can be lower or 904 even presumed in the conformity assessment procedure without verification through testing 905 (similar to specific conditions for PFCs, see Annex I, Part II, point 4 of the FPR).

6. PRELIMINARY ASSESSMENT OF CANDIDATE MATERIALS

The JRC has preliminary screened the responses on the questionnaire launched in May 2019 by DG GROW to the Commission expert group for Fertilising Products. JRC has performed such screening based on an incomplete knowledge base and limited consultation of techno-scientific sources and experts. The screening has been performed with an initial intention to have a better view on the materials and to develop a strategy for the grouping of materials as proposed in section 5.3.3. At the same time, JRC believes that the **cross-verification and the updating of the information by all experts** involved may be most helpful to further develop the project. Therefore, experts' opinions on the preliminary screening are welcomed and have been requested as part of this questionnaire.

The information previously submitted by Member State authorities and EU umbrella organisations has been screened against the scope objectives and evaluation criteria applied in this project. The candidate material list will be further updated in a later project phase after which the materials could be subject to a more in-depth assessment in view of criteria development. Based on this preliminary screening, the candidate materials have been divided into three subcategories:

- Candidate by-product material with a favourable outlook (Table 2), including 4 main material groups:
 - o 1 residues from the chemical industry;
 - o 2 residues from food, feed and beverage industry and biorefineries;
 - o 3 residues from smelting industry, and
 - o 4 residues from air cleaning systems,
- Candidate by-product materials with an unfavourable outlook (Table 3), and
- Candidate by-product materials with an uncertain outlook (Table 4).

6.1. Candidate materials with a favourable outlook for further assessment

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Table 2: Candidate materials with a favourable outlook for further detailed assessment based on a preliminary screening of the responses from the questionnaire launched in May 2019 by DG GROW to the Commission expert group for Fertilising Products (materials preceded by an asterisk * are by-products that are currently covered under Regulation (EC) No 2003/2003 as fertilisers; PFC: Product Function class in Fertilising Products Regulation (PFC 1 – fertiliser; PFC 2 – liming material, PFC 3 – soil improver, PFC 6 – plant biostimulant). Stakeholders are requested to verify the Table information as well as to update or correct the information on any Table cells on which information can be provided (see questionnaire, section 8.4).

| candidate material group | chemical composition or nature of material | process description, by-product from the production of | tentative use | identified hazards | group and material-specific legislative criteria/standards | additional comment / outstanding issues |
|--------------------------------|--|---|------------------|--------------------|---|--|
| Group 1: re | sidues from the chemical indus | stry | | | | |
| | * ammonium sulphate | caprolactam, used for nylon | PFC 1 | | | |
| | * ammonium sulphate | acrylonitrile, used for plastics | PFC 1 | | | |
| | * ammonium sulphate | hydrocyanic acid/hydrocyanic acid, precursors to many chemical compounds ranging from polymers to pharmaceuticals | PFC 1 | cyanides | | |
| | binary salts (in solution) | amino acids, e.g. from sugar | PFC 1/ PFC 6 | | | |
| | * calcium nitrate ("nitrate of lime") | N fertilisers, through Odda process | PFC 1 | | | |

| candidate material group | chemical composition or nature of material | process description, by-product from the production of | tentative use | identified hazards | group and material-specific legislative criteria/standards | additional comment / outstanding issues |
|--------------------------------|---|---|------------------|---------------------------|--|--|
| * | lime | acetylene production | PFC 2 | | | |
| k | ammonium sulphate | saccharin | PFC 1 | | | |
| | | | | | | |
| Group 2: res | idues from food, feed and bev | erage industry and biorefineries | | biological pathogens, pes | ts | |
| * | sulphate salts | citric acid | PFC 1 | | | |
| | glycerol, oils and fats of vegetable origin | biodiesel (by-product of the transesterification process) | PFC 6 | methanol | | |
| | vegetable fibres | vegetal protein extraction | PFC 3 | | | |
| | filter cakes | obtained during the filtration of foodstuffs on inorganic filter media (diatomaceous earth, perlite, bleaching earth) | PFC 3 | | | |
| | oilseed cake | obtained by extracting oil by pressing oil seeds (possibly including hydrolysis, esterification or transesterification) | PFC 3 | | | |
| | malt sprouts | malthouse, brewery | PFC 3 | | | |
| | lime | agar, from seaweed extraction | PFC 2 | CI- | | |

| candidate material group | chemical composition or nature of material | process description, by-product from the production of | tentative use | identified hazards | group and material-specific legislative criteria/standards | additional comment / outstanding issues |
|---|--|--|--------------------------------------|---|--|--|
| | vinasse extract, potassic vinasse, chicory vinasse | syrupy, inulin; residue from fermented molasses | PFC 3 | | | possible overlap with CMC 6 |
| | fermentation residues, hydrolysed proteins | aroma, amino acids, vitamins, alcoholic beverages | PFC 3 | | | |
| | potato cell sap effluent concentrates | waste waters from potato protein processing, including derived "struvite-like" flocculates | PFC 3/ PFC 6/ binding agent | | | |
| | harvested mushroom growing media | residual growing medium after mushroom cultivation | PFC 3 | biological pathogens | | |
| * | gypsum | drinking water (ground- and freshwater softening), salt (brine softening) | PFC 1/ PFC 3 | Fe ₂ O ₃ , MnO, Cl- | | |
| | feed materials, like calcium phosphates | off-specifications from feed materials | material- specific | | | |
| | | | | | | |
| Group 3: residues from smelting industr | | | | metals/metalloids | | |
| * | grinded steel slag | steel | PFC 2 | | | |
| * | ammonium sulphate | coke | PFC 1 | cyanide | | |

| candidate material group | chemical composition or nature of material | process description, by-product from the production of | tentative use | identified hazards | group and material-specific legislative criteria/standards | additional comment / outstanding issues |
|--------------------------------|---|---|------------------|--|--|--|
| , | * gypsum | calcium-rich ore processing | PFC 1/ PFC 3 | | | |
| | * lime | soda lime | PFC 2 | recovered glass from pharmaceutical/medical industry | | |
| | * ammonium sulphate, zinc sulphate, iron sulphate | from the spent pickle liquor for metal processing (e.g steel production, tungsten production) | PFC 1 | | | |
| | | | | | | |
| Group 4: res | idues from air cleaning syster | ns | | PAH, PCB, PCDD, metals | | overlap with animal-by- products (stables) |
| | * ammonium sulphate | air/exhaust purification systems from different industries | PFC 1 | | | |
| , | * gypsum | desulphurisation of power plants and other combustion fumes | PFC 1/ PFC 3 | | | |
| | dust particles, including calcium carbonates, MgO fines and flax/grain dust | limestone crushing plant, MgO production, milling | PFC 1/ PFC 3 | | | |

6.2. Candidate materials with an unfavourable outlook for further assessment

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Table 3: Candidate materials with an unfavourable outlook for further detailed assessment based on a preliminary screening of the responses from the questionnaire launched in May 2019 by DG GROW to the Commission expert group for Fertilising Products. Stakeholders are requested to verify the information provided, and if necessary, to provide further information for a possible re-evaluation of the materials (see questionnaire, section 8.4)

| chemical composition or nature of material | process description, by-product from the production of | Argument |
|--|--|--|
| ammonium bisulphate | methylmethacrylate production (acetone cyanohydrin (ACH) route) | not integral part of production process; requires further treatment with ammonia for conversion to fertilizer grade ammonium sulphate (out of scope) |
| sulphuric acid | various, metal processing, food industry, oil and gas industry, etc. | principally used for the processing of raw materials into fertilisers, not a fertilising product of direct use (or negligible volumes) |
| sugar factory lime | sugar beets, lime was used to capture and remove impurities in the juice of sugar beets | already covered under CMC 6 |
| cocoa, tobacco and coffee dried waste | | possibly covered under CMC 2, waste excluded |
| crushed metal magnesium slag | automotive industry - obtained by reprocessing of extruded magnesium products | recycling/recovery process is not considered as an integral part of production process (out of scope) |
| molasse | by-product of the refining of sugarcane or sugar beet into sugar | covered under CMC 6 |
| vinasse | a by-product obtained from distillation of molasses or other sugar-syrups during the production of spirits | covered under CMC 6 |
| ash | electricity and heat production, thermal oxidation of biomass and waste | covered under STRUBIAS CMCs |

| chemical composition or nature of material | process description, by-product from the production of | Argument |
|--|---|--|
| ammonium sulphate | regeneration of NH4-loaded zeolites for the preparation of used ammonium sulphate solutions | recycling/recovery process is not considered as an integral part of production process (out of scope) |
| eggshells | food industry | animal by-products (out of scope) |
| bog lime | deposits of calcium carbonate in freshwater ponds | not a by-product from a production process |
| potassium mother lye | liquid substance containing potassium as potassium carbonate and potassium bicarbonate | covered under STRUBIAS CMC (thermal oxidation derivates), recovered via the leaching of ashes, a waste material |
| ammonium phosphate | recycled ammonium phosphate minerals from fire extinguisher maintenance | derived from waste |
| calcium phosphates from animal by-product processing | gelatine production | animal by-products out of scope |
| bone meal ash | incineration of category 2 and 3 animal by-products | covered under STRUBIAS CMC (thermal oxidation materials & derivates) |
| protamylasse | a by-product from potato processing, concentrated and heat sterilised | heat sterilisation is not considered normal industrial practice, and therefore the material is out of scope |
| farm run-out liquid | silage | animal by-products out of scope |
| black liquor and lime mud | generated as by-products from pulping (kraft mill process) or cellulosic ethanol production | further recovery is likely required before possible use on land (see below) |
| derived materials from black liquor and lime mud (e.g. lignosulphonates) | recovered materials from black liquor and lime mud | a recovery process is required (e.g. based on combustion, CaO additions, extraction), disqualifying the material as a by-product. It could, however, possibly classify as a derivate from thermal oxidation (STRUBIAS CMC) |

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|----|---|--|

| chemical composition or nature of material | process description, by-product from the production of | Argument |
|--|---|---|
| primary products derived from plant extracts | e.g. extracts containing amino acids derived from plants through enzymatic and acid/alkaline hydrolysis | products not included under CMC 11 |
| ammonium sulphate | recovery of ammonia from collected and separated digestate (liquid fraction) | not part of the integral production process of energy, the digestate could be a waste material (it would be waste-derived?) |
| partially solubilized phosphate | from laundry detergent production | phasing out of phosphates in detergents in the EU |
| lime | residues from the production of aerated concrete | concerns on contaminants, such as oil, grease, epoxy-based sealers |
| phosphogypsum | residue from phosphorous fertilisers | closeness to waste, stocked/discarded due to concerns on radioactivity and fluoride |
| natural stone processing sludge | obtained by sawing, grinding and polishing limestone containing natural stone | concerns on contaminants, such as oil and grease; |

6.3. Candidate materials with an uncertain outlook for further assessment

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Table 4: Candidate materials with an uncertain outlook for further detailed assessment based on a preliminary screening of the responses from the questionnaire launched in May 2019 by DG GROW to the Commission expert group for Fertilising Products. Stakeholders are requested to provide further detailed information on the nature of the production process and other relevant parameters (see questionnaire, section 8.4)

| chemical composition or nature of material | process description, by-product from the production of | further questions |
|--|--|---|
| ammonium sulphate | municipal and industrial effluent treatment | |
| ammonium sulphate | sugar beet | |
| lime | from the stripping of ammonia with CaSO ₄ | from particular air cleaning systems? |
| lime | lime from anaerobic treatment of organic matter (digestate) | lime applied as a disinfection treatment? |
| tricalcium phosphate | by-product from industrial waste water treatment | from which industry? |
| dolomite | by-product from magnesium oxide production | collected dust particles? |
| calcium formate | unclear, | by-product from trimethylolpropane (for polymer industry) production? Used as fertilising product component in significant volumes? |
| phosphate fertilisers | obtained through precipitation with calcium chloride, limewash, magnesium chloride, magnesium oxide or hydroxide | overlap with precipitated phosphate salts as CMC? |
| potassium sulphate from sugar residues | Process recovery of sugar confectionery and other agro-based processes | recovery processes? |

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| chemical composition of nature of material | process description, production of | by-product | from | the | further questions |
|--|------------------------------------|------------|------|-----|---|
| sulphate salts | methionine | | | | synthesized from diethyl sodium phthalimidomalonate by alkylation with chloroethylmethylsulphide? |

949 **7. NEXT STEPS**

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7.1. Mode of interaction with stakeholders

- 951 The JRC will collaborate exclusively on the Commission expert group for Fertilising Products
- 952 to collect expert knowledge and techno-scientific data during the development of the project.
- 953 Opportunities for feedback on interim deliverables during project developments will be provided
- 954 through oral and written consultations rounds (see section 7.2). Meetings will be organised
- either virtually as webinars or physically through the physical presence of the JRC team at the
- 956 Commission facilities (e.g. in combination with Commission expert group meetings).

7.2. Tentative timeline

A tentative project timeline is provided in Table 5.

759 Table 5: Tentative project timeline with the different project steps and stakeholder consultations

| Tentative date | Project step | Stakeholder consultation |
|----------------------------|---|---|
| April 2020 | webinar: presentation of project | |
| | report draft 1 – scope and directional framework questionnaire 1: feedback on directional framework and requests for proposals for candidate CMC 11 materials | written consultation - deadline 4 June |
| (June 2020) | (webinar/meeting: discussion of report draft 1 and directional framework) | (oral consultation) |
| Autumn 2020 | webinar/meeting: final selection of candidate materials for CMC 11 questionnaire 2: additional data requests for selected materials | oral and written consultation - deadline autumn 2020 |
| Spring 2021 | webinar/meeting: presentation of draft criteria | |
| 93. | report draft 2 – updated report, draft criteria for CMC 11 questionnaire 3: feedback on draft criteria | oral and written consultation - deadline spring 2021 |
| Autumn 2021 | report draft 3 – full report this report will take into account the feedback from stakeholders and the Commission on the report draft 2, and include a proposal for the draft delegated acts that will be presented to the Fertilisers Working Group in autumn 2021 | oral consultation |
| Spring / Summer 2022 | decision on the implementation of the delegated act for CMC 11 | oral consultation (DG GROW) |

The tentative project timing has been developed taking into consideration Article 42(7) of the FPR: "By 16 July 2022, the Commission shall adopt delegated acts in accordance with Article 44 supplementing point 3 of component material category 11 in Part II of Annex II to this Regulation by laying down criteria on agronomic efficiency and safety for the use of by-products within the meaning of Directive 2008/98/EC in EU fertilising products".

Apart from the consultation round on this document, JRC will collect feedback from the stakeholders on the selection of candidate materials from CMC 11 (autumn 2020), and the proposed draft criteria for by-products (spring 2021). The JRC will strive to deliver the final proposals by Autumn 2021 to DG GROW.

971 **8. STAKEHOLDER FEEDBACK**

972 **8.1. Objective of the questionnaire**

- 973 The objective of this questionnaire is two-fold:
- 974 o To validate and comment on the scope of this work and the proposed directional approach for the next project steps;
 - To cross-verify and complement a preliminary assessment by JRC on candidate by-products against the scope, objectives of evaluation criteria applied in this project. The candidate material list will be further updated in a later project phase after which the materials could be subject to a more in-depth assessment in view of criteria development.

8.2. Information exchange

- 981 The Commission expert group for Fertilising Products is now invited to provide their feedback on
- 982 this draft report 1. JRC will take into account relevant and credible techno-scientific information
- 983 for the final report from these different stakeholders. However, to ensure a structured and time-
- 984 efficient consultation process, the feedback will be based on a structured approach. The expert
- group members shall provide any feedback in a concise, constructive and structured form to enable
- 986 the rapid understanding of the key messages.
- 987 The feedback should be provided in English, in order to facilitate the exchange of feedback among
- 988 all stakeholders.

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- 989 It is required that organisations provide a consolidated opinion; one contribution per organisation
- 990 will be accepted. Umbrella organisations (e.g. EU wide industry associations or Member States)
- 991 with daughter organisations (e.g. national industry associations or regional authorities) should
- 992 compile the feedback of their daughter associations into one consolidated reply.
- 993 The JRC is pleased to take into account any feedback from the Commission expert group for
- 994 Fertilising Products until the deadline of Thursday 4 June 2020 through the European
- 995 Commission's CIRCABC platform.

8.3. Procedure

- 997 The CIRCABC platform is the preferred exchange information platform between experts and the
- 998 JRC. Therefore, JRC has created a new CIRCABC interest group, entitled "JRC by-product
- 999 fertilisers". Note that the information posted in the interest group is available to all stakeholders.
- An open exchange of information is preferred to ensure transparency. Please contact JRC (JRC-
- 1001 B5-FERTILISERS@ec.europa.eu) for the provision of any confidential information that, on an
- exceptional basis, cannot be shared with other stakeholders.

1003 8.3.1. Accessing the CIRCABC "JRC by-product fertilisers" Interest Group

- 1004 JRC will invite the experts from the Commission expert group for Fertilising Products in due
- course. Alternatively, experts can also apply for membership. The interest group can be accessed,
- 1006 as follows:

- 1007 Step 1: Access CIRCABC
- Open an internet browser and go to the CIRCABC homepage https://circabc.europa.eu/
- 1009 In EU Login, your credentials and personal data remain unchanged. You can still access the same
- interest groups (e.g. "Fertilisers", the interest group managed by DG GROW) and applications as
- before. You just need to use your e-mail/password address for logging in.
- 1012 Step 2: Access Interest Group "JRC by-product fertilisers"
- 1013 https://circabc.europa.eu/ -> Browse Public Groups -> European Commission -> Joint Research
- 1014 Centre > JRC by-product fertilisers
- 1015 Click on 'Browse Public Groups' in the top header, and choose 'European Commission'. Inside the
- European Commission, click on 'Joint Research Centre', and then "JRC by-product fertilisers".
- 1017 <u>Step 3: Fill in Membership Application Form</u>
- 1018 If you are not yet listed as a group member, click on 'Join the Group' and fill in the Membership
- 1019 Application Form and then click 'submit'. After the manual approval by the JRC by-product
- fertilisers team, you will be admitted as full member of the Interest Group. You will receive an e-
- mail with the link to the Interest Group confirming your access. Note that membership is restricted
- to experts of the Commission expert group for Fertilising Products.

1023 **8.3.2.** Uploading feedback on the draft report version 1

- The library is the place where all documents are stored, managed and shared. Once logged into the
- 1025 'JRC by-products fertilisers' Interest Group, the library can be accessed by clicking on the icon in
- the header.
- The report and the template for feedback can be downloaded from the CIRCABC Interest Group:
- 1028 EUROPA > European Commission > CIRCABC > Joint Research Centre > JRC by-product
- 1029 fertilisers > Information distributed by JRC.
- 1030 Expert feedback can be uploaded via: CIRCABC Interest Group: EUROPA > European
- 1031 Commission > CIRCABC > Joint Research Centre > JRC by-product fertilisers > Feedback
- 1032 Commission expert group (top right green icon "ADD +"). The document name should start with
- the country code or acronym of the member organisation.
- Please structure your reply in an organised manner to ensure that feedback is task-focused, clear,
- to the point, and does not contain redundant or marginal information to safeguard time efficiency.
- 1036 Any opinions should be supported by objective and evidence-based arguments. No template for
- the feedback is provided by the JRC. You are welcome to join technical or scientific documents
- 1038 (e.g. reports, databases, peer reviewed journal articles) with your feedback. These supporting
- documents should also be in English or accompanied by at least an English translation of the
- relevant section. For any document of more than 10 pages in length, clear indications should be
- 1041 given on where the relevant information can be found (e.g. "See contaminant concentrations of
- candidate by-product A in Table X on page Y of the enclosed document entitled ZZZ.pdf").
- The JRC is pleased to take into account any feedback from the stakeholders **UNTIL THE**
- 1044 **DEADLINE OF THURSDAY 4 JUNE 2020.**
- 1045 In case of any further questions, please contact the JRC team at: JRC-B5-
- 1046 FERTILISERS@ec.europa.eu
- 1047

1048 8.4. Questionnaire on version 1 of this draft

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- 1049 1. Have you noticed any incorrect or obsolete information in the report section that describes the 1050 scope of this work (section 3)?
- 1052 2. Based on your expert views, the JRC would appreciate receiving further feedback and other 1053 observations related to the proposal for a directional framework (section 5). Have specific 1054 challenges or issues been omitted during the development of the directional framework for this 1055 project? Please provide general notes of support or disapproval for the proposed approach, as 1056 well as any specific comments you may have on particular challenges and issues outlined in 1057 this section.
- 1059 3. Are you aware of any relevant information sources that should be taken into consideration for 1060 the screening and identification of potential contaminants in by-products, other than the 1061 information sources already listed in section 5.1.3.2?
- 1063 4. Given that the techno-scientific understanding on substances of concern has increased over 1064 time, would you have objections against the by-products listed in Table 2? Have you identified relevant contaminants or other risks from the use of these materials as fertilising product 1065 component? If so, please identify the materials and provide an explanation of the reasons that 1066 motivate your objections and concerns. Please also update or correct the information on any 1067 1068 other Table cells on which information can be provided.
- 5. Do you agree with the JRC screening that explains the proposed exclusion of the materials for 1070 this study as listed in Table 3, taking into account the scope and candidate evaluation criteria 1072 outlined in section 5.3.2.2? If not, please further elaborate and explain the reason of 1073 disagreement using objective and evidence-based arguments.
- 6. The exact nature and underlying production process for some previously proposed candidate 1075 1076 materials are unclear to the JRC (Table 4). Please provide further explanation, including a clear 1077 production process description and other elements/headings as per Table 2, for the materials 1078 listed in Table 4.
- 1080 7. Apart from the materials listed in Table 2, Table 3 and Table 4, are there other candidate by-1081 products of interest? Please provide specific information that could support the inclusion of 1082 these material for assessment by the JRC (see section 5.3.2, page 23), in particular a brief 1083 description of the production process (including processing steps, chemicals applied, etc.), 1084 possible material concerns, and presumed added value as a component for fertilising materials 1085 (e.g nutrient provision, neutralising value, binding agent, etc.), current material fate and use 1086 routes (e.g. feed industry, disposal), and market volumes and potential.