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EU survey on possible future development of the FPR

Fields marked with * are mandatory.

Introduction

The purpose of this survey is to collect proposals to adapt the annexes of the Fertilising Products Regulation (EU) 2019/1009 ('FPR') to technical progress.
In accordance with Article 42 FPR, the Commission is empowered to adopt delegated acts.

The **scope** of the empowerment covers:

- Annex I, with the exception of cadmium limit values and the definitions, or other elements relating to the scope, of product function categories,
- Annexes II, III and IV.

The **purposes** of such amendments are:

- adapting those Annexes to technical progress and
- facilitating internal market access and free movement for EU fertilising products.

The EU fertilising products concerned by such amendments have to fulfil the following conditions:

1. they have the potential to be the subject of significant trade on the internal market, and
2. there is scientific evidence that they:

    a. do not present a risk to human, animal or plant health, to safety or to the environment, and
    b. ensure agronomic efficiency.

National authorities as well as any interested stakeholders (industry associations, economic operators, etc.) are invited to fill it in.
The Commission services will decide if to follow-up on any of the proposals submitted depending on the priorities of the Commission, the robustness of the data provided and the available resources. Proposals submitted by 16 September 2022 will be screened for possible inclusion in a study to support the Commission assessment. Proposals submitted after that date would be gathered and considered for future developments on the medium and long term.

All questions are mandatory and the contribution cannot be finalised without including replies to all questions.

The information provided in reply to this EU Survey becomes publicly available once the contribution is submitted, with the exception of **personal data included in the field marked with ****. Please, make sure not to include personal data outside the fields dedicated for personal data and marked accordingly.

Please, do not include any confidential information. If you find that sharing confidential documents in support of your proposal is necessary, please, send them by e-mail to GROW-fertilising-products@ec.europa.eu after having finalized your contribution in EU survey. Please, clearly indicate in your e-mail that the documents are shared in the context of the data collection via this EU survey and that they are confidential.

In case you require more information on how the Commission will treat confidential data/documents please check this document

FPR__confidentiality_aspects.pdf

Section A – Who are you?

*** 1. I represent:**

- ○ An EU country
- ○ An Observer in the Commission expert group on fertilising products
- ○ A national industry association
- ◉ A University/research institute
- ○ A company
- ○ An NGO
- ○ Other

2. Details on the institution/entity you represent:

* a. Name of the institution/entity

Leibniz Institute of Vegetable and Ornamental Crops (IGZ) e.V.

* b. Address – at least the country where it is established

Theodor-Echtermeyer-Weg 1, 14979 Großbeeren, Germany

c. Main objective

Research at the IGZ contributes to understanding fundamentals of horticultural and plant science, to sustainability in production and use of plants, and to healthy nutrition and well-being of the population.

The project "Intermunicipal acceptance for sustainable valorisation from separately collected sanitary streams" - in short "zirkulierBAR" - is coordinated by IGZ. zirkulierBAR is an inter- and transdisciplinary research project working in Eberswalde, in the Barnim district, and funded by the Federal Ministry of Education and Research (BMBF) as part of the REGION.innovativ funding measure. Here, municipalities and future-oriented companies, together with universities and research institutions, are creating a real laboratory for sustainable regional circular economy in the field of agriculture and water management. The project started in May 2021 and will run for 3 years.
zirkulierBAR's vision is to "recover nutrients from consumed food and return them to agriculture in the sense of a sustainable regional circular economy."
To achive this vision, the mission of zirkulierBAR includes building an innovative and scalable recycling plant for the closed-loop treatment of contents from dry toilets. The end products are recycled fertilizers for agriculture and horticulture that are harmless to health, rich in nutrients and low in pollutants. Municipalities can plan and build a water-saving and resource-conserving alternative to linear water-dependent sewage treatment systems.

Links:
https://zirkulierbar.de/
https://www.igzev.de/projekt_type/zirkulierbar/?lang=en

*** 3. My name and contact details** (these are personal data and will not be published)**

Dr. Ariane Krause, krause@igzev.de, project coordinator of zirkulierBAR

Section B – what do you propose?

*** I propose to:**

- ○ Introduce new input materials in an existing CMC
- ○ Introduce a new material or amend the requirements for a material into an existing CMC
- ○ Add a new micro-organism into CMC 7
- ○ Introduce a new processing method or amend the requirements for processes into an existing CMC
- ◉ Introduce a new CMC
- ○ Other (choose this option for proposals concerning Annex I, III or IV)

Section C – description of your proposal

Section C5 - Introduce a new CMC

General questions

* 1. What is your material? How could you describe your material?

- Human feces from separative, dry or water-saving toilets, potentially mixed with human urine, and toilet-related operational additives including toilet paper and auxiliary material for dry toilets operation such as sawdust, wood chips, cereal straw, biochar, biomass ash, etc.
- Organic recycling fertilizer that feed humus to the soil; hereby referred to as 'humus-providing fertilizers' produced from aerobically sanitized and humified solid residues from separative toilets (i.e. separately collected human feces, potentially mixed with human urine and toilet-related additives, see above) with operational recovery additives as clay minerals, biochar, garden & park waste and crop residues (e.g. straw).
- Feces-based fertilizing products are suitable as P-fertilizers and also contain more Ca and Mg than urine and are appropriate for humus regeneration. Feces-based fertilizers are thus more suitable as long-term fertilizers releasing nutrients for following cropping seasons. Operational additives such as toilet paper, sawdust, or biochar do not contribute many nutrients, but they are significant sources of C, and thus play a role in humus build-up.

* 2. Does your material have a REACH registration dossier (submitted by your organization or other organisations)?

REACH stands for 'registration, evaluation, authorization and restriction of chemicals', in accordance with Regulation (EC) No 1907/2006.

If the material has a REACH registration, please, mention:

- *the tonnage band of the registration*
- *the level of assessment provided (Annex VI, VII, VIII REACH)*
- *if there is a safety report*
- *if the use as a fertilising product is covered.*

No registration with REACH yet. Registration shall be obtained in future; possible is a registration as UVCB „Unknown or Variable composition, Complex reaction products or Biological mate".

* 3. Is your material classified in accordance with the CLP Regulation?

Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP Regulation) lays down rules on the classification of substances in various categories depending on their hazards. Please, refer to self-classification or to harmonized classification, depending on the situation.

No classification with the CLP Regulation. Registration shall be obtained in future; possible is a registration as UVCB „Unknown or Variable composition, Complex reaction products or Biological mate".

*

4. What is a) the manufacturing process of your material or

b) the recovery operation that generates this material?

Please, include technical information on the input materials (waste and non-waste) used and processing requirements.

- Separate collection of human feces from separative dry or water-saving toilets prevents the dilution of valuable nutrients and the contamination with toxic substances such as heavy metals or organic pollutants from other wastewater streams. This allows for reduced loads of contaminants, more effective removal of e. g. pharmaceuticals and high recycling rated for nutrients (e.g. up to 80% for both N and P).
- The treatment process and recycling fertilizer production involves firstly an extended hygienisation phase at >70 °C for more than 7 days for sanitation. The sanitized material is subsequently mixing with operational recovery additives and organic wastes (clay minerals, biochar, garden & park waste and crop residues) and undergoes a thermophilic aerobic stabilization with controlled oxygen supply through intensive turning of the material.
- The biological aerobic stabilization (composting) of organic substances is classified as R3 operation "Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)" according to the waste framework directive (2008/98/EC, Annex II; EUROPEAN PARLIAMENT, 2008).
- Aerobic stabilization through thermophilic or mesophilic composting has been proven to be an effective sanitation option for the treatment of solid contents from dry toilets, eliminating pathogens and pharmaceuticals. (Vinnerås, 2007; Ogwang et al., 2012; Tilley et al., 2014; Krause et al., 2015; Sangare et al., 2015; Heinzelmann, 2020; Eberhardt, 2021; Schröder et al., 2021).

(List of references is provided as supporitng document.)

Agronomic efficiency

*5. Is your material agronomically efficient? Or how does it contribute to the agronomic efficiency of fertilising products ?

Depending on the situation, please, include information on:

- *nutrient content of the input material, or other characteristics which will ensure that the resulting component material in the final product will fulfill any of the functions described in the products function categories 1 to 6 in Annex I to the FPR (meaning, the function of a fertilizer, liming material, soil improver, growing medium, inhibitor or plant biostimulant); or*
- *how it improves the safety or the agronomic value of an EU fertilising product (in case it could be used as a technical additive)*

- According to the Fertilizer Product Regulation (2019/10097EC - Annex I) feces-based fertilizing products can be characterized as solid organic fertilizer as the they contain more than one declared primary nutrient (N, P2O5, K2O) with at least above 1 % and as sum above 3 % (see confidential data provided as attachment; this attached data collection was prepared by the working group agricultural use of products from resource-oriented sanitation system of Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V. (DWA); Web-Link: https://fachgremien.dwa.de/details.php?id=137; Contact: Dr. Martina Winker winker@isoe.de and Dr. Ariane Krause krause@igzev.de PLEASE NOTE: THIS TABLE INCLUDES UNPUBLISHED SCIENTIFIC RESULTS AND MUST BE TREATED AS CONFIDENTIAL !!!!)).
- A positive fertilizing effect, based on content and availability of plant nutrients, has been demonstrated for fecal compost. Empirically, studies on fecal composts conducted in African countries revealed that crop productivity can improve when fecal compost is used as a soil amendment (e.g., Niwagaba et al., 2009; Ogwang et al., 2012; Krause et al., 2016). Previous experiments with lettuce showed that fecal compost can support plant growth to a certain extent, but does not provide sufficient N for horticultural production (Schröder et al., 2021). Another experiment with cabbage showed that the combination of humus providing recycling fertilizer from feces with nitrified urine recycling fertilizer led to increased marketable yield compared to compost alone and may increase soil carbon content in the long term, promoting climate-friendly food production (Häfner et al., submitted).
- Please also see our comments in section “Saftey”.

(List of references is provided as supporitng document.)

Safety

* 6. Is the material safe for the use as fertilising product?

Please, refer to the information available on the safety for humans, animals, plants and environment (soil and aquatic ecosystems).

More precisely, add information on:

- *contaminants (heavy metals)*
- *pathogens*
- *persistent organic pollutants*
- *substances with maximum residues limits (MRLs) for food or feed or other impurities (e.g. glass, plastic, metal) which could present a risk to*
- *humans, animals and environment (soil and aquatic ecosystems)*

- A high product quality has been monitored over the past two years by repeated analysis of the humus providing recycling fertilizer product according to the product standard DIN SPEC 91421 (see confidential data provided as attachment). Analysis showed that all relevant pollutants, i.e. pathogens and contaminants such as heavy metals or persistent organic pollutants, substances with maximum residues limits (MRLs) for food or feed or other impurities (e.g. glass, plastic, metal), which could present a risk to humans, animals and environment (soil and aquatic ecosystems), have been below the limit of detection or below threshold limits (where available; cf. DIN SPEC 91421 (Deutsches Institut für Normung, 2020)).
- Monitoring of product quality according to DIN SPEC 91421 will continue for the next two years within research project zirkulierBAR (www.zirkulierBAR.de).
- In general, pharmaceuticals contained in the solid contents from dry toilet can be largely eliminated by means of thermal composting (Heinzelmann, 2020; Eberhardt, 2021). Separate collection of human excreta followed by targeted treatment of urine and feces most likely allows for a more efficient way to prevent environmental pollution by pharmaceutical compounds, compared to the treatment of mixed wastewater in centralized treatment plants (Köpping et al., 2020a).
- A qualitative risk analysis for the contents of dry toilets use for to produce novel recycling fertilizers (Krause et al., 2021) assessed the potential threats from human feces and urine when used to produce novel recycling fertilizers. The study concluded the following: (i) Regarding the potential to cause infections, feces pose the most serious risk to human health, as it contributes the highest load of microorganisms including human pathogens. There are various established hygienization processes for organic waste or wastewater that can be used. (ii) With respect to human health, the risk of chemical substances must also be considered. The most critical substances are pharmaceutical residues. These substances can be degraded in the environment, but those remaining in water, soil, or fertilizer can be absorbed by plants. The likely hood of pharmaceutical uptake by plants varies according to the compound, environmental conditions, and plant species. Due to the very low levels found in crops to date, the health risk for humans is considered low.

* 7. Has a national authority of an EU country assessed the use of such an input material in the production of a fertilising product? If yes, had the respective authority gave a positive or a negative opinion?

We are not aware of such an initiative of any national authority of an EU country.

Market data

* 8. Is the material already marketed in more than one EU country?

Composts or other humus providing recycling fertilizers cannot be marked in the EU yet since the input material is not yet registered as input material to produce fertilizers therefrom.
The material is not marketed, yet.

* 9. What are the volumes involved?

Please, estimate current trade and/or use volumes (EU total or in specific EU countries, tonnes/year, if relevant specify dry matter or fresh matter)

Current productions volumes comprise about 100 t per year. The material is not marketed but used for scientific purposes and field trials with special permission.

* 10. Do products containing such materials have the potential to be subject to significant trade in the internal market?

Please, estimate possible future trade and/or use volumes (EU total or in specific EU countries, tonnes/year, if relevant specify dry matter or fresh matter)

- First estimates showed that human feces-based humus-providing recycling fertilizer products would attain a theoretical potential of 16.2 million tons in Germany, with a median nutrient content of about 45 and 15 thousand tons of Nitrogen and Phosphorus, respectively. This could substitute for about 3 % of the N and 17 % of the P supplied by synthetic mineral fertilizers in Germany in 2019.
- For the EU 27, the median theoretical potential comprises about 87 million tons of human feces-based humus-providing recycling fertilizers and about 244 and 81 thousand tons of N and P, respectively. This represents about 2 % and 7 % of the inorganic fertilizer demand in the EU27.
- EU Census data from 2011 showed that about 5.5 million dwellings or 3 % all housing in the EU were without flush toilet in the housing unit – serving these dwellings (assuming 1 household of 4 persons per households) could amount to about 4.3 million tons of feces-based fertilizer and 3 and 1 thousand tons of N and P, respectively.

Section D – broader context

* 1. Does your proposal follow the logic of Circular Economy?

- The production of human feces-based humus-providing recycling fertilizer products is the very core of circular economy, recycling low energy-value wastes to valorize contained nutrients and soil-function supporting product.
- Achieving sustainable food production requires significant improvement of current agricultural nutrient management and recycling practices (Gerten et al., 2020). Hence, circular economy is a key strategy for regulating the environmental impact of food production (FAO - Food and Agriculture Organization of the United Nations, 2015; Springmann et al., 2018). Policies and laws have been enforced in the past to increase circularity, including the European Union circular economy action plan under the Green Deal of the European Commission (2020).

* 2. Is it environmental friendly?

- Separate collection of human excreta followed by targeted treatment of urine and feces most likely allows for a more efficient way to prevent environmental pollution by pharmaceutical compounds, compared to the treatment of mixed wastewater in centralized treatment plants (Köpping et al., 2020b).
- N and P discharge from WWTPs largely contributes to eutrophication of rivers and coastal zones (Tuholske et al., 2021). Reducing N and P loads in wastewater, e.g. by implementing urine source separation, could therefore lower the risk for eutrophication and associated losses in aquatic biodiversity. Recovering N and P from source-separated urine can consume considerably less energy than N and P recovery from WWTP efflux (McCartney, Watanabe and Yip, 2021).
- Research over the last decade has demonstrated that source separation of human excreta is a viable path for the integrated recycling of plan nutrients, including N and P, and more environmentally friendly compared to the wastewater-sewage-path (Larsen et al., 2013; Harder et al., 2019; Larsen, 2020). In particular, the benefits of separate collection of human urine are numerous: i) decreased energy requirements of sewage plants, ii) decreased greenhouse gas emissions from wastewater treatment, iii) increased stability of plant operation due to lower daily loads of N and P, iv) improved quality of effluent, v) reduced harm to aquatic environments through high nutrient loads or dilution of trace substances, vi) decreased use of freshwater, which is most relevant in the face of the current global drought, and vii) significantly increased nutrient recovery of P and N (Remy and Jekel, 2008; Bisinella de Faria et al., 2015; Bradford-Hartke et al., 2015; Ishii and Boyer, 2015; Kjerstadius et al., 2017; Hilton et al., 2021; Larsen et al., 2021; McCartney et al., 2021).

*3. Will this initiative contribute to the reduction of dependency on critical raw materials, such as phosphate rock?

- N and P recycling of high interest for fertilizer production in regional circular economies;
- P scarcity, high import rates, increasing heavy metal pollution levels in phosphate rock.
- N crises with factories closing due to high dependency on natural gas.
- Human excreta is a key source for ‘urban mining’ of N and P (Mihelcic et al., 2011; Chowdhury et al., 2014; Esculier et al., 2019). However, this potential often remains untapped, and nutrient cycling in agriculture and horticulture is primarily based on recycling of nutrients from livestock farming, biogas production or composting of agricultural and domestic residues. This must change.
- About 3.1 Tg (i.e. 109 kg) N and 0.6 Tg P are excreted every year by the EU’s population (Fowler et al., 2013; Garnier et al., 2015), corresponding to 30% and 55% of the amount of mineral fertilizers applied on agricultural fields in the EU (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_mineral_fertiliser_consumption)

Section E – supporting documents

Please, attach supporting documents such as:

- Documents from the national authorisation process
- REACH registration dossier
- Studies, scientific literature
- Statistical data, market data
- Your amendment proposal

- Other

Attention! The documents will become publicly available. Please, make sure they do not contain any personal or confidential data.

Only files of the type pdf,txt,doc,docx,odt,rtf are allowed

8df68798-2693-4093-b05c-2ead4391513b/Attachment_DIN_SPEC_91421.pdf
823bd18c-922c-4fa1-870f-c51243f11490/Attachment_Flyer_zirkulierBAR_EN_WEB.pdf
ce05f6f6-f441-4223-b24b-18cf4f409f9c/Attachment_Permalink_to_video.pdf
3b17b73f-94a7-4c5f-a58f-deb39c313928/Attachment_References.pdf
e0e72873-1904-4c0d-b1d0-12f9b9740e9e/Attachment_Risk_Analysis-komprimiert.pdf

Contact

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