

Reflections on the acceptability of recycled P fertilisers for European organic agriculture

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1. Introduction

In recent years, a number of technologies for the recycling of phosphorus have been developed. For most of the resulting end-products, it is not clear whether they may be used as P fertilisers in organic agriculture. Authorization for organic production requires an entry in Annex II of Reg. 2021/1165. This paper provides an overview of the major aspects determining the acceptability of different technologies. The paper is based on summary information on a number of technologies provided by the European Sustainable Phosphorus Platform (ESPP).

2. Raw materials

Annex II of Reg. 2021/1165 lists materials which may be used as fertilisers, soil conditioners or plant nutrients. We suggest that by extension, such materials should also be acceptable as raw materials for recycled fertilisers. For recycled P fertilisers, the following materials have the greatest importance at the moment:

- **manure:** various forms of manure are listed in Annex II of Reg. 2021/1165 and therefore authorized. However, manure from factory farming origin is forbidden.
- **waste water/waste from the food industry:** 'by-products of plant origin' and certain by-products of animal origin are listed in Annex II of Reg. 2021/1165. Therefore, materials such as potato water, dairy waste or fish waste are authorized.
- **composted or fermented mixture of source separated household waste:** listed in Annex II of Reg. 2021/1165 and therefore authorized.
- **bones:** 'bone meal' and 'degelatinised bone meal' are listed in Annex II of Reg. 2021/1165 and therefore authorized.
- **sewage sludge, wastewater:** materials derived from sewage sludge or wastewater are not listed in Annex II of Reg. 2021/1165 at present and therefore

not authorized. However, EGTOP identified no reasons for not allowing fertilisers derived from these materials, provided that the method of production ensures hygienic and pollutant safety¹.

3. Solubility

The EU organic legislation requires that only *low solubility* mineral fertilisers may be used², but gives no further guidance on how this requirement should be implemented in practice. In our opinion, it is adequate to set a maximum value of 25 % P which may be present in water-soluble form. Under this requirement, most recycled P fertilisers qualify as poorly soluble and could therefore be authorized.

4. Manufacturing process and reagents

The vast majority of phosphorus recovery processes involve the use of synthetic chemical reagents. In processes recovering phosphorus from ashes, acids are often used. Mineral acids (sulphuric, hydrochloric, phosphoric or nitric acid) are used most frequently, in some cases also organic acids (e.g. citric or formic acid). Acids that consist of a 'synthetic plant nutrient' are problematic. Nitric acid is particularly critical, because it will result in a certain amount of unwanted 'synthetic nitrogen' present in the fertiliser.

Other reagents include for example lime, magnesium salts and chitosan-calcite adsorbent. In its evaluation of struvite³, EGTOP expressed some concern over the use of synthetic reagents in high quantities. Nevertheless, it recommended the authorization of struvite. Taking into consideration the valuable contribution to the closing of nutrient cycles and to the reduction of the use of non-renewable sources of phosphorus, we think that the use of synthetic reagents is acceptable. However, the use of such substances should be kept to the minimum. Preference should be given to reagents of plant, algal, animal, microbial or mineral origin, and negative impacts on the environment and human health should be avoided. In our opinion, most of the reagents mentioned above (with the exception of nitric acid) can be acceptable.

5. Contaminants

Depending on the raw materials and manufacturing processes, recycled P fertilisers may potentially be contaminated with heavy metals, pathogens and various organic pollutants. In line with the principles of organic farming, general requirements of environmental protection should be respected. Therefore, preference should be given to recycled P fertilisers with low content of contaminants. This includes the option that the organic legislation might only authorize selected products with a particularly low level

¹ see EGTOP report on Fertilisers and soil Conditioners (II), chapters 4.4.

² see Reg. 2018/848, Article 5.

³ see EGTOP report on Fertilisers and soil Conditioners (II), chapters 4.2.

of contaminants, or even phase out an authorized product, if an alternative with lower contamination levels becomes available. We consider that the relevant contaminant limits of the EU fertiliser legislation⁴ provide an adequate level of environmental protection. They should therefore be respected by all recycled P fertilisers, even if the product is not registered as an EU-fertiliser (e.g. sold under national fertiliser legislation).

6. Final remarks

The aspects pointed out above may guide the industry to focus on processes for which an authorization for organic farming seems most likely. However, readers are reminded that this paper provides only the personal opinion of the authors and final decisions will be taken by the competent authorities. Recycled P fertilisers may only be used in European organic farming after they have been included in Annex II of Reg. 2021/1165.

This paper deals only with recycled P fertilisers. However, other plant nutrients can also be obtained with recycling processes, and might be the subject of future discussion papers.

⁴ Reg. 2019/1009