

## Industrial by-products used in plant biostimulants

The Regulation (EU) 2019/1009 on Fertilising Products (FPR) allows the incorporation of industrial by-products in EU fertilising products if they meet the requirements of Component Material Category II. The regulation also mandates the Commission to define safety and “agronomic efficiency” criteria for these by-products.

This paper will provide an indicative list of the primary industrial by-products that are used in the manufacture of plant biostimulants and will highlight current difficulties for some of these by-products to be used under the future regulation as it is currently worded.

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### General remarks on how industrial by-products are defined in the FPR

We understand and share the Member States’ concerns that fertilisers should not be used as a channel for waste disposal. However, we have some concerns about the idea of defining “agronomic efficiency” criteria for a component:

- **Product function can only be ascertained at the product – not component – level.** That means that the agronomic interest of a component may not be clear until it is further processed or combined with another component.
- **“Agronomic efficiency” is not defined anywhere in the FPR, and the term “efficiency” implies a measurable efficacy level.** How do you measure the efficiency of soil organic carbon or a growing media? You can observe their effect, but efficiency is a different matter. We think it would be useful for “agronomic efficiency” to be defined in terms of the **broader concept of “agronomic benefit”**.
- That wider concept could also address the fact that manufacturers may also add **components for technical, not agronomic, reasons**. Fertilising products may be of higher quality (e.g. less clumping), safer for the handler, etc. due to these components being present, but they may not affect the agronomic performance.

## Industrial by-products already used in plant biostimulants

In this section, we list various industrial by-products used by the European biostimulant industry that do not appear to be covered currently by any of the component material categories of Regulation (EU) 2019/1009 on Fertilising Products (FPR).

### Polymers that occur in nature

Despite

- 1) being allowed by most national fertiliser laws;
- 2) being exempted from REACH registration; and
- 3) having a derogation from the forthcoming restriction on microplastics (because they are considered inherently biodegradable),

many polymers formed in nature are currently excluded from the Fertilising Products Regulation. There is no scientific basis for this exclusion. Furthermore, it creates market distortions: for example, hydrolysed proteins from animal sources will be allowed under CMC 10, but hydrolysed proteins from plant sources which are increasingly in demand to meet consumer preferences (animal welfare, vegetarian diets, religious rules on food production, etc.) are not eligible for CE-marking. It creates the situation whereby natural polymers approved for use in EU organic agriculture are not eligible to be placed on the market under the Fertilising Products Regulation.

Examples of such natural polymers used in plant biostimulants include:

- **Lignosulphonates** obtained through heat treatment and acid/alkaline treatment, sulphite treatment, and other chemical treatment in the paper industry. (Authorised as a complexing agent under Regulation (EC) 2003/2003).
- **Seaweed residues** left following the extraction through alkaline hydrolysis (feed-grade quality).
- **Amino acids** derived from plants through enzymatic and acid/alkaline hydrolysis
- **Starches, cellulose, hemicellulose, chitosan, lignin, collagen and keratin:** substances obtained by industrial processes that meet the following criteria:
  - Over 50% of the weight of the substance consists of natural polymer molecules and
  - The amount of polymer molecules presenting the same molecular weight is less than 50% of the weight of the substance

They can be classified on the basis of their natural origin and number of monomers, such as:

- Vegetable oils, acids, fats and amino acids/hydrolysed proteins;
- From agro-sources such as fermentation residues.

### Plant-based residues left after extraction

- **Natural sugars from vegetal protein extraction:** A mixture of complex sugars and carbohydrates extracted by water, with possible pH buffer, from plant seeds, including oilseeds and proteinaceous seeds. The natural sugars may be in solution or dried form.
- **Vegetal fibres from vegetal protein extraction:** The dietary fibres obtained after carbohydrate and protein extraction by chemical or enzymatic means from plant seeds, including oilseeds and proteinaceous seeds. The vegetal fibres may be in dry or wet form, possibly stabilised by pH modifiers.

- **Oilcakes from non-edible oils or edible oils** which were obtained through chemical solvents. These are usually approved for use in feed, so it is not clear why they would not be acceptable for use in fertilising products.

#### Food industry by-products

- **Sugarbeet vinasse** issued from alcohol production from sugarbeet molasses. Already used in national standards in France, Italy, Spain, and others and commonly used in organic fertilisers. It is unclear why only one type of vinasse was included in the FPR.
- **Sugarcane vinasse** from the extraction and fermentation of sugar molasses juice. Molasses from sugar cane processes. It is a 100% natural product, made from processed vegetable extracts. Already included in different national standards in France, Italy, Spain, etc. It is unclear why only one type of vinasse was included in the FPR.
- **Whitewash/lime:** by-product from sugar industries

#### Other industrial by-products

- **Sulfuric acid.** May be used to produce plant and seaweed extracts. Obtained through leaching of ores for extraction of Copper, Zinc, Nickel, etc.; recovery of sulphur in smokestacks of industrial units like smelter; or recovery of an acid used in another process and diluted (waste acid or sulphuric acid process). Already authorised under Regulation (EC) 2003/2003 as a source of sulphur fertilisers.

#### Industrial by-products used by biostimulant producers in other types of fertilising products they also manufacture

- **Ammonium sulphate** from two main sources (already authorised under Regulation (EC) 2003/2003):
  - Recovery from exhausts in the steel industry
  - Certain ore extraction (nickel, aluminium) or co-product of chemical synthesis (caprolactam, acrylonitrile, methylmethacrylate mainly but also methionine).
- **Potassium sulphate (K<sub>2</sub>SO<sub>4</sub>)** from several sources: Process recovery of sugar confectionery and other agro-based processes; chemical synthesis from potassium chloride and H<sub>2</sub>SO<sub>4</sub>; reaction between magnesium sulphate and potassium chloride Already authorised under Regulation (EC) 2003/2003
- **Binary salts:** by-product of the synthesis of amino acids (e.g. lysine, theonine, glutamate) from sweet substrate (glucose syrup, beet). Commonly used in fertilisers.
- **Calcium sulphate** obtained from the treatment of certain Ca-rich ores treated with sulphuric acid or as a residue from the treatment of various combustion fumes (petcoke, incineration, fluorine, etc.) or recycled from waste treatment facilities. (Already authorised under Regulation (EC) 2003/2003)
- **Synthetic anhydrite** (calcium sulfate) By-product from the fluorine industry. (Already authorised under Regulation (EC) 2003/2003)
- **Ammonium sulphate in solution:** by-product from all kinds of methanisation processes. Commonly used in fertilisers production. Indirectly authorised under Regulation (EC) 2003/2003.
- **TCP (Tricalcium Phosphate):** by-product from industrial wastewater treatment. Commonly used in fertiliser production.

- **Sodium sulphate:** by-product from methionine production. Commonly used in fertiliser production.
- **Struvite:** By-product from wastewater treatment or industrial water treatment (potato industry, for instance).
- **Partially solubilised phosphate:** by-product from laundry detergent production. Commonly used in fertiliser production.
- **Dolomite:** By-product from Magnesium oxide production (commonly used in fertiliser production)
- **Formiate calcium:** process unknown
- **Calcium carbonate fines** from dedusting process of main production of calcium carbonate (Already authorised under Regulation (EC) 2003/2003).
- **MgO fine dust particles** from dedusting process from main production of MgO.
- **MDCP:** off-specification product from MCP/DCP production (not the right content)
- **Potassium salts**
- **Phosphoric acid**
- **Dust from manure drying:** The fine particles recovered from animal manure drying by hot air. Characterised by its NPK content, including ammonium salts, from animal origin.