FERTIMANURE

Deliverable

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D3.4 – Synthesis of FERTIMANURE contributions to standardisation procedures

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Preface

This synthesis was carried out as a part of the FERTIMANURE project, funded by the H2020 programme (project number 86 28 49). FERTIMANURE aims to develop, integrate, test and validate innovative nutrient management strategies to efficiently recover and reuse nutrients from manure, to ultimately obtain reliable and safe fertilisers that can compete in the EU fertiliser market. The processes and the agronomic quality of the produced fertilisers (BBF) have already been proven in the other parts of the project (WP2 and WP4).

However, before placing a new product on the market, it must be ensured that it meets local regulatory requirements. Here the 18 BBF produced during FERTIMANURE project are subjected to both European regulations (in particular FPR 2019/1009) and the regulations of each member country (especially for countries involved in the project). To meet this need, the definition of harmonised standards for generic safety and quality requirements of fertilising products within current frameworks of EU28 and national regulations was one of the specific objectives of the WP3 ("Production of Tailor-Made fertilisers and quality assessment") of the project.

The WP3 of the FERTIMANURE project aims to obtain high-added value Tailor-Made fertilisers (TMF) that can, not only compete with the conventional chemical industry, but in collaboration with them to move towards a better use of renewable resources in production of fertilisers.

The global objectives of the WP3 were to:

1. assess the quality of the end-products obtained (bio-based fertilisers – BBF) (T3.1),
2. formulate criteria for BBF to comply with crop requirements (T3.3),
3. define process equipment to produce tailor-made fertilisers to meet the crop requirements (T3.2 and T3.4),
4. define the impact on logistics production (T3.5) and finally
5. define harmonised standards for generic safety and quality requirements of fertilising products within the current framework of EU28 and national regulations (3.6).

The objective of this last task was to evaluate in which way BBFs and TMFs comply with the current legal restrictions (European Directives, Regulations), and regional and national legislations and new regulations (Nitrate Directive/SafeManure, FPR, ...) and organic farming conditions. In addition, a tool was developed to easily check the compliance of new fertiliser products with the Fertilising Products Regulation (Regulation (EU) 2019/1009, 2019). The way this tool works is also described in this deliverable.

This deliverable summarizes the work that was done on Task 3.6 of the project to verify the compliance of the BBFs produced during the project with European and National regulations. It is divided into 4 Chapters.

1. Introduction.
2. European regulation and the compliance of FERTIMANURE BBF with it as well as the new FERTIMANURE Regulatory Tool.
3. National regulations and the compliance of FERTIMANURE BBF with them
4. Overall conclusions.

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Content

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List of Tables

List of Figures

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List of Abbreviations

ANSES	Agence Nationale de Sécurité Sanitaire
BBF	Bio-Based Fertiliser
CE	Conformité Européenne (European conformity)
CMC	Component Material Category
D	Deliverable
DM	Dry Matter
EU	European Union
FM	Fresh Matter
FPR	Fertilizing Products Regulation
PFC	Product Function Category
TMF	Tailor-Made Fertiliser
WP	Work Package

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1. Introduction

The European Union (EU) has established a comprehensive regulatory framework to promote sustainable nutrient management and protect water quality. In this sense, significant efforts have been made to boost the reintroduction of fertilisers obtained from secondary sources into the manufacturing chain, aiming to enhance sustainability, reduce dependency on synthetic fertilisers, and promote a circular economy. These efforts include legislative measures, research and innovation support, and the development of new market opportunities for bio-based fertilisers.

On another side, the EU has established another comprehensive regulatory framework to govern the registration and commercialization of fertilising products, with a significant emphasis on sustainability and the integration of recovered materials. Central to this framework is the Fertilising Products Regulation (Regulation (EU) 2019/1009, 2019), which came into effect on July 17, 2022. This regulation replaces the older Regulation (EC) No 2003/2003 and marks a significant shift towards a more inclusive and sustainable approach to fertiliser production and trade.

The Fertilising Products Regulation (Regulation (EU) 2019/1009, 2019) broadens the scope of what constitutes fertilising products to include both virgin and recycled materials derived from mineral and organic sources. This inclusive definition is designed to facilitate the use of innovative fertilisers made from recovered materials, thus supporting the EU's circular economy goals. One of the key features of this regulation is the introduction of the "end-of-waste" status for compliant products. This status allows materials recovered from waste streams to be used as fertilisers once they meet specific criteria, effectively transforming waste into valuable agricultural inputs. This provision is crucial for integrating recovered materials into the manufacturing chain and reducing dependence on synthetic fertilisers.

The regulation also sets out new requirements for "Conformité Européenne" marking (CE), which is essential for the free trade of fertilising products within the EU. The CE marking signifies that a product meets the EU's health, safety, and environmental protection standards. For manufacturers, importers, and distributors, obtaining the CE mark for their products is now a streamlined process under the new regulation, ensuring that recovered fertilisers can be traded freely across the EU. It is important to note that this regulation establishes a unified framework for fertilising products across EU member states. While this regulation aims to harmonize rules, member states may maintain their own national regulations, provided they align with EU law. Overall, the relationship between EU and national regulations seeks to balance harmonization with flexibility to promote the free movement of goods within the EU single market.

FERTIMANURE project analysed the regulatory framework related to the nutrient management in its D1.3 Report on the BBF Regulatory Framework in the EU and CELAC countries. After the completion of the work associated to the optimisation of manure processing technologies and production of BBFs, the compliance of those BBFs with the European and National regulatory framework must be done. To facilitate the cross checking the quality and safety related parameters with the Fertilising Products Regulation (Regulation (EU) 2019/1009, 2019) FERTIMANURE Regulatory Tool was developed.

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2. European regulation

2.1. Introduction

In addition to the BBFs agronomic performance considered during the other WP of the FERTIMANURE project (WP4), it is also important to verify the BBF concordance with European regulations, in particular with the RCE 2019/1009 implemented during the project's lifetime (https://eur-lex.europa.eu/eli/reg/2019/1009/oj).

This Regulation replaced the Regulation (EC) No 2003/2003, expanding its scope to secondary raw material based, i.e. recovered and bio-based fertilising products. The new EU Fertilising Products Regulation (EU) 2019/1009 was approved by the European Parliament and the Council of the European Union on 5th June 2019 and is in application since 16th June 2022.

According to this new regulation, to be authorized, a product must be 1) made of authorized components (CMC), and 2) meet the regulatory requirements defined according to the functionality of the product (PFC).

2.2. The FERTIMANURE Regulatory Tool

The tool was designed to study these two aspects of the regulation: at first, BBFs are compared to CMCs requirements, then, the final products (constituted with one BBF or in mixture) are compared to the PFC requirements.

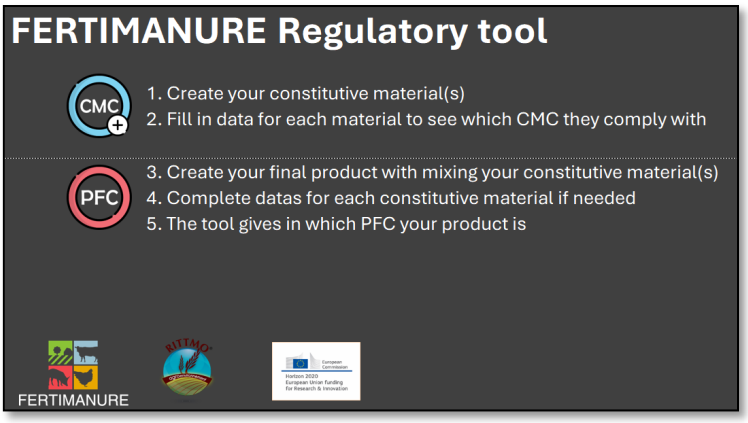

Figure 1: FPR tool homepage.

The tool was created on Excel. When it is empty it only contains 2 sheets:

i. **A home page** (Figure 1) containing 2 buttons: one to create new CMC (a new sheet per CMC), and another to access to the second sheet:
ii. **The PFC conformity sheet**, which is used to check the compliance of the different crated CMCs according to regulatory requirements

At the end, the tool will be filled with as many pages as CMC and 2 tabs for the home page and the PFCs.

2.2.1. CMC validation

The tool was designed to manage the constitutive materials separately one from each other. Each creation of a new material results in the creation of a new tab in which component analytical data must be indicated.

When you click on "CMC+", the tool asks for a BBF name (Figure 2). Any character string is possible, but do not forget that this name will serve in a second time as a reference in the tool to recall the material in the PFC checking part.

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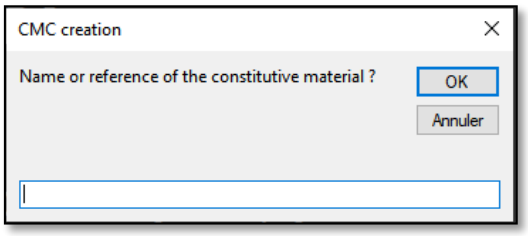

Figure 2: FRP tool CMCs creation step

After entering the name, the tool asks if it is necessary to create another constitutive material. This function allows you to create several materials very quickly (useful if you have 18 BBF to create as in the case of FERTIMANURE project)

When the CMC creation is finished, each sheet must be completed with data on each of the materials. For each CMC, the regulations define lists of authorized (or prohibited) materials, and analytical criteria to be respected. The complete checking list for each CMC is shown in Appendix 1.

While filling a sheet, the tool automatically checks that the material created complies with regulatory requirements. When a compliance is found, the sheet bookmark turns red to green (Figure 3).

Figure 3: Valid CMC detected

The valid CMC can be identified with hiding the wrong CMCs by clicking on the orange “Hide wrong CMC” button (Figure 4).

Figure 4: Hide/Show CMC buttons

If no CMC emerges, it is possible to scroll down the list of CMCs by clicking on the green “Show all CMC” button and investigate why the material is not compatible with potentially interesting CMCs (by comparing the list of authorized materials, checking that all the necessary criteria have been correctly fulfilled and that the values are well within the authorized limits).

Please note that the tool is based on user good use and faith. The tool does not verify the correspondence between the constituent materials and other in actual regulations (Regulation (EC) N°1907/2006, 2006).

Once the CMC creation and validation step is complete, you can move on to the product modelling step and validate its suitability for the PFC requirements.

2.2.2. PFC requirements

In this step, the operation of the tool is similar to the CMCs part: the tool compares the entered data with regulatory requirements and informs the user about valid and invalid PFCs.

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In “PFC CONFORMITY” sheet, constitutive materials can be created by clicking on 

button.

In the new column that is created, indicate the name and CMC number of the material (this is done automatically if the CMC has been created and validated by the tool), as well as the proportion of CMC in the final product. With this feature, you can create a final product consisting of a single CMC, or a combination of multiple CMCs (for example in the context of FERTIMANURE this functionality allowed us to create any theoretical TMF by mixing various BBFs). Note that the tool is not able to verify the physical feasibility of the mixture.

Then, for each CMC included in the composition of the product, indicate the possible functions of CMC, the analysis results (elements, pollutants, pathogens, or even some specific analyses linked to particular categories of PFCs).

For each PFC, the regulations define lists a list of minimums and maximums to respect (depending on the PFC). The complete checking list for each PFC is shown in Appendix 2. While filling a sheet, the tool automatically checks that the material created complies with regulatory requirements. When a compliance is found, the cell under the PFC name turns red to green (Figure 5).

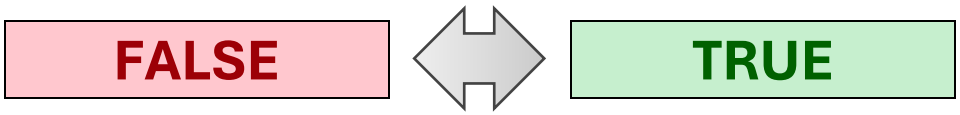

Figure 5: Valid PFC detected

More than one PFC can be detected simultaneously. The valid PFCs can be identified with hiding the wrong PFCs by clicking on the orange “Hide wrong PFC” button (Figure 6).

If no PFC emerges, it is possible to scroll down the list of PFCs by clicking on the green “Show all PFC” button (Figure 6) and investigate why the product is not compatible with potentially interesting PFCs PFC (missing analyses or outside the authorized ranges, unauthorized constitutive materials, …)

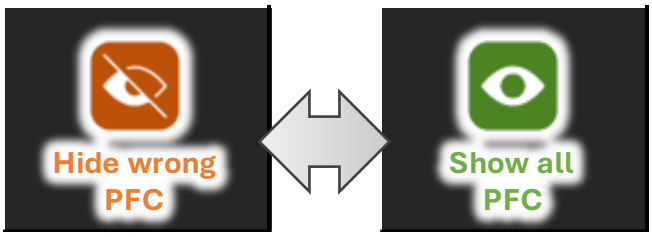

Figure 6: Hide/Show PFC buttons

Once the tool was operational, it was put to the test on FERTIMANURE’s 18 BBFs

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2.3. Compliance with CMC of the FERTIMANURE BBF

2.3.1. BBF list and potential CMC

During Fertimanure project, 18 BBF were produced. The Table 1 lists all the produced BBF and the potential CMC they should theoretically correspond to.

Table 1: BBF list and potential CMC

Origin country	Input manure	BBF	Potential CMC
	Digestate from cattle slurry	NL-AS	CMC 15
		NL-LK	CMC 5
		NL-SC	CMC 5
		NL-WetP	CMC 5
		NL-DryP	CMC 5
	Pig slurry	ES-DSC	CMC 10
		ES-PA	CMC 13
		ES-AM	CMC 15
		ES-NC	CMC 10
		ES-AA	CMC 1
	Cattle manure	DE-BC	CMC 14
		DE-AP	CMC 15
	Manures + food wastes	BE-AN	CMC 15
		BE-AS	CMC 15
		BE-AW	CMC 15
	Cattle or Poultry manure	FR-BC	CMC 14
	Digestate or Pig slurry	FR-AS	CMC 15
	Agricultural digestate	FR-LK	CMC 5
	Pig slurry		CMC 10

2.3.2. CMC 1: Virgin material substances and mixtures

Only the ES-AA (AminoAcids-based biostimulant) can claim to be a virgin material substance because it is only constituted by amino acids and does not contain any forbidden row material (plants, wastes, animal by product, polymers, compost, digestate, oxides, pyrolysis byproducts, microorganisms…). The only needed criteria is the molecule need to be registered pursuant to REACH Regulation (Regulation (EC) N°1907/2006, 2006). No other analysis is needed for this CMC.

Therefore, the ES-AA complies with the requirements of CMC 1.

2.3.3. CMC 5: Digestate other than fresh crop digestate

CMC5 should concerned all the remaining residue from digestate treatment:

- NL-LK (remaining liquid fraction of digestate after stripping process from N and P extraction, used as K fertiliser),
- NL-SC (remaining solid fraction of digestate after phase separation, used as soil conditioner),
- NL-WetP (extracted P from the liquid fraction of digestate),
- NL-DryP (dryed extracted P from the liquid fraction of digestate), and
- FR-LK (remaining digestate from N stripping used as K fertiliser).

CMC5 products have to be digestate from biowaste (Regulation (EC) No 1272/2008, 2008) resulting from separate bio-waste collection at source and/or final animal derived products ((Regulation (EC) No 1069/2009,

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2009), art 32) for which the end point has been determined ((Regulation (EC) No 1069/2009, 2009), art 5). Digestion additives are tolerated if they represent less than 5% of the global digestate. Furthermore, other parameters need to be checked:

- the sum of 16 PAH[1] have to be under 6 mg/kg DM,
- Glass, stones, plastics > 2 mm have to be under 3 mg/kg DM each, and the sum need to be under 5 mg/kg DM,
- The oxygen uptake rate has to be between 25 and 10,000 mmol O_2/kg OM/h.
- The residual biogas potential has to be between 0.25 and 1,000 L biogas/g VS.

All the listed BBF are in accordance with regulatory limits. On the other hand, the French and Dutch pilots did not have a sanitation system integrated to the whole process (more details in D2.1 Pilots descriptions). **The products are therefore theoretically non-compliant with the requirements of CMC5.** On the other hand, we can suppose that at the industrial level a sanitisation step can easily be added. Thus, it would be possible to **make these products compliant to the European regulation.**

2.3.4. CMC 10: Derived products within the meaning of Regulation (EC) No 1069/2009

CMC10 should concerned all the remaining residue from raw manure treatment:

- ES-DSC (biodried solid fraction),
- ES-NC (nutrient rich concentrate),
- FR-LK (remaining pig slurry from N stripping used as K fertiliser).

For CMC10, no analysis is necessary. On the other hand, the materials are limited to animal by-products which have reached the end point in the manufacturing chain ((Regulation (EC) No 1069/2009, 2009), art 5) after applying authorised treatments (Commission Regulation (EU) No 142/2011, 2011).

As CMC 5, during the Fertimanure project, the French and Spain pilots did not have a sanitation system integrated to the whole process. **The products are therefore theoretically non-compliant with the requirements of CMC10.** On the other hand, we can assume that at the industrial level a hygienisation step can easily be added. Thus, it would be possible to **make these products compliant to the European regulation.**

2.3.5. CMC 13: Thermal oxidation materials and derivates

CMC 13 concerns only the ES-PA (P from ashes).

Material produced from animal by-products like the ES-PA have to reach the end point in the manufacturing chain (1069/2009/EC, art 5) after applying authorised treatments (implementing Regulation 142/2011). Furthermore, other parameters need to be checked:

- Total organic carbon has to be under 3 % FM,
- If chloride is needed, it has to be under 30 g/kg DM,
- Total chromium has to be under 400 mg/kg DM,
- Total thallium has to be under 2 mg/kg DM,
- Total vanadium has to be under 600 mg/kg DM,
- PAH (sum of 16) have to be under 6 mg/kg DM,
- Dioxins and furans (FCDD-F) have to be under 20 ng/kg DM.

ES-PA complies with regulatory limits, but the temperature regime of the biomass boiler obtained when generating this product does not meet the processing requirements established in the Regulation 142/2011.

[1] Sum of 16 PAH established by US EPA: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene and benzo[ghi]perylene.

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Therefore, the product does not comply with CMC13 requirements. **By adding sanitation to the process, the ES-PA would become compliant with European regulation.**

2.3.6. CMC 14: Pyrolysis and gasification materials

This CMC concerns the 2 biochars produced during Fertimanure project, which means:

- DE-BC (biochar from cattle manure)
- FR-BC (biochar from cattle or poultry manure)

Like the CMC 13, material produced from animal by-products are authorized only if they have reached the end point in the manufacturing chain (1069/2009/EC, art 5) following the authorised processing established in the Implementing regulation 142/2011. Furthermore, other parameters need to be checked:

- Ratio Hydrogen/Organic carbon has to be under 0.7,
- If chloride is needed, it has to be under 30 g/kg DM,
- Total thallium has to be under 2 mg/kg DM,
- Dioxins and furans (FCDD-F) have to be under 20 ng/kg DM.

DE and FR-BC comply with regulatory limits, and although pyrolysis units reach in both cases to high enough temperatures for sanitisation, endpoint can't be established following the pertinent regulation, thus CMC13 requirements are not met and other authorised processing would be required. **By adding sanitation to the process, the two products would become compliant with European regulation**.

2.3.7. CMC 15: Recovered high purity materials

CMC 15 concerns all the pure extracted fertilizing element from manures, which means:

- NL-AS (Ammonium Sulfate produced by N-stripping)
- ES-AM (Ammonium Sulfate produced by N-stripping)
- DE-AP (Ammonium Phosphate produced by N-stripping)
- BE-AN (Ammonium Nitrate produced by N-stripping)
- BE-AS (Ammonium Sulfate produced by N-stripping)
- BE-AW (Ammonium Water produced by N-stripping)
- FR-AS (Ammonium Sulfate produced by N-stripping)

To be compliant with the CMC 15 requirements, products must be either ammonium, sulphates, or phosphates salts, sulphur, calcium carbonate or oxide.

Furthermore, other parameters need to be checked:

- Total organic carbon has to be under 0.5 % FM,
- Total chromium has to be under 400 mg/kg DM,
- Total thallium has to be under 2 mg/kg DM,
- PAH (sum of 16) have to be under 6 mg/kg DM,
- Dioxins and furans (FCDD-F) have to be under 20 ng/kg DM,
- *Salmonella* must be absent in 25g of product,
- *Enterococci* or *Escherichia coli* have to be under 1,000 MPN/kg DM.

All listed BFF are below the thresholds required by CMC 15. **The 7 listed BBF comply with the requirements of CMC 15.**

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2.3.8. Summary of BFF compliance with CMC

Table 2 repeats Table 1 while indicating the valid CMCs (in green)

Table 2: BBF list and validation of CMC compliance

Origin country	Input manure	BBF	Valid CMC
	Digestate from cattle slurry	NL-AS	**CMC 15**
		NL-LK	**CMC 5***
		NL-SC	**CMC 5***
		NL-WetP	**CMC 5***
		NL-DryP	**CMC 5***
	Pig slurry	ES-DSC	**CMC 10***
		ES-PA	**CMC 13***
		ES-AM	**CMC 15**
		ES-NC	**CMC 10***
		ES-AA	**CMC 1**
	Cattle manure	DE-BC	**CMC 14***
		DE-AP	**CMC 15**
	Manures + food wastes	BE-AN	**CMC 15**
		BE-AS	**CMC 15**
		BE-AW	**CMC 15**
	Cattle or Poultry manure	FR-BC	**CMC 14***
	Digestate or Pig slurry	FR-AS	**CMC 15**
	Agricultural digestate	FR-LK	**CMC 5***
	Pig slurry		**CMC 10***

** Only if a sanitation process following the Implementing Regulation 142/2011 is added to the global production system*

As BBF production currently stand in FERTIMANURE project, 8 out of 18 BBFs are compliant with the regulation. By adding sanitation process, **all BBFs would be compliant with the regulation.** if technically the sanitation process is well mastered, it still constitutes an additional investment cost and an additional energy cost, in particular for processes that do not produce energy.

2.4. Compliance with PFC of the FERTIMANURE BBF

2.4.1. BBF list and potential PFC

Following the validation of the CMC, the same work is carried out to define the PFCs that each BBF product can potentially claim (Table 3). 3 PFC should be involved by the BBF produced: PFC 1 (fertilisers), PFC 3 (soil improvers) and PFC 6 (biostimulant).

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Table 3: BBF list and potential PFC

Origin country	Input manure	BBF	Valid CMC	Potential PFC	Explanation
	Digestate from cattle slurry	NL-AS	CMC 15	PFC 1	Only mineral content Very high N and S content
		NL-LK	CMC 5*	PFC 1 or 3	Mix of mineral and organic element low concentrated fertilizing elements
		NL-SC	CMC 5*	PFC 3	Very high organic matter content Poor nutrient content
		NL-WetP	CMC 5*	PFC 1 or 3	Only mineral content P content diluted
		NL-DryP	CMC 5*	PFC 1	Only mineral content Very high P content
	Pig slurry	ES-DSC	CMC 10*	PFC 3	Very high organic matter content Poor nutrient content
		ES-PA	CMC 13*	PFC 1	Only mineral content Very high N and P content
		ES-AM	CMC 15	PFC 1	Only mineral content Very high N and S content
		ES-NC	CMC 10*	PFC 1 or 3	Mineral elements Low concentrated nutrient content
		ES-AA	CMC 1	PFC 6	Amino Acid isolation for biostimulation effect
	Cattle manure	DE-BC	CMC 14*	PFC 3	Very high organic matter content Poor nutrient content
		DE-AP	CMC 15	PFC 1	Only mineral content Very high N and P content
	Manures + food wastes	BE-AN	CMC 15	PFC 1	Only mineral content Very high N content
		BE-AS	CMC 15	PFC 1	Only mineral content Very high N and S content
		BE-AW	CMC 15	PFC 1	Only mineral content Very high N content
	Cattle or Poultry manure	FR-BC	CMC 14*	PFC 3	Very high organic matter content Poor nutrient content
	Digestate or Pig slurry	FR-AS	CMC 15	PFC 1	Only mineral content Very high N and S content
	Agricultural digestate	FR-LK	CMC 5*	PFC 1 or 3	Mix of mineral and organic element low concentrated fertilizing elements
	Pig slurry		CMC 10*		

** Only if a sanitation process following the Implementing Regulation 142/2011 is added to the global production system*

2.4.2. PFC 1: Fertilising products

This PFC concerns all BBF highly concentrated in fertiliser element (N, P, K, Mg, Ca, S, and Na). If we look one by one at the BBFs supposed to be able to meet the conditions of PFC 1The BBF (Table 3):

- **NL-AS** contains a high amount of N (6.53 % FM) and S (18.27 % FM). Because of its N-content above 1.5% and S-content above 0.75%, and other elements under the lower limit, it can be used as a **straight liquid inorganic N+S fertiliser (PFC 1.C.I.b.i.(b)).**
- **NL-LK** contains too little organic matter to be an organic fertiliser (1.57% C_{orga} < 5%) and not enough potassium to be a mineral or organo-mineral fertiliser (K = 1.12% < 2%). **This BBF cannot be a PFC 1.**
- **NL-WetP** contains too little organic matter to be an organic fertiliser (4.11% C_{orga} < 5%) and not enough phosphorus (or another main nutrient) to be a mineral or organo-mineral fertiliser (N = 0.62%, P = 0.71% and K = 1.01% < 2%). **This BBF cannot be a PFC 1.**
- **NL-DryP** contains more than 15% of organic carbon and 1 % FM of each macronutrient (1.84 % N, 2.13 % P-P_2O_5 and 3 % K-K_2O) so it can claim a role of **Solid organic NPK fertiliser (PFC 1.A.I.(b))**
- **ES-PA** contains a lot of interesting fertilizing element (P-P_2O_5: 15.22 % FM, K-K_2O: 16.62 % FM, MgO: 6 % FM, SO_3: 20.92 % FM, Na_2O: 7.28 % FM) so it can claim multiple kind of **Compound Solid Inorganic Fertiliser (PFC 1.C.I.a.ii.(a) for P and K, (b) for micronutrients)**

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- **ES-AM** contains a substantial amount of N (1.55 % FM) and S (7.51 % FM). Because of its N-content above 1.5% and S-content above 0.75%, and other elements under the lower limit, it can be used as a **straight liquid inorganic N+S fertiliser (PFC 1.C.I.b.i.(b)).**
- **ES-NC** contains too little organic matter to be an organic fertiliser (1.26% C_{orga} < 5%) and not enough main nutrient to be a mineral or organo-mineral fertiliser (N = 0.38%, P = 0.12% and K = 0.40% < 2%). **This BBF cannot be a PFC 1.**
- **DE-AP** contains 62.14 % P-P_2O_5. The Nitrogen content is only at 1.23 % FM. The BBF cannot claim for a NP fertiliser but only for a **Straight Solid Inorganic P Fertiliser (PFC 1.C.I.a.i.(a))**
- **BE-AN** contains a very high amount of N (15.31 % FM). Because of its N-content above 5%, and other elements under the lower limit, it can be used as a **straight liquid inorganic N fertiliser (PFC 1.C.I.b.i.(a)).**
- **BE-AS** contains high amount of N (7.44 % FM) and S (20.30 % FM). Because of its N-content above 1,5% and S-content above 0,75%, and other elements under the lower limit, it can be used as a **straight liquid inorganic N+S fertiliser (PFC 1.C.I.b.i.(b)).**
- **BE-AW** only contain N (15.82 % FM). Because of its N-content above 5% and other elements under the lower limit, it can be used as a **straight liquid inorganic N fertiliser (PFC 1.C.I.b.i.(a)).**
- **FR-AS** contains great amount of N (4.88 % FM) and S (32.61 % FM). Because of its N-content above 1,5% and S-content above 0,75%, and other elements under the lower limit, it can be used as a **straight liquid inorganic N+S fertiliser (PFC 1.C.I.b.i.(b)).**
- **FR-LK** contains too little organic matter to be an organic fertiliser (0.12% C_{orga} < 5%) and not enough potassium to be a mineral or organo-mineral fertiliser (K = 0.44% < 2%). **This BBF cannot be a PFC 1.**

The Table 4 brings together analyses of BBF pollutants content and compares them to the regulatory requirements concerning products claiming a PFC 1.

Table 4: PFC1 pollutant verification for FERTIMANURE BBF.

POLLUTANTS (mg/kg DM)	*Max. inorg.*	NL-AS	ES-PA	ES-AM	DE-AP	BE-AN	BE-AS	BE-AW	FR-AS	*Max. org.*	NL-DryP
Cadmium (Cd)	***3***	0.05	0.15		0.00	0.36	0.25	0.25	0.25	***1.5***	0.20
Hexavalent Chrome (Cr VI)	***2***	0.70	0.05		0.00	1.00	0.10	0.10	0.10	***2***	0.00
Mercury (Hg)	***1***	0.01	0.10		0.00	0.04	0.03	0.03	0.02	***1***	0.03
Nickel (Ni)	***100***	0.90	81.00		0.00	3.55	44.50	44.50	2.45	***50***	26.00
Lead (Pb)	***120***	0.70	15.00		0.00	3.55	2.51	2.51	2.45	***120***	3.50
Total Arsenic (As)	***40***	0.10	2.00		0.00	5.00	0.25	0.25	0.25	***40***	1.30
Copper (Cu)	***600***	0.50	645		0.00	5.00	5.00	5.00	4.90	***300***	59.00
Zinc (Zn)	***1500***	1.80	3632		0.00	5.00	5.00	5.00	4.90	***800***	331.00
Biuret ($C_2H_5N_3O_2$)	***12***	0.10	0.00		0.00	0.10	0.10	0.10	0.00	***0***	0.00
Perchlorate (ClO_4)	***50***	0.03	0.00	nc	0.00	0.25	0.25	0.25	0.02	***nc***	nc
Cd/P_2O_5	***60***	nc	nc	nc	0.00	nc	nc	nc	nc	***nc***	nc
Salmonella spp. (CFU/25g)	***nc***	nc	nc	nc	nc	nc	nc	nc	nc	***0***	0
Escherichia coli (CFU/1g)	***nc***	nc	nc	nc	nc	nc	nc	nc	nc	***1000***	0
Enterococcae (CFU/1g)	***nc***	nc	nc	nc	nc	nc	nc	nc	nc	***1000***	0

Max.inorg. : xxxxx. Max.org.: xxxxx. nc: not concerned. Green values comply with regulation. Red values do not comply with regulation.

The pollutant contents of BBF **NL-AS, DE-AP, BE-AN, BE-AS, BE-AW and FR-AS** comply with the regulations. As an organic fertilizer, the limitations are not the same for **NL-DryP** and require pathogen analysis. Even so, the pollutant content and microbiological analysis of **NL-DryP** fully comply with the regulations.

Pollutant analysis is not available for **ES-AM**, so pollutant content compliance with regulations cannot be checked. Nevertheless, considering its production process, pathogen presence is not expected in this product.

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Due to a copper and zinc contamination, **ES-PA** does not comply with regulation. More research is needed to find the source of the contamination (probably due to animal effluent particularly rich in copper and zinc due probably to feeding complements).

2.4.3. PFC 3: Soil improvers

This PFC concerns all BBF poorly concentrated in fertiliser element (N, P, K, Mg, Ca, S, and Na), potentially with high organic matter content, and which have an impact on soil.

The following BBF are concerned: NL-LK, NL-SC, NL-WetP, ES-DSC, ES-NC, DE-BC, FR-BC and FR-LK. In general,

- The K content in **NL-LK** is too low to claim a fertiliser role (0.51 % K_2O/FM). On the other hand, it can claim the role of soil improver. Due to its low content of organic matter (2.46 % FM) and organic carbon (1.57 % FM), it can claim a role of **inorganic soil improver (PFC 3.B).**
- Due to its DM content (26 %) and organic carbon content (10.26 % FM), **NL-SC** can claim a role of **organic soil improver (PFC 3.A).**
- The P-content in **NL-WetP** is too low to claim a role of P fertiliser (0.71 % P_2O_5/FM). Due to its low content of organic matter (8.23 % FM) and organic carbon (4.11 % FM), it can claim a role of **inorganic soil improver (PFC 3.B).**
- Due to its DM content (48.74 %) and organic carbon content (25.64 % FM), **ES-DSC** can claim a role of **organic soil improver (PFC 3.A).**
- **ES-NC** can claim the role of soil improver. Due to its low content of organic matter (2.24 % FM) and organic carbon (1.26 % FM), it can claim a role of **inorganic soil improver (PFC 3.B).**
- Due to its DM content (99,6 %) and organic carbon content (39,36 % FM), **DE-BC** can claim a role of **organic soil improver (PFC 3.A).**
- Due to its DM content (95.54 %) and organic carbon content (36.94 % FM), **FR-BC** can claim a role of **organic soil improver (PFC 3.A).**
- The K content in **FR-LK** is too low to claim a fertiliser role (0.44 % K_2O/FM). On the other hand, it can claim the role of soil improver. Due to its low content of organic matter (0.25 % FM) and organic carbon (0.12 % FM), it can claim a role of **inorganic soil improver (PFC 3.B).**

The Table 5 brings together analyses of BBF pollutants content and compares them to the regulatory requirements concerning products claiming a PFC 3.

NL-LK, NL-WetP,DE-BC and FR-BC pollutant content complies with regulation.

NL-SC does not comply with regulation due to a presence of *E. coli*. This pathogen is quite sensitive to sanitation process. Adding a sanitation procedure during BBF production (necessary for CMC compliance anyway) should resolve this contamination problem.

FR-LK chromium VI is slightly too high compared to the regulation limits. This contamination is probably due to the stainless-steel corrosion due to the sulfuric acid circulation.

Due to a cadmium and zinc contamination, ES-DSC does not comply with regulation. More research is needed to find the source of the contamination (due to raw materials, process equipment or process additives).

ES-NC also shows a zinc contamination.

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Table 5: PFC3 pollutant verification

POLLUTANTS (mg/kg DM)	*Max. inorg.*	NL-LK	NL-WetP	ES-NC	FR-LK	*Max. org.*	NL-SC	ES-DSC	DE-BC	FR-BC
Cadmium (Cd)	1.5	0.01	0.07	0,50	0.43	2	0.05	60.30	0,06	0.11
Hexavalent Chrome (Cr VI)	2	0.10	0.00	0,00	2.03	2	1.60	0.00	0,05	0.10
Mercury (Hg)	1	0.00	0.00	0,40	0.43	1	0.01	0.40	0,02	0.01
Nickel (Ni)	100	0.40	1.10	10,00	6.95	50	1.00	4.00	6,90	22.50
Lead (Pb)	120	0.10	3.50	5,00	10.52	120	0.60	4.00	1,93	1.34
Inorganic Arsenic (As)	40	0.09	0.40	2,50	4.28	40	0.10	2.00	0,47	0.50
Copper (Cu)	300	5.40	19.00	232,00	57.53	300	14.00	62.00	51,30	48.60
Zinc (Zn)	800	29.00	108.00	992,00	98.22	800	92.00	819.00	358,50	137.30
Salmonella spp. (CFU/25g)	***nc***	nc	nc	nc	nc	***0***	0	0	0	0
Escherichia coli (CFU/1g)	***nc***	nc	nc	nc	nc	***1000***	9500	10	0	10
Enterococcae (CFU/1g)	***nc***	nc	nc	nc	nc	***1000***	0	0	0	0

Max.inorg. : xxxxx. Max.org.: xxxxx. nc: not concerned. Green values comply with regulation. Red values do not comply with regulation.

2.4.4. PFC 6: Biostimulant

ES-AA can claim a role of **non-microbial plant biostimulant (PFC 6.B).**

There is no requirement in terms of fertilizing elements (except of course showing the effectiveness of the product), there are only pollutant limits in the regulations. Pollutant analysis is not available for ES-AA, so pollutant content compliance with regulations cannot be checked.

2.4.5. Summary of BBF compliance with PFC

Table 6 repeats Table 3 while indicating the valid CMCs (in green)

As BBF production currently stand in FERTIMANURE project:

- ✓ 8 out of 18 BBFs are already compliant with the regulation (CMC and PFC).
- ✓ 5 out of the remaining 10 BBFs would be compliant with the regulation by simply adding sanitation process,
- ✓ The 5 remaining BBF shows TM contaminations, probably due to the raw materials (pig manure). With a preliminary analysis of the raw materials, heavy metal contamination issues should be resolved

Note that the tool only indicates whether the product is, according to the analyses, compliant with a PFC. At the same time, its effectiveness must be proven with suitable plant/soil tests.

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Table 6: BBF list and validation of PFC compliance

Origin country	Input manure	BBF	Valid CMC	Valid PFC	PFC denomination
	Digestate from cattle slurry	NL-AS	CMC 15	PFC 1.C.I.b.i.(b)	Straight liquid inorganic NS fertiliser
		NL-LK	CMC 5*	PFC 3.B	Inorganic soil improver
		NL-SC	CMC 5*	PFC 3.A**	Organic soil improver
		NL-WetP	CMC 5*	PFC 3.B	Inorganic soil improver
		NL-DryP	CMC 5*	PFC 1.A.I.(b)	Solid organic NPK fertiliser
	Pig slurry	ES-DSC	CMC 10*	PFC 3.A**	Organic soil improver
		ES-PA	CMC 13*	PFC 1.C.I.a.ii.(a)**	Compound solid inorganic PK fertiliser
		ES-AM	CMC 15	PFC 1.C.I.b.i.(b)	Straight liquid inorganic NS fertiliser
		ES-NC	CMC 10*	PFC 3.B**	Inorganic soil improver
		ES-AA	CMC 1	PFC 6.B	Non microbial plant biostimulant
	Cattle manure	DE-BC	CMC 14*	PFC 3.A	Organic soil improver
		DE-AP	CMC 15	PFC 1.C.I.a.i.(a)	Straight solid inorganic P fertiliser
	Manures + food wastes	BE-AN	CMC 15	PFC 1.C.I.a.i.(a)	Straight solid inorganic N fertiliser
		BE-AS	CMC 15	PFC 1.C.I.b.i.(b)	Straight liquid inorganic NS fertiliser
		BE-AW	CMC 15	PFC 1.C.I.a.i.(a)	Straight solid inorganic N fertiliser
	Cattle or Poultry manure	FR-BC	CMC 14*	PFC 3.A	Organic soil improver
	Digestate or Pig slurry	FR-AS	CMC 15	PFC 1.C.I.b.i.(b)	Straight liquid inorganic NS fertiliser
	Agricultural digestate	FR-LK	CMC 5*	PFC 3.B**	Inorganic soil improver
	Pig slurry		CMC 10*		

** Only if a sanitation process following the Implementing Regulation 142/2011 is added to the global production system*

*** Possible PFC but pollutant(s) detected in the BBF.*

2.5. Show case of TMF (combination of BBF)

Thanks to the tool, we can create theoretical TMF with combination of different BFFs. The number of theoretical TMFs that can be created with the tool is huge. Detailing all the possible combinations would be tedious. Thus, to validate the possibility that TMFs produced in FERTIMANURE are compliant with regulation, regardless of the mixture, we are going to detail an example, and extrapolate the operation in a global case to describe a general framework which remains valid regarding to the regulations.

2.5.1. Study of a particular case

For the example, here we will create a TMF made up of:

- 90% biochar for the amendment part (here we will take DE-BC, already available as CMC 14 and PFC 3.A),
- 9% ammonium sulphate for the supply of fertilizing elements (here we will take the NL-AS, already available as CMC 15 and PFC 1.C.I.b.i.(b)), and
- 1% biostimulant for the biostimulation of plants (here we will take the ES-AA, already available as CMC 1 and PFC 6.B)

The final theoretical composition of the product is this following (Table 7)

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Table 7: Theorical TMF composition and compliance with PFCs limitations

Analysis	TMF	PFC 1.C.I.b.i.(b)	PFC 3.A	PFC 6.B	PFC 1.C.I.a.ii.(a)	PFC 1.C.I.a.ii.(b)
Final constitution	Solid	Liquid	Solid	nc	Solid	Solid
Dry matter (% FM)	92.60	nc	20 - 100	nc		
Organic Carbon (% FM)	35.43	nc	7.5 - 100	nc		
Total Nitrogen (N % FM)	1.60	1.5 – 100 in in only one of them	nc	nc	3 – 100 in at least one of them	
Total Phosphorus (P_2O_5 % FM)	6.95		nc	nc		
Total Potassium (K_2O % FM)	18.85		nc	nc		
Total Magnesium (MgO % FM)	10.07	0.75 – 100 in at least one of them	nc	nc		1.5 – 100 in at least one of them
Total Calcium (CaO % FM)	2.95		nc	nc		
Total Sulphur (SO_3 % FM)	2.22		nc	nc		
Total Sodium (Na_2O % FM)	0.13		nc	nc		
Total N+P+K+Mg+Ca+S+Na (% FM)	43.38	7 – 100	nc	nc	18 – 100	18 – 100

nc: not concerned

The Table 7 shows that it is not because the constitutive materials already check all the PFC requirements that the combination of these materials will also meet them. Typically, the PFC 3.A and 6.B provided by the BBF DE-BC and ES-AA are still relevant, but not the PFC 1.C.I.b.i.(b) because it is reserved for liquids and too much phosphorus and potassium were supplied by the biochar. On the other hand, the combination of BBF can open access to new PFCs, and this is indeed the case here (Table 7) with both available PFC 1.C.I.a.ii.(a) and PFC 1.C.I.a.ii.(b).

With this composition, this TMF can claim all the following PFC:

- PFC 1.C.I.a.ii.(a) Solid Inorganic PK Compound Fertiliser
- PFC 1.C.I.a.ii.(b) Solid Inorganic MgCaS Compound Fertiliser
- PFC 3.A. Organic Soil Improver
- PFC 6.B. Non-microbial Plant Biostimulant
- PFC 7. Fertilising Product Blend

This TMF is also complies with all PFC pollutants limitations (Table 8).

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Table 8: TMF pollutant verification

		PFC 1. FERTILISER			PFC 3. SOIL IMPROV.			PFC 6. BIOSTIM.		
POLLUTANTS (mg/kg DM)	**Value**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	0.06	0	3	*OK*	0	2	*OK*	0	1.5	*OK*
Hexavalent Chrome (Cr VI)	0.07	0	2	*OK*	0	2	*OK*	0	2	*OK*
Mercury (Hg)	0.02	0	1	*OK*	0	1	*OK*	0	1	*OK*
Nickel (Ni)	6.71	0	100	*OK*	0	50	*OK*	0	50	*OK*
Lead (Pb)	1.89	0	120	*OK*	0	120	*OK*	0	120	*OK*
Inorganic Arsenic (As)	0.46				0	40	*OK*	0	40	*OK*
Total Arsenic (As)	0.46	0	40	*OK*						
Copper (Cu)	49.68	0	600	*OK*	0	300	*OK*	0	600	*OK*
Zinc (Zn)	347.12	0	1500	*OK*	0	800	*OK*	0	1500	*OK*
Biuret ($C_2H_5N_3O_2$)	0.00	0	12	*OK*						
Perchlorate (ClO_4)	0.00	0	50	*OK*						
PATHOGENS	**Value**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp. (CFU/25g)	0				0	0	*OK*	0	0	*OK*
Escherichia coli (CFU/1g)	10				0	1000	*OK*	0	1000	*OK*
Enterococcae (CFU/1g)	0				0	1000	*OK*	0	1000	*OK*

2.5.2. General case

As we could see in the previous example, the addition of products which respecting one or more PFC separately does not ensure the sustainability of the PFC on the final product.

In the general case, the main categories of PFC are transmitted from BBF to the mixture (PFC 1, 3 or 6 for example with the BBFs from FERTIMANURE). For example, a product made from materials that can be a PFC 1 will have a strong chance to be in this category too.

On the other hand, the PFCs subcategories are not preserved (case of PFCs 1 and 3): changes in elemental contents mean that the final product can be concentrated in certain elements, causing it to fall outside the minimum and maximum thresholds defined in regulations. For example, adding organic matter in large quantities can change a mineral fertilizer into an organo-mineral or even organic fertilizer.

Thus, within the framework of FERTIMANURE project, given the BBFs authorized PFCs:

- TMFs containing organic fertilizers (NL-DryP) or organic amendments (NL-SC, ES-DSC, DE-BC, FR-BC), even if they include other mineral materials, will have a good chance of remaining in organic PFC subclasses (PFC1.A or 3.A) (unless the mixture is disproportionate).
- Mixtures incorporating organic fertilizers (NL-DryP) or mineral fertilizers (DE-AP, BE-AN, BE-AW, ES-PA, NL-AS, ES-AM, BE-AS and FR-AS) will have high chance of exceeding the minimum thresholds for fertilizing elements and will therefore be able to claim one or more subcategories of PFC 1.
- Mixtures including BBF ES-AA will all be eligible for PFC 6.B

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3. National regulations

3.1. Dutch regulation

3.1.1. General overview

The Fertilizer Law ("Meststoffenwet") describes the categories of fertilisers. Substances cannot be applied to soil without compliance to the Fertiliser Law The types of fertilizers are found in the **Fertiliser Regulation ("Uitvoeringsregeling Meststoffenwet"):**

1. Fertilisers according to EU laws.
2. Animal manure
3. Sewage sludge
4. Compost
5. Recycled Phosphates ("herwonnen fosfaten")
6. Other Inorganic Fertilisers ("Overige Anorganische Meststoffen") and Other Organic Fertilisers ("Overige Anorganische Meststoffen").

The last category contains lime, but also waste streams that are permitted. The permissions of waste streams to be used as Other (in)organic Fertilisers follows a producer has filed for permission and has provided all necessary data according to a protocol (Commissie Deskundigen Meststoffenwet, 2016[2]). Also, all inputs of digesters, which results in digestate, must file for permission. The permission is given for categories of waste (e.g. grass from verges) of specific producers. All permitted waste streams are published in Annex II ("Bijlage II" van Uitvoeringsregeling meststoffenwet). All fertilisers, depending on the category, always have to comply with the limit values. There are specific limit values for: composts, sewage sludges, and for the Other (in)organic Fertilisers. For the Other Organic Fertilisers there are also limit values for organic contaminants (PAH's, PCB's, dioxines, pesticides). For the composts, sewages sludges, recycled phosphates and Other Inorganic Fertilisers there are only limit values for inorganic contaminants ("Uitvoerinsregeling Meststoffenwet" and "Uitvoeringsbesluit Meststoffenwet"). The limit values for composts and sewage sludges are on the basis of dry material of a product, while the limit values for the recycled phosphates and the Other (in)organic Fertilisers are based on nutrients contents. Importantly: for animal manure no limit values are used. The moment it is digested, the limit values for Other Organic Fertilisers are used because it is assumed that waste streams are also used in the digester.

Based on the Nitrates Directive, all fertilisers can only be used with certain times limits, certain weather, and certain techniques, and there are farmtype- crop- and soil- specific application norms for nitrogen and phosphorus (Fertiliser Law, Decree and Regulation: "Meststoffenwet", "Uitvoerinsregeling Meststoffenwet", "Uitvoeringsbesluit Meststoffenwet", Environmental and Planning Law, Activities Act and Activities Decree: "Omgevingswet", "Activiteitenregeling", "Activiteitenbesluit").

3.1.2. Compliance of FERTIMANURE BBF

If we consider that all the FERTIMANURE BBF are produced in Netherlands (in order to avoid customs regulations which would further complicate the issue), all the BBF which are compliant with European regulation (§2.4.5) can be place on the market.

If European regulation is not considered, Table 9 summarizes the simplest conditions to put each BBF on the Dutch market:

[2] https://www.rvo.nl/sites/default/files/2020/07/Protocol%20beoordeling%20stoffen%20Meststoffenwet.pdf

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Table 9: Ways to put BFF on Dutch market

Origin country	Input manure	BBF	Conditions to be met
	Digestate from cattle slurry	NL-AS	Other Inorganic Fertilisers in UM
		NL-LK	Other Organic Fertilisers in UM
		NL-SC	Other Organic Fertilisers in UM
		NL-WetP	Other Organic Fertilisers in UM
		NL-DryP	Other Organic Fertilisers in UM
	Pig slurry	ES-DSC	Other Organic Fertilisers in UM
		ES-PA	Recycled phosphates
		ES-AM	Other Inorganic Fertilisers in UM
		ES-NC	Other Organic Fertilisers in UM
		ES-AA	Other Inorganic Fertilisers in UM
	Cattle manure	DE-BC	Other Organic Fertilisers in UM
		DE-AP	Recycled phosphates
	Manures + food wastes	BE-AN	Other Inorganic Fertilisers in UM
		BE-AS	Other Inorganic Fertilisers in UM
		BE-AW	Other Inorganic Fertilisers in UM
	Cattle or Poultry manure	FR-BC	Other Organic Fertilisers in UM
	Digestate or Pig slurry	FR-AS	Other Inorganic Fertilisers in UM
	Agricultural digestate	FR-LK	Other Organic Fertilisers in UM
	Pig slurry		

UM: fertiliser Regulation: "Uitvoerinsregeling Meststoffenwet", Other Inorganic Fertilisers: "Overige Anorganische Meststof", Other Organic Fertilisers: "Overige Anorganische Meststof".

3.2. Spanish regulation

3.2.1. General overview

The Spanish Royal Decree on fertilising products (Real Decreto 506/2013, 2013) is the regulation ruling the registration of fertilising products in Spain and thus, it establishes the criteria, labelling requirements of fertilising products allowed to be commercialised in Spain. It specifies and typifies the different marketable fertilising products and requirements for each of them such as physic-chemical characteristics, safety requirements, feedstocks allowed and other specifications. It also regulates the registration of fertilising products and describes its procedure.

The Decree establishes 7 categories (see below) for fertilising products in its Annex I and allows certain biodegradable organic wastes as input materials for fertilisers in its annex IV. Manure (codified as 02.01.06) is included in this list of authorised feedstocks. Each category establishes many sub-categories in which specific criteria are set regarding their feedstock origin, or specific physic-chemical or biological parameters that must be met.

- Group 1. Inorganic fertilisers.
- Group 2. Organic fertilisers.
- Group 3. Organo-mineral fertilisers.
- Group 4. Other fertilizers and special products.
- Group 5. Limestone amendments.
- Group 6. Organic amendments.
- Group 7. Other amendments.

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According to the article 17 of this decree, when any of the wastes typified in the European list of waste it must comply with the established in the Spanish Law 22/2011 of wastes and contaminated soils (already derogated with the new Law on waste and contaminated soils (Ley 7/2022, 2022, p. 7). Considering the abovementioned, the Law 7/2022 establishes any product registered in the market of fertilising products in Spain should have achieved its end-of waste status according to the European fertilising product regulation (EU Reg. 2019/1009).

If a manure-derived BBF is not able to establish the end-of waste status, then it will remain as manure and therefore there are some limitations for their use in agricultural fields. The rules governing that case are established in the Spanish Royal Decree 1051/2022 (Real Decreto 1051/2022, 2022) of sustainable nutrition of soils. The mentioned rule establishes some specific application criteria for such products: authorised application criteria are specified in Annex V (trailing shoe, dribble bar, disc-injector, direct injection. Bury of manure and derived products up to maximum 4 h after application) of the same regulation and it limits the manure-derived products' application periods to minimum 2 months before harvest and to certain application periods for differing crops, which are more restrictive when edible parts of the crops are fertilised. The rule opens a window for autonomous communities to be more restrictive on application. In this sense, Catalan Decree 153/2019 on the management of soil fertilization and animal manure as specific action program in vulnerable areas in relation to nitrate pollution coming from agricultural sources (Decree 153/2019, 2019) establishes more restrictive application periods and organic nitrogen application limits according to the targeted crop and type of exploitation (dry or irrigated agricultural systems).

3.2.2. Compliance of FERTIMANURE BBF

If we consider that all the FERTIMANURE BBF are produced in Spain (in order to avoid customs regulations which would further complicate the issue), all the BBF which are compliant with European regulation (§2.4.5) can be place on the market.

If European regulation is not considered, the Spanish Royal Decree 506/2013 regulation already categorize several products according to their agronomic function. However, due to their complexity and origin, some of the BBFs obtained are difficult to categorize. Table 10 summarizes the simplest conditions to put each BBF on the Spanish market.

The complexity of the Spanish rule on fertilizing product categories makes difficult to establish one category for recovered BBFs.

There are several FERTIMANURE BBFs that could fit as inorganic fertilisers (Group 1) according to the Spanish regulation.

Ammonium sulphate products **(NL- AS, ES-AS, BE-AS, FR-AS)** could fit in the category **1.1.1.10 Ammonium thiosulphate solution**. The description given for this product is "a product obtained by chemical means whose essential component is ammonium thiosulfate". It is uncertain if this category would accept stripped nitrogen. It stablishes a minimum nitrogen content of 10% in ammoniacal form and 54% of SO3 soluble in water in which 90% would be present in the form of thiosulfate. Considering the characteristics of the ammonium sulphate BBFs obtained in FERTIMANURE (up to >7% of N content), concentration of nitrogen content (up to 10%) would be required before their registration as marketable product in Spain.

Ammonium water (BE-AW) could be categorized as **1.1.1.01 Nitrogenated inorganic fertiliser: Ammoniacal solution**. The product could fit according to the description provided: "Product obtained by chemical means whose essential component is ammonia in water". According to its requirements, this product requires 20% of N content, in ammoniacal form. The average N content of BE-AW obtained (up to 15% in ammoniacal form) would not be enough to be categorized as such and a concentration process would be required.

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Table 10: Ways to put BFF on Spanish market

Origin country	Input manure	BBF	Product category referring to the Spanish Royal Decree 506/2013 on fertilising products
	Digestate from cattle slurry	NL-AS	1.1.1.10 Ammonium thiosulphate solution
		NL-LK	3.7.01 liquid organo-mineral NK fertiliser
		NL-SC	6.01b Humic organic amendment from animal or plant origin
		NL-WetP	2.3.01 solid NPK Organic fertiliser of animal origin
		NL-DryP	2.3.01 solid NPK Organic fertiliser of animal origin
	Pig slurry	ES-DSC	6.01b Humic organic amendment from animal or plant origin
		ES-PA	Not allowed
		ES-AS	1.1.1.10 Ammonium thiosulphate solution
		ES-NC	6.01b Humic organic amendment from animal or plant origin
		ES-AA	4.01 Aminoacids
	Cattle manure	DE-BC	6.01b Humic organic amendment from animal or plant origin
		DE-AP	1.4.2.2 Compound solid inorganic fertilisers with primary nutrient elements: NP fertilisers
	Manures + food wastes	BE-AN	1.4.1.1.4 Simple inorganic fertilisers with primary macronutrient as nitrogen: ammonium nitrate
		BE-AS	1.1.1.10 Ammonium thiosulphate solution
		BE-AW	1.1.1.01 Nitrogenated inorganic fertiliser: Ammoniacal solution
	Cattle or Poultry manure	FR-BC	6.01b Humic organic amendment from animal or plant origin
	Digestate or Pig slurry	FR-AS	1.1.1.10 Ammonium thiosulphate solution
	Agricultural digestate	FR-LK	3.7.01 liquid organo-mineral NK fertiliser
	Pig slurry		

Ammonium nitrate (BE-AN) could fit as **1.4.1.1.4 Simple inorganic fertilisers with primary macronutrient as nitrogen: ammonium nitrate**. This product is described as "Product obtained chemically and that contains as components essential ammonium nitrate and ammonium sulphate". It is uncertain if this category would accept stripped nitrogen. This category establishes as requirement a minimum N content of 25% expressed as ammoniacal and nitric nitrogen and a minimum content of nitric nitrogen of a 5%.

Monoammonium phosphate product (DE-AP) could fit in the category of **compound inorganic fertilisers with primary nutrients, as 1.4.2.2 NP fertilisers**. However, according to the product description provided "Product obtained chemically or by mixture, without incorporation of organic matter of animal or plant origin" it is uncertain if chemical recovery from off gases in TCR reactor could fit in this category. The minimum nutrient content of this category is established as 18% as a sum of nitrogen and phosphorus (expressed as P_2O_5) plus a minimum content of 3% of N and 5% of P_2O_5.

Finally, **phosphorus rich ash** obtained from the combustion of biodried product (**ES-PA**) could not be categorised as such according to the Spanish regulation.

Only 2 FERTIMANURE BBFs could fit as organic fertilisers (group 2) considering their nutrient contents. **Wet and Dry phosphorus rich fertilisers (NL-WetP and NL-DryP)** derived from the liquid digestate after settling could be regarded as **2.3.01 solid NPK Organic fertiliser of animal origin or 2.3.02 solid NPK Organic fertiliser of animal and vegetal origin** if feeding regime of anaerobic digestor is considered. The products fit with the definition provided "Solid product obtained by excrement treatment animals and/or other materials organic animals mixed with vegetable organic matter". This product requires a minimum content of 4% as a

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sum of nitrogen, phosphorus (expressed as P_2O_5) and potassium (expressed as K_2O) and a minimum content of 1% for each nutrient. Finally, the maximum C/N ratio for these products is of 15. Considering their characteristics, only the dried P product could meet the criteria established, while the wet product could be used as an organic amendment, although it is uncertain if it would be categorized as solid or liquid product considering its sludge-like consistency.

2 FERTIMANURE BBFs could be identified as organo-mineral fertilisers (Group 3) according to the Spanish regulation: **Liquid K-rich fertilisers** obtained after stripping processes of nitrogen (**NL-LK and FR-LK**) and the **nutrient rich concentrate (ES-NC)** obtained after the freeze concentration of the retentates obtained in membrane systems treating the liquid fraction of pig slurry. They could specifically fit as 3.7 NK liquid organo-mineral fertilisers. However, the description establishes this product to be a "Product in solution or in suspension from a mixture or combination of materials or organic fertilizers and fertilizers minerals" and therefore, the origin of FERTIMANURE BBFs might not be accepted as they are produced as a remaining by-product from nitrogen stripping of nutrient rich effluents. In any case, the minimum nutrient content of such category is established as 6% of nutrients as a sum of nitrogen and potassium (expressed as K_2O), and minimum 2% content each and minimum 1% organic nitrogen. Additionally, minimum 4% of organic carbon is required. Neither of the **liquid K fertilisers (NL-LK or FR-LK)** or **nutrient rich concentrate (ES-NC)** reaches the minimum nutrient or organic carbon content and therefore, they do not meet the requirements to be categorised as organo-mineral fertiliser according to the Spanish regulation. A further concentration step as evaporation or directly drying of the products could be needed to obtain a marketable product according to this national regulation.

The **aminoacid-based biostimulant (ES-AA)** could be categorized as **4.01 Aminoacids** according to the Spanish regulation. The description of this category requires free aminoacids obtained via authorised processes: protein hydrolysis; synthesis, fermentation. According to the requirements in this category, the minimum content of free aminoacids should be of 6% and origin of the aminoacids should be declared. The content of free aminoacids in FERTIMANURE BBFS **ES-AA** does not reach the minimum required and therefore it should be concentrated to be regarded as such.

Finally, there are several BBFs that could be regarded as organic amendments: **soil conditioner** from cattle digestate **(NL-SC)**, biodried solid fraction as **organic amendment (ES-DSC)** and **biochar** from different origins **(DE-BC and FR-BC)**. Digestate, biochar or biodried products are not recognised as such in the Spanish regulation although there are some other categories such as composts from different origin or humic organic amendments that could be similar in some cases. The three products could fit as **6.01b humic organic amendment from animal or plant origin** as the only requirement established in the description is their origin as animal or plant source. The required characteristics of this kind of product as established in the regulation are a minimum organic matter content of 25%, sum of the humic and fulvic acids content of minimum 5%, maximum moisture content of 40% and a C/N ratio below 20. **Soil conditioner (NL-SC)** is obtained from the solid fraction of digestate of cattle manure, and therefore, its organic matter content is quite low, not reaching the minimum content required for the category identified. Additionally, this product is obtained after a simple solid/liquid separation of digestate and therefore, its moisture content is too dry. Considering those limitations a drying step would be needed. All **biochars (DE-BC and FR-BC)** meet the requirement of organic matter and moisture content. However, their C/N ratio meets the requirement mainly depending on their origin. Only biochar from poultry manure presents a C/N ratio below 20, probably due to the high content on N of the original feedstock. Finally, only the **organic amendment (ES-DSC)** derived from poultry manure meets the requirements established for organic matter, moisture content and C/N while the one derived from the solid fraction of pig slurry still presents too high moisture content and a C/N ratio slightly higher than 20. The extraction of humic substances has not been performed in any of the products mentioned as it is not required in the European Regulation. These parameters should be assessed for those that could be potentially accepted in this category (**FR-BC** and **ES-DSC** from biochar poultry and **NL-SC** and **ES-DSC** from pig slurry after their drying).

It is worth highlighting again that in all the cases, for those BBFs which a potentially fitting category was identified and for those which was not, first the establishment of the end-of-waste status is required. This end-

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of-waste status is done according to the Spanish regulation on waste and contaminated soils (Ley 7/2022, 2022) which involves the requirements stated in the European Fertilising Product Regulation (Regulation (EU) 2019/1009, 2019). Even though, the Spanish regulation establishes a high variety of different types of products, for those products derived from biodegradable organic materials, limitation to what is stated in the European Regulation is found.

3.3. French regulation

3.3.1. General overview

The marketing of fertiliser materials in France is governed by the rural code. In principle, all fertilising materials must obtain marketing authorisation provided by ANSES (Agence Nationale de Sécurité Sanitaire). There are several possible exemptions to simplify obtaining marketing authorisation:

- The products comply with European regulation.
- The products comply with a French standard made compulsory by a decree published in the Official Journal.
- The products comply with national specifications approved by regulation guaranteeing their effectiveness and safety.
- The products are natural substances for biostimulating use (special procedure provided for in the 2nd paragraph of article L253-1 of the rural and maritime fishing code (Code rural, article L253-1, 2024).
- The products are waste, residues or effluents from installations defined by the environmental code and whose evacuation or discharge on agricultural land as fertilizing materials is the subject of a spreading plan.
- The products are raw organic materials or growing media of natural origin, obtained from natural materials without chemical treatment and which constitute by-products of an agricultural operation or a non-agricultural livestock establishment or maintenance of animals when they are transferred directly by the operator or the person in charge of the establishment.

The exemptions cited above are established in French regulatory which define the criteria and eligibility requirements necessary to be in compliance with these texts and to be able to benefit from the possibility of placing on the market without prior authorization

3.3.2. Compliance of FERTIMANURE BBF

If we consider that all the FERTIMANURE BBF are produced in France (in order to avoid customs regulations which would further complicate the issue), all the BBF which are compliant with European regulation (§2.4.5) can be place on the market.

If European regulation is not considered, Table 11 summarizes the simplest conditions to put each BBF on the French market.

French regulations are quite flexible on the marketing of agricultural materials. Generally, the marketing application becomes necessary if the product contains household bio-waste, food industry waste or wastewater from plant sludge.

Most BBFs already meet the general conditions of French standards (NF U 44-051 for organic amendments (AFNOR, 2019), NF U 42-001 for fertilizers (AFNOR, 2011, 2020a, 2020b)). NL-LK and FR-LK, as agricultural digestate are also fall within the conditions of use of the specifications put in place for the marketing of agricultural digestates.

The only exceptions at present are biochars FR-BC and DE-BC, not currently taken into account in French regulations (but currently changing), as well as the biostimulant ES-AA, for the same reasons.

Be careful however, here are listed the possible routes for the marketing of each BFF in France according to the laws and standards in force, but it remains to be verified for each BFF some analysis (nutrient content,

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hether it meets the requirements in terms of basic analyzes regulatory (differ depending on the standard or text of law concerned).

An analysis was carried out to compare each BBF with the requirements of each of the regulations or standards concerned. The details of this comparison are provided in Appendix 3. Most BBFs are in accordance with the regulations. Only NL-WetP, ES-DSC, ES-PA, ES-AM and ES-NC are non-compliant. The problem of NL-WP, ES-PA, ES-AM and ES-NC is a too low fertilizing element concentration. ES-DSC and ES-NC are contaminated with TM (Zinc and cadmium). It was already a problem at European level.

Table 11: Ways to put BFF on French market

Origin country	Input manure	BBF	Conditions to be met
	Digestate from cattle slurry	NL-AS	Standard (NF U 42-001-1: Mineral fertiliser)
		NL-LK	National specification (CDC Dig)
		NL-SC	Standard (NF U 44-051: Organic amendment), type 1 or 2
		NL-WetP	Standard (NF U 44-051: Organic amendment), type 1 or 2
		NL-DryP	Standard (NF U 44-051: Organic amendment), type 1 or 2
	Pig slurry	ES-DSC	Standard (NF U 44-051: Organic amendment), type 1 or 2
		ES-PA	Standard (NF U 42-001-1: Mineral fertiliser)
		ES-AM	Standard (NF U 42-001-1: Mineral fertiliser)
		ES-NC	Standard (NF U 44-051: Organic amendment), type 1 or 2
		ES-AA	Mandatory marketing application
	Cattle manure	DE-BC	Mandatory marketing application
		DE-AP	Standard (NF U 42-001-1: Mineral fertiliser)
	Manures + food wastes	BE-AN	Standard (NF U 42-001-1: Mineral fertiliser)
		BE-AS	Standard (NF U 42-001-1: Mineral fertiliser)
		BE-AW	Standard (NF U 42-001-1: Mineral fertiliser)
	Cattle or Poultry manure	FR-BC	Mandatory marketing application
	Digestate or Pig slurry	FR-AS	Standard (NF U 42-001-1 : Mineral fertiliser)
	Agricultural digestate	FR-LK	National specification (CDC Dig)
	Pig slurry		Standard (NF U 44-051: Organic amendment)

3.4. Argentinian regulation

3.4.1. General overview

In Argentina, the categories of fertilizer materials are defined in the regulations 264/2011 (Resolución 264 / 2011, 2011).

3.4.2. Compliance of FERTIMANURE BBF

If we consider that all the FERTIMANURE BBF are produced in Argentina (in order to avoid customs regulations which would further complicate the issue), Table 12 summarizes the simplest conditions to put each BBF on the Argentinian market:

Table 12: Ways to put BFF on Argentinian market

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Origin country	Input manure	BBF	Conditions to be met
	Digestate from cattle slurry	NL-AS	Resolution 264/2011: liquid chemical product
		NL-LK	Resolution 264/2011: liquid organic product
		NL-SC	Resolution 264/2011: solid organic fertiliser
		NL-WetP	Resolution 264/2011: liquid organic fertiliser
		NL-DryP	Resolution 264/2011: solid organic fertiliser
	Pig slurry	ES-DSC	Resolution 264/2011: solid organic fertiliser
		ES-PA	Resolution 264/2011: chemical powder, or chemical organic fertiliser
		ES-AM	Resolution 264/2011: liquid chemical product
		ES-NC	Resolution 264/2011: solid organic fertiliser
		ES-AA	
	Cattle manure	DE-BC	Resolution 264/2011: solid organic fertiliser
		DE-AP	Resolution 264/2011: chemical product
	Manures + food wastes	BE-AN	Resolution 264/2011: liquid chemical product
		BE-AS	Resolution 264/2011: liquid chemical product
		BE-AW	Resolution 264/2011: liquid chemical product
	Cattle or Poultry manure	FR-BC	Resolution 264/2011: solid organic fertiliser
	Digestate or Pig slurry	FR-AS	Resolution 264/2011: liquid chemical product
	Agricultural digestate	FR-LK	Resolution 264/2011: liquid organic product
	Pig slurry		

Almost all of the BBF are already take into account by Argentinian regulation (except for biostimulant such as ES-AA).

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4. Overall conclusions

The Table 13 regroup all the BBF in their corresponding PFC class.

Table 13: BBF distribution in the different PFC classes

Main PFC	PFC Subclass	Denomination	BBF list
PFC 1: Fertilising products	PFC 1.A.I.(b)	Solid organic NPK fertiliser	NL-DryP
	PFC 1.C.I.a.i.(a)	Straight Solid Inorganic N Fertiliser	BE-AN; BE-AW
		Straight Solid Inorganic P Fertiliser	DE-AP
	PFC 1.C.I.a.ii.(a)	Compound Solid PK Inorganic Fertiliser	ES-PA*
	PFC 1.C.I.b.i.(b)	Straight liquid inorganic NS fertiliser	NL-AS; ES-AM; BE-AS; FR-AS
PFC 3: Soil improvers	PFC 3.A	Organic soil improver	NL-SC*; ES-DSC*; DE-BC; FR-BC
	PFC 3.B	Inorganic soil improver	NL-LK; NL-WetP; ES-NC*; FR-LK*
PFC 6: Biostimulant	PFC 6.B	Non microbial plant biostimulant	ES-AA

** TM or pathogen contamination detected*

Table 14 groups the 18 BBFs according to their compliance with the regulations:

- 6 BBF are already totally compliant with the European regulation,
- 2 may be compliant, but pollutant analyses are missing so we cannot go further,
- 6 other BBFs comply with European regulations if a sanitation step is added to the overall process
- 4 BBF show contamination with TM. The problem should be easily resolved by checking the quality of the raw materials and slightly modifying the processes

Table 14: BBF list and validation of CMC and PFC compliance.

Validation	Concerned BBF	Ratio
Total compliance with European regulation	NL-AS, DE-AP, BE-AN, BE-AS, BE-AW, FR-AS	6/18
Total compliance but pollutant analysis is missing	ES-AM, ES-AA	2/18
PFC compliance, but sanitation process is needed for CMC compliance	NL-LK, NL-SC, NL-WetP, NL-DryP, DE-BC, FR-BC	6/18
Pollutant analysis not compliant with PFC requirements, and sanitation process is needed for CMC compliance	ES-DSC, ES-PA, ES-NC, FR-LK	4/18

4.1. The future of the tool after FERTIMANURE

Although the tool was initially created to meet a need for the FERTIMANURE project, during its creation we realized that it could be useful to a greater purpose, and it could continue to exist beyond the project.

The tool will be update before its final release with the latest version of the RCE 2019/1009 and with national data provided by the project partners (for now Spain and Netherlands). The tool will be available to everyone for free download on the FERTIMANURE website.

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5. Appendix

Appendix 1:CMCs complete checking list

CMC_DRAFT [Details about actual CMC]	Hide wrong CMC	CMC 01 Virgin material substances and mixtures		CMC 02 Plants, plant parts or plant extracts		CMC 03 Compost	
		FALSE		FALSE		FALSE	
RAW MATERIALS SELECTION							
Registered pursuant to Regulation (EC) No 1907/2006 (REACH)	☐	Yes	FALSE	Yes	FALSE		
Plant, plant parts or extracts, algae and mushrooms	☐	No	TRUE	Yes	FALSE	No	TRUE
Wastes (2008/98/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Animal by-products (1069/2009/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Polymers	☐	No	TRUE	No	TRUE	No	TRUE
Food Industry by-products	☐	No	TRUE	No	TRUE	No	TRUE
Compost	☐	No	TRUE	No	TRUE	Yes	FALSE
Digestate	☐	No	TRUE	No	TRUE	No	TRUE
Thermal oxidation materials	☐	No	TRUE				
Pyrolysis and gazeification materials	☐	No	TRUE				
High purity materials	☐						
Organic chelating agent	☐	All yes if presence	TRUE	No	TRUE	No	TRUE
Organic complexing agent	☐	All yes if presence	TRUE	No	TRUE	No	TRUE
Nitrification inhibitor	☐	All yes if presence	TRUE	No	TRUE	No	TRUE
Denitrification inhibitor	☐	All yes if presence	TRUE	No	TRUE	No	TRUE
Urease inhibitor	☐	All yes if presence	TRUE	No	TRUE	No	TRUE
Micro-organisms	☐	No	TRUE	No	TRUE		
		Completed criteria:					

Parameters	Unit		0 / 0			0 / 0			0 / 8		
ELEMENTS AND POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Dry Matter (DM)	(% FM)										
Ratio H / C_{org}	(mol/mol)										
Total organic Carbon	(% FM)										
Total Phosphorus	(% P_2O_5/DM)										
Total Aluminium (Al) + Iron (Fe)	(% DM)										
Chloride (Cl-)	(g/kg DM)										
Cl- is needed to produce alkali salts (declared in accordance with annex III)	(Yes/No)										
Composting or digestion additives	(% FM)								0	5	ND
Total Chromium (Cr)	(mg/kg DM)										
Total Thallium (Tl)	(mg/kg DM)										
Total Vanadium (V)	(mg/kg DM)										
Sum 16 PAH	(mg/kg DM)								0	6	ND
Formaldehyde	(ppm)										
WHO-TEQ (2005) PCDD/F	(ng/kg DM)										
MICROORGANISMS											
Salmonella	(MPN/25 g FM)										
Enterococci (faecal streptococci)	(MPN/g FM)										
E.coli (faecal coliform germs)	(MPN/g FM)										
Clostridium perfringens	(MPN/g FM)										
Ascaris sp. viable eggs	(MPN/25 g FM)										
IMPURITIES											
Glass > 2 mm	(mg/kg DM)								0	3	ND
Stones > 2 mm	(mg/kg DM)										
Metal > 2 mm	(mg/kg DM)								0	3	ND
Organic Matter > 2 mm	(mg/kg DM)										
Plastics > 2 mm	(mg/kg DM)								0	3	ND
Sum of impurities > 2 mm	(mg/kg DM)								0	5	ND
BIOLOGICAL TESTS											
Oxygen Uptake Rate	(mmol O2/kg OM/h)								25	10000	ND
Rottegrad test	(Maturity level)								3	5	ND
Residual biogas potential	(L biogas/g volatile solids)										
Plant growth acute toxicity test	(% germination)										
Earthworm acute toxicity test	(% mortality)										
Nitrification inhibition test with soil micro-organisms	(% nitrification)										

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CMC_DRAFT [Details about actual CMC]	Hide wrong CMC	CMC 04 Fresh crop digestate		CMC 05 Digestate other than fresh crop digestate		CMC 06 Food industry by-products	
		FALSE		FALSE		FALSE	
RAW MATERIALS SELECTION							
Registered pursuant to Regulation (EC) No 1907/2006 (REACH)	☐					Yes	FALSE
Plant, plant parts or extracts, algae and mushrooms	☐	No	TRUE	No	TRUE	Yes (optionnal)	
Wastes (2008/98/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Animal by-products (1069/2009/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Polymers	☐	No	TRUE	No	TRUE	No	TRUE
Food Industry by-products	☐	No	TRUE	No	TRUE	Yes	FALSE
Compost	☐	No	TRUE	No	TRUE	No	TRUE
Digestate	☐	Yes	FALSE	Yes	FALSE	No	TRUE
Thermal oxidation materials	☐						
Pyrolysis and gazeification materials	☐						
High purity materials	☐						
Organic chelating agent	☐	No	TRUE	No	TRUE	No	TRUE
Organic complexing agent	☐	No	TRUE	No	TRUE	No	TRUE
Nitrification inhibitor	☐	No	TRUE	No	TRUE	No	TRUE
Denitrification inhibitor	☐	No	TRUE	No	TRUE	No	TRUE
Urease inhibitor	☐	No	TRUE	No	TRUE	No	TRUE
Micro-organisms	☐						

Parameters	Unit		0 / 3			0 / 8			0 / 0		
ELEMENTS AND POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Dry Matter (DM)	(% FM)										
Ratio H / C_{org}	(mol/mol)										
Total organic Carbon	(% FM)										
Total Phosphorus	(% P_2O_5/DM)										
Total Aluminium (Al) + Iron (Fe)	(% DM)										
Chloride (Cl-)	(g/kg DM)										
Cl- is needed to produce alkali salts (declared in accordance with annex III)	(Yes/No)										
Composting or digestion additives	(% FM)		0	5	ND	0	5	ND			
Total Chromium (Cr)	(mg/kg DM)										
Total Thallium (Tl)	(mg/kg DM)										
Total Vanadium (V)	(mg/kg DM)										
Sum 16 PAH	(mg/kg DM)					0	6	ND			
Formaldehyde	(ppm)										
WHO-TEQ (2005) PCDD/F	(ng/kg DM)										
MICROORGANISMS											
Salmonella	(MPN/25 g FM)										
Enterococci (faecal streptococci)	(MPN/g FM)										
E.coli (faecal coliform germs)	(MPN/g FM)										
Clostridium perfringens	(MPN/g FM)										
Ascaris sp. viable eggs	(MPN/25 g FM)										
IMPURITIES											
Glass > 2 mm	(mg/kg DM)					0	3	ND			
Stones > 2 mm	(mg/kg DM)										
Metal > 2 mm	(mg/kg DM)					0	3	ND			
Organic Matter > 2 mm	(mg/kg DM)										
Plastics > 2 mm	(mg/kg DM)					0	3	ND			
Sum of impurities > 2 mm	(mg/kg DM)					0	5	ND			
BIOLOGICAL TESTS											
Oxygen Uptake Rate	(mmol O2/kg OM/h)		25	10000	ND	25	10000	ND			
Rottegrad test	(Maturity level)										
Residual biogas potential	(L biogas/g volatile solids)		0,25	1000	ND	0,25	1000	ND			
Plant growth acute toxicity test	(% germination)										
Earthworm acute toxicity test	(% mortality)										
Nitrification inhibition test with soil micro-organisms	(% nitrification)										

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CMC_DRAFT [Details about actual CMC]	Hide wrong CMC	CMC 07 Micro-organisms		CMC 08 Nutrient polymers		CMC 09 Polymers other than nutrient polymers	
		FALSE		FALSE		FALSE	
RAW MATERIALS SELECTION							
Registered pursuant to Regulation (EC) No 1907/2006 (REACH)	☐			Yes	FALSE		
Plant, plant parts or extracts, algae and mushrooms	☐			No	TRUE		
Wastes (2008/98/EC)	☐			No	TRUE		
Animal by-products (1069/2009/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Polymers	☐			Yes	FALSE	Yes	FALSE
Food Industry by-products	☐			No	TRUE		
Compost	☐			No	TRUE		
Digestate	☐			No	TRUE		
Thermal oxidation materials	☐						
Pyrolysis and gazeification materials	☐						
High purity materials	☐						
Organic chelating agent	☐						
Organic complexing agent	☐						
Nitrification inhibitor	☐						
Denitrification inhibitor	☐						
Urease inhibitor	☐						
Micro-organisms	☐	Yes	FALSE				

Parameters	Unit		0 / 0			0 / 1			0 / 3		
ELEMENTS AND POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Dry Matter (DM)	(% FM)										
Ratio H / C_{org}	(mol/mol)										
Total organic Carbon	(% FM)										
Total Phosphorus	(% P_2O_5/DM)										
Total Aluminium (Al) + Iron (Fe)	(% DM)										
Chloride (Cl-)	(g/kg DM)										
Cl- is needed to produce alkali salts (declared in accordance with annex III)	(Yes/No)										
Composting or digestion additives	(% FM)										
Total Chromium (Cr)	(mg/kg DM)										
Total Thallium (Tl)	(mg/kg DM)										
Total Vanadium (V)	(mg/kg DM)										
Sum 16 PAH	(mg/kg DM)										
Formaldehyde	(ppm)					0	600	ND			
WHO-TEQ (2005) PCDD/F	(ng/kg DM)										
MICROORGANISMS											
Salmonella	(MPN/25 g FM)										
Enterococci (faecal streptococci)	(MPN/g FM)										
E.coli (faecal coliform germs)	(MPN/g FM)										
Clostridium perfringens	(MPN/g FM)										
Ascaris sp. viable eggs	(MPN/25 g FM)										
IMPURITIES											
Glass > 2 mm	(mg/kg DM)										
Stones > 2 mm	(mg/kg DM)										
Metal > 2 mm	(mg/kg DM)										
Organic Matter > 2 mm	(mg/kg DM)										
Plastics > 2 mm	(mg/kg DM)										
Sum of impurities > 2 mm	(mg/kg DM)										
BIOLOGICAL TESTS											
Oxygen Uptake Rate	(mmol O2/kg OM/h)										
Rottegrad test	(Maturity level)										
Residual biogas potential	(L biogas/g volatile solids)										
Plant growth acute toxicity test	(% germination)								90	100	ND
Earthworm acute toxicity test	(% mortality)								0	10	ND
Nitrification inhibition test with soil micro-organisms	(% nitrification)								90	100	ND

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FERTIMANURE

CMC_DRAFT [Details about actual CMC]	Hide wrong CMC	CMC 10 Derived products within the meaning of Regulation (EC)		CMC 11 By-products within the meaning of Directive		CMC 12 Precipitated phosphate salts and derivates	
		FALSE		FALSE		FALSE	
RAW MATERIALS SELECTION							
Registered pursuant to Regulation (EC) No 1907/2006 (REACH)	☐			Yes	FALSE	Yes	FALSE
Plant, plant parts or extracts, algae and mushrooms	☐						
Wastes (2008/98/EC)	☐			Yes	FALSE		
Animal by-products (1069/2009/EC)	☐	Yes	FALSE	No	TRUE	No	TRUE
Polymers	☐			No	TRUE		
Food Industry by-products	☐						
Compost	☐			No	TRUE		
Digestate	☐			No	TRUE		
Thermal oxidation materials	☐			No	TRUE		
Pyrolysis and gazeification materials	☐			No	TRUE		
High purity materials	☐						
Organic chelating agent	☐						
Organic complexing agent	☐						
Nitrification inhibitor	☐						
Denitrification inhibitor	☐						
Urease inhibitor	☐						
Micro-organisms	☐						

Parameters	Unit		0 / 0			0 / 0			3 / 14		
ELEMENTS AND POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Dry Matter (DM)	(% FM)										
Ratio H / C_{org}	(mol/mol)										
Total organic Carbon	(% FM)								0	3	ND
Total Phosphorus	(% P_2O_5/DM)								16	100	ND
Total Aluminium (Al) + Iron (Fe)	(% DM)								0	10	ND
Chloride (Cl-)	(g/kg DM)										
Cl- is needed to produce alkali salts (declared in accordance with annex III)	(Yes/No)										
Composting or digestion additives	(% FM)										
Total Chromium (Cr)	(mg/kg DM)										
Total Thallium (Tl)	(mg/kg DM)										
Total Vanadium (V)	(mg/kg DM)										
Sum 16 PAH	(mg/kg DM)								0	6	
Formaldehyde	(ppm)										
WHO-TEQ (2005) PCDD/F	(ng/kg DM)										
MICROORGANISMS											
Salmonella	(MPN/25 g FM)								0	0	ND
Enterococci (faecal streptococci)	(MPN/g FM)								0	1000	ND
E.coli (faecal coliform germs)	(MPN/g FM)										
Clostridium perfringens	(MPN/g FM)								0	100	
Ascaris sp. viable eggs	(MPN/25 g FM)								0	0	
IMPURITIES											
Glass > 2 mm	(mg/kg DM)								0	3	ND
Stones > 2 mm	(mg/kg DM)								0	3	ND
Metal > 2 mm	(mg/kg DM)								0	3	ND
Organic Matter > 2 mm	(mg/kg DM)								0	3	ND
Plastics > 2 mm	(mg/kg DM)								0	3	ND
Sum of impurities > 2 mm	(mg/kg DM)								0	5	ND
BIOLOGICAL TESTS											
Oxygen Uptake Rate	(mmol O2/kg OM/h)										
Rottegrad test	(Maturity level)										
Residual biogas potential	(L biogas/g volatile solids)										
Plant growth acute toxicity test	(% germination)										
Earthworm acute toxicity test	(% mortality)										
Nitrification inhibition test with soil micro-organisms	(% nitrification)										

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FERTIMANURE

CMC_DRAFT [Details about actual CMC]	Hide wrong CMC	CMC 13 Thermal oxidation materials and derivates		CMC 14 Pyrolysis and gasification materials		CMC 15 Recovered high purity materials	
		FALSE		FALSE		FALSE	
RAW MATERIALS SELECTION							
Registered pursuant to Regulation (EC) No 1907/2006 (REACH)	☐	Yes	FALSE	Yes	FALSE	Yes	FALSE
Plant, plant parts or extracts, algae and mushrooms	☐						
Wastes (2008/98/EC)	☐						
Animal by-products (1069/2009/EC)	☐	No	TRUE	No	TRUE	No	TRUE
Polymers	☐						
Food Industry by-products	☐						
Compost	☐						
Digestate	☐						
Thermal oxidation materials	☐	Yes	FALSE				
Pyrolysis and gazeification materials	☐			Yes	FALSE		
High purity materials	☐					Yes	FALSE
Organic chelating agent	☐						
Organic complexing agent	☐						
Nitrification inhibitor	☐						
Denitrification inhibitor	☐						
Urease inhibitor	☐						
Micro-organisms	☐						

Parameters	Unit		1 / 8			1 / 5			1 / 8		
ELEMENTS AND POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Dry Matter (DM)	(% FM)										
Ratio H / C_{org}	(mol/mol)					0	0,7	ND			
Total organic Carbon	(% FM)		0	3	ND				0	0,5	ND
Total Phosphorus	(% P_2O_5/DM)										
Total Aluminium (Al) + Iron (Fe)	(% DM)										
Chloride (Cl-)	(g/kg DM)		0	30	ND	0	30	ND			
Cl- is needed to produce alkali salts (declared in accordance with annex III)	(Yes/No)		Yes			Yes					
Composting or digestion additives	(% FM)										
Total Chromium (Cr)	(mg/kg DM)		0	400	ND				0	400	ND
Total Thallium (Tl)	(mg/kg DM)		0	2	ND	0	2	ND	0	2	ND
Total Vanadium (V)	(mg/kg DM)		0	600	ND						
Sum 16 PAH	(mg/kg DM)		0	6	ND				0	6	ND
Formaldehyde	(ppm)										
WHO-TEQ (2005) PCDD/F	(ng/kg DM)		0	20	ND	0	20	ND	0	20	ND
MICROORGANISMS											
Salmonella	(MPN/25 g FM)								0	0	ND
Enterococci (faecal streptococci)	(MPN/g FM)								0	1000	ND
E.coli (faecal coliform germs)	(MPN/g FM)								0	1000	
Clostridium perfringens	(MPN/g FM)										
Ascaris sp. viable eggs	(MPN/25 g FM)										
IMPURITIES											
Glass > 2 mm	(mg/kg DM)										
Stones > 2 mm	(mg/kg DM)										
Metal > 2 mm	(mg/kg DM)										
Organic Matter > 2 mm	(mg/kg DM)										
Plastics > 2 mm	(mg/kg DM)										
Sum of impurities > 2 mm	(mg/kg DM)										
BIOLOGICAL TESTS											
Oxygen Uptake Rate	(mmol O2/kg OM/h)										
Rottegrad test	(Maturity level)										
Residual biogas potential	(L biogas/g volatile solids)										
Plant growth acute toxicity test	(% germination)										
Earthworm acute toxicity test	(% mortality)										
Nitrification inhibition test with soil micro-organisms	(% nitrification)										

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Appendix 2: PFCs complete checking list

			1.A. ORGANIC FERTILISER											
			1.A.I. SOLID ORGANIC FERTILISER						1.A.II. LIQUID ORGANIC FERTILISER					
			1.A.I.(a) Solid Organic Fertiliser			1.A.I.(b) Solid Organic Fertiliser			1.A.II.(a) Liquid Organic Fertiliser			1.A.II.(b) Liquid Organic Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	All biological origin matter + peat, loenardite or lignite ONLY			All biological origin matter + peat, loenardite or lignite ONLY			All biological origin matter + peat, loenardite or lignite ONLY			All biological origin matter + peat, loenardite or lignite ONLY		
PROPORTION	**% w/w**	**0%**												
CLAIMED FUNCTION														
Fertiliser	(double clic to select)	☐	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE
Liming materials	(double clic to select)	☐												
Soil improver	(double clic to select)	☐												
Growing medium	(double clic to select)	☐												
Inhibitor	(double clic to select)	☐												
Plant biostimulant	(double clic to select)	☐												
GENERALITIES			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Form	Solid/Liquid	Solid	Solid		TRUE	Solid		TRUE	Liquid		FALSE	Liquid		FALSE
Dry matter (%DM)	% RM	0												
Organic matter (%OM)	% RM	0												
Organic Carbon (%Corg)	% RM	0	15	100	FALSE	15	100	FALSE	5	100	FALSE	5	100	FALSE
NUTRIENTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Total Nitrogen (N)	% RM	0,00	2,5	100	FALSE	1	100	FALSE	2	100	FALSE	1	100	FALSE
Total Phosphorus pentoxide (P2O5)	% RM	0,00	2	100	FALSE	1	100	FALSE	1	100	FALSE	1	100	FALSE
Total Potassium oxide (K2O)	% RM	0,00	2	100	FALSE	1	100	FALSE	2	100	FALSE	1	100	FALSE
Ammonia (NH4)	% RM	0,00												
Nitrate (NO3)	% RM	0,00												
Organic Nitrogen	% RM	0,00												
Total Magnesium (MgO)	% RM	0,00												
Total Calcium (CaO)	% RM	0,00												
Total Sulphur (SO3)	% RM	0,00												
Total Sodium (Na2O)	% RM	0,00												
Total Boron (B)	% RM	0,00												
Total Cobalt (Co)	% RM	0,00												
Total Copper (Cu)	% RM	0,00												
Total Iron (Fe)	% RM	0,00												
Total Manganese (Mn)	% RM	0,00												
Total Molybdenum (Mo)	% RM	0,00												
Total Zinc (Zn)	% RM	0,00												
Microelements in oxide or hydroxid form	yes/no	No												
Part of chelated micronutrient	% Micronutrient	0,00												
Part of complexed micronutrient	% Micronutrient	0,00												
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***				4	100	FALSE				3	100	FALSE
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***												
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***												

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			1.A.I.(a) Solid Organic Fertiliser			1.A.I.(b) Solid Organic Fertiliser			1.A.II.(a) Liquid Organic Fertiliser			1.A.II.(b) Liquid Organic Fertiliser		
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	mg/kg DM		0	1,5	FALSE	0	1,5	FALSE	0	1,5	FALSE	0	1,5	FALSE
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	2	FALSE	0	2	FALSE
Mercury (Hg)	mg/kg DM		0	1	FALSE	0	1	FALSE	0	1	FALSE	0	1	FALSE
Nickel (Ni)	mg/kg DM		0	50	FALSE	0	50	FALSE	0	50	FALSE	0	50	FALSE
Lead (Pb)	mg/kg DM		0	120	FALSE	0	120	FALSE	0	120	FALSE	0	120	FALSE
Inorganic Arsenic (As inorg.)	mg/kg DM		0	40	FALSE	0	40	FALSE	0	40	FALSE	0	40	FALSE
Total Arsenic (As)	mg/kg DM													
Copper (Cu)	mg/kg DM		0	300	FALSE	0	300	FALSE	0	300	FALSE	0	300	FALSE
Zinc (Zn)	mg/kg DM		0	800	FALSE	0	800	FALSE	0	800	FALSE	0	800	FALSE
Biuret (C2H5N3O2)	g/kg DM		0	0	FALSE	0	0	FALSE	0	0	FALSE	0	0	FALSE
Perchlorate (ClO4)	mg/kg DM													
As/Micronutr.	*mg/kg Micronutr.*													
Cd/P2O5	*mg/kg P2O5*													
Cd/Micronutr.	*mg/kg Micronutr.*													
Pb/Micronutr.	*mg/kg Micronutr.*													
Hg/Micronutr.	*mg/kg Micronutr.*													
Ni/Micronutr.	*mg/kg Micronutr.*													
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp.	CFU/25 g		0	0	FALSE	0	0	FALSE	0	0	FALSE	0	0	FALSE
Escherichia coli	CFU/1 g		0	1000	FALSE	0	1000	FALSE	0	1000	FALSE	0	1000	FALSE
Enterococcae	CFU/1 g		0	1000		0	1000		0	1000		0	1000	
Listeria monocytogenes	CFU/25 g													
Vibrio spp	CFU/25 g													
Shigella spp	CFU/25 g													
Staphylococcus aureus	CFU/25 g													
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g													
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g													
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE
Nitrogen from NH4NO3	% RM	0,00												
1 mm grain size proportion	% RM	0,00												
Neutralising value (equivalent CaO)	-	0,00												
Neutralising value (equivalent HO-)	-	0,00												
Reactivity (hydrochloric test)	%	0,00												
Reactivity (6 month incubation test)	%	0,00												
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00												
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00												
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00												

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			1.B. ORGANO-MINERAL FERTILISER											
			1.B.I. SOLID ORGANO-MINERAL FERTILISER						1.A.II. LIQUID ORGANO-MINERAL FERTILISER					
			1.B.I.(a) Solid Organo-Mineral Fertiliser			1.B.I.(b) Solid Organo-Mineral Fertiliser			1.B.II.(a) Liquid Organo-Mineral Fertiliser			1.B.II.(b) Liquid Organo-Mineral Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	Mineral fertiliser (PFC 1.C), all biological origin matter + peat, loenardite or lignite ONLY			Mineral fertiliser (PFC 1.C), all biological origin matter + peat, loenardite or lignite ONLY			Mineral fertiliser (PFC 1.C), all biological origin matter + peat, loenardite or lignite ONLY			Mineral fertiliser (PFC 1.C), all biological origin matter + peat, loenardite or lignite ONLY		
PROPORTION	**% w/w**	**0%**												
CLAIMED FUNCTION														
Fertiliser	(double clic to select)	☐	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE
Liming materials	(double clic to select)	☐												
Soil improver	(double clic to select)	☐												
Growing medium	(double clic to select)	☐												
Inhibitor	(double clic to select)	☐												
Plant biostimulant	(double clic to select)	☐												
GENERALITIES			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Form	Solid/Liquid	Solid	Solid		TRUE	Solid		TRUE	Liquid		FALSE	Liquid		FALSE
Dry matter (%DM)	% RM	0												
Organic matter (%OM)	% RM	0												
Organic Carbon (%Corg)	% RM	0	7,5	100	FALSE	7,5	100	FALSE	3	100	FALSE	3	100	FALSE
NUTRIENTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Total Nitrogen (N)	% RM	0,00	2,5	100	FALSE	2	100	FALSE	2	100	FALSE	2	100	FALSE
Total Phosphorus pentoxide (P2O5)	% RM	0,00	2	100	FALSE	2	100	FALSE	2	100	FALSE	2	100	FALSE
Total Potassium oxide (K2O)	% RM	0,00	2	100	FALSE	2	100	FALSE	2	100	FALSE	2	100	FALSE
Ammonia (NH4)	% RM	0,00												
Nitrate (NO3)	% RM	0,00												
Organic Nitrogen	% RM	0,00	1	100	FALSE	0,5	100	TRUE	0,5	100	FALSE	0,5	100	TRUE
Total Magnesium (MgO)	% RM	0,00												
Total Calcium (CaO)	% RM	0,00												
Total Sulphur (SO3)	% RM	0,00												
Total Sodium (Na2O)	% RM	0,00												
Total Boron (B)	% RM	0,00												
Total Cobalt (Co)	% RM	0,00												
Total Copper (Cu)	% RM	0,00												
Total Iron (Fe)	% RM	0,00												
Total Manganese (Mn)	% RM	0,00												
Total Molybdenum (Mo)	% RM	0,00												
Total Zinc (Zn)	% RM	0,00												
Microelements in oxide or hydroxid form	yes/no	No												
Part of chelated micronutrient	% Micronutrient	0,00												
Part of complexed micronutrient	% Micronutrient	0,00												
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***				8	100	FALSE				6	100	FALSE
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***												
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***												

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			1.B.I.(a) Solid Organo-Mineral Fertiliser			1.B.I.(b) Solid Organo-Mineral Fertiliser			1.B.II.(a) Liquid Organo-Mineral Fertiliser			1.B.II.(b) Liquid Organo-Mineral Fertiliser		
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	mg/kg DM		0	3	FALSE	0	3	FALSE	0	3	FALSE	0	3	FALSE
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	2	FALSE	0	2	FALSE
Mercury (Hg)	mg/kg DM		0	1	FALSE	0	1	FALSE	0	1	FALSE	0	1	FALSE
Nickel (Ni)	mg/kg DM		0	50	FALSE	0	50	FALSE	0	50	FALSE	0	50	FALSE
Lead (Pb)	mg/kg DM		0	120	FALSE	0	120	FALSE	0	120	FALSE	0	120	FALSE
Inorganic Arsenic (As inorg.)	mg/kg DM		0	40	FALSE	0	40	FALSE	0	40	FALSE	0	40	FALSE
Total Arsenic (As)	mg/kg DM													
Copper (Cu)	mg/kg DM		0	600	FALSE	0	600	FALSE	0	600	FALSE	0	600	FALSE
Zinc (Zn)	mg/kg DM		0	1500	FALSE	0	1500	FALSE	0	1500	FALSE	0	1500	FALSE
Biuret (C2H5N3O2)	g/kg DM		0	12	FALSE	0	12	FALSE	0	12	FALSE	0	12	FALSE
Perchlorate (ClO4)	mg/kg DM													
As/Micronutr.	*mg/kg Micronutr.*													
Cd/P2O5	*mg/kg P2O5*		0	60	TRUE	0	60	TRUE	0	60	TRUE	0	60	TRUE
Cd/Micronutr.	*mg/kg Micronutr.*													
Pb/Micronutr.	*mg/kg Micronutr.*													
Hg/Micronutr.	*mg/kg Micronutr.*													
Ni/Micronutr.	*mg/kg Micronutr.*													
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp.	CFU/25 g		0	0	FALSE	0	0	FALSE	0	0	FALSE	0	0	FALSE
Escherichia coli	CFU/1 g		0	1000	FALSE	0	1000	FALSE	0	1000	FALSE	0	1000	FALSE
Enterococcae	CFU/1 g		0	1000		0	1000		0	1000		0	1000	
Listeria monocytogenes	CFU/25 g													
Vibrio spp	CFU/25 g													
Shigella spp	CFU/25 g													
Staphylococcus aureus	CFU/25 g													
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g													
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g													
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE
Nitrogen from NH4NO3	% RM	0,00	0	16	TRUE	0	16	TRUE	0	16	TRUE	0	16	TRUE
1 mm grain size proportion	% RM	0,00												
Neutralising value (equivalent CaO)	-	0,00												
Neutralising value (equivalent HO-)	-	0,00												
Reactivity (hydrochloric test)	%	0,00												
Reactivity (6 month incubation test)	%	0,00												
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00												
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00												
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00												

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			1.C.I.a. SOLID INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.a.i.(a) Straight Solid Inorganic ?? Fertiliser			1.C.I.a.i.(b) Straight Solid Inorganic ?? Fertiliser			1.C.I.a.ii.(a) Solid Inorganic Compound Fertiliser			1.C.I.a.ii.(b) Solid Inorganic Compound Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
PROPORTION	% w/w	GLOBAL	1 Major or minor macronutrient ONLY			1 to 3 Major macronutrients only OR 1 Major macronutrient and 1 or several Minor macronutrient			Mix of NPK only			Mix of Mg, Ca, S, Na only		
CLAIMED FUNCTION														
Fertiliser	(double clic to select)	☐	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE
Liming materials	(double clic to select)	☐												
Soil improver	(double clic to select)	☐												
Growing medium	(double clic to select)	☐												
Inhibitor	(double clic to select)	☐												
Plant biostimulant	(double clic to select)	☐												
GENERALITIES			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Form	Solid/Liquid	Solid	Solid		TRUE	Solid		TRUE	Solid		TRUE	Solid		TRUE
Dry matter (%DM)	% RM	0												
Organic matter (%OM)	% RM	0												
Organic Carbon (%Corg)	% RM	0												
NUTRIENTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Total Nitrogen (N)	% RM	0,00	10	100	FALSE	3	100	FALSE	3	100	FALSE			
Total Phosphorus pentoxide (P2O5)	% RM	0,00	12	100	FALSE	3	100	FALSE	3	100	FALSE			
Total Potassium oxide (K2O)	% RM	0,00	6	100	FALSE	3	100	FALSE	3	100	FALSE			
Ammonia (NH4)	% RM	0,00												
Nitrate (NO3)	% RM	0,00												
Organic Nitrogen	% RM	0,00												
Total Magnesium (MgO)	% RM	0,00	5	100	FALSE	1,5	100	FALSE				1,5	100	FALSE
Total Calcium (CaO)	% RM	0,00	12	100	FALSE	1,5	100	FALSE				1,5	100	FALSE
Total Sulphur (SO3)	% RM	0,00	10	100	FALSE	1,5	100	FALSE				1,5	100	FALSE
Total Sodium (Na2O)	% RM	0,00	1	40	FALSE	1	40	FALSE				1	40	FALSE
Total Boron (B)	% RM	0,00												
Total Cobalt (Co)	% RM	0,00												
Total Copper (Cu)	% RM	0,00												
Total Iron (Fe)	% RM	0,00												
Total Manganese (Mn)	% RM	0,00												
Total Molybdenum (Mo)	% RM	0,00												
Total Zinc (Zn)	% RM	0,00												
Microelements in oxide or hydroxid form	yes/no	No												
Part of chelated micronutrient	% Micronutrient	0,00												
Part of complexed micronutrient	% Micronutrient	0,00												
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***												
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***				18	100	FALSE	18	100	FALSE	18	100	FALSE
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***												

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under grant agreement No. 862849

			1.C.I.a. SOLID INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.a.i.(a) Straight Solid Inorganic ?? Fertiliser			1.C.I.a.i.(b) Straight Solid Inorganic ?? Fertiliser			1.C.I.a.ii.(a) Solid Inorganic Compound Fertiliser			1.C.I.a.ii.(b) Solid Inorganic Compound Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	1 Major or minor macronutrient ONLY			1 to 3 Major macronutrients only OR 1 Major macronutrient and 1 or several Minor macronutrient			Mix of NPK only			Mix of Mg, Ca, S, Na only		
PROPORTION	**% w/w**	**0%**												
CLAIMED FUNCTION														
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	mg/kg DM		0	3	FALSE	0	3	FALSE	0	3	FALSE	0	3	FALSE
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	2	FALSE	0	2	FALSE
Mercury (Hg)	mg/kg DM		0	1	FALSE	0	1	FALSE	0	1	FALSE	0	1	FALSE
Nickel (Ni)	mg/kg DM		0	100	FALSE	0	100	FALSE	0	100	FALSE	0	100	FALSE
Lead (Pb)	mg/kg DM		0	120	FALSE	0	120	FALSE	0	120	FALSE	0	120	FALSE
Inorganic Arsenic (As inorg.)	mg/kg DM													
Total Arsenic (As)	mg/kg DM		0	40	FALSE	0	40	FALSE	0	40	FALSE	0	40	FALSE
Copper (Cu)	mg/kg DM		0	600	FALSE	0	600	FALSE	0	600	FALSE	0	600	FALSE
Zinc (Zn)	mg/kg DM		0	1500	FALSE	0	1500	FALSE	0	1500	FALSE	0	1500	FALSE
Biuret (C2H5N3O2)	g/kg DM		0	12	FALSE	0	12	FALSE	0	12	FALSE	0	12	FALSE
Perchlorate (ClO4)	mg/kg DM		0	50	FALSE	0	50	FALSE	0	50	FALSE	0	50	FALSE
As/Micronutr.	*mg/kg Micronutr.*													
Cd/P2O5	*mg/kg P2O5*		0	60	TRUE	0	60	TRUE	0	60	TRUE	0	60	TRUE
Cd/Micronutr.	*mg/kg Micronutr.*													
Pb/Micronutr.	*mg/kg Micronutr.*													
Hg/Micronutr.	*mg/kg Micronutr.*													
Ni/Micronutr.	*mg/kg Micronutr.*													
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp.	CFU/25 g													
Escherichia coli	CFU/1 g													
Enterococcae	CFU/1 g													
Listeria monocytogenes	CFU/25 g													
Vibrio spp	CFU/25 g													
Shigella spp	CFU/25 g													
Staphylococcus aureus	CFU/25 g													
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g													
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g													
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE
Nitrogen from NH4NO3	% RM	0,00	28	100	FALSE	28	100	FALSE	28	100	FALSE			
1 mm grain size proportion	% RM	0,00												
Neutralising value (equivalent CaO)	-	0,00												
Neutralising value (equivalent HO-)	-	0,00												
Reactivity (hydrochloric test)	%	0,00												
Reactivity (6 month incubation test)	%	0,00												
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00												
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00												
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00												

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			1.C.I. INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.b. LIQUID INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.b.i.(a) Straight Liquid Inorganic ?? Fertiliser			1.C.I.b.i.(b) Straight Liquid Inorganic ?? Fertiliser			1.C.I.b.ii. Liquid Inorganic Compound Fertiliser			1.C.I.b.ii. Liquid Inorganic Compound Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	1 Major or minor macronutrient ONLY			1 to 3 Major macronutrients only OR 1 Major macronutrient and 1 or several Minor macronutrient			Mix of NPK only			Mix of Mg, Ca, S, Na only		
PROPORTION	**% w/w**	**0%**												
CLAIMED FUNCTION														
Fertiliser	(double clic to select)	☐	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE
Liming materials	(double clic to select)	☐												
Soil improver	(double clic to select)	☐												
Growing medium	(double clic to select)	☐												
Inhibitor	(double clic to select)	☐												
Plant biostimulant	(double clic to select)	☐												
GENERALITIES			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Form	Solid/Liquid	Solid	Liquid		FALSE	Liquid		FALSE	Liquid		FALSE	Liquid		FALSE
Dry matter (%DM)	% RM	0												
Organic matter (%OM)	% RM	0												
Organic Carbon (%Corg)	% RM	0												
NUTRIENTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Total Nitrogen (N)	% RM	0,00	5	100	FALSE	1,5	100	FALSE	1,5	100	FALSE	1,5	100	FALSE
Total Phosphorus pentoxide (P2O5)	% RM	0,00	5	100	FALSE	1,5	100	FALSE	1,5	100	FALSE	1,5	100	FALSE
Total Potassium oxide (K2O)	% RM	0,00	3	100	FALSE	1,5	100	FALSE	1,5	100	FALSE	1,5	100	FALSE
Ammonia (NH4)	% RM	0,00												
Nitrate (NO3)	% RM	0,00												
Organic Nitrogen	% RM	0,00												
Total Magnesium (MgO)	% RM	0,00	2	100	FALSE	0,75	100	FALSE	0,75	100	FALSE	0,75	100	FALSE
Total Calcium (CaO)	% RM	0,00	6	100	FALSE	0,75	100	FALSE	0,75	100	FALSE	0,75	100	FALSE
Total Sulphur (SO3)	% RM	0,00	5	100	FALSE	0,75	100	FALSE	0,75	100	FALSE	0,75	100	FALSE
Total Sodium (Na2O)	% RM	0,00	1	40	FALSE	0,5	20	FALSE	0,5	20	FALSE	0,5	20	FALSE
Total Boron (B)	% RM	0,00												
Total Cobalt (Co)	% RM	0,00												
Total Copper (Cu)	% RM	0,00												
Total Iron (Fe)	% RM	0,00												
Total Manganese (Mn)	% RM	0,00												
Total Molybdenum (Mo)	% RM	0,00												
Total Zinc (Zn)	% RM	0,00												
Microelements in oxide or hydroxid form	yes/no	No												
Part of chelated micronutrient	% Micronutrient	0,00												
Part of complexed micronutrient	% Micronutrient	0,00												
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***												
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***				7	100	FALSE	7	100	FALSE	7	100	FALSE
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***												

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FERTIMANURE

			1.C.I. INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.b. LIQUID INORGANIC MACRONUTRIENT FERTILISER											
			1.C.I.b.i.(a) Straight Liquid Inorganic ?? Fertiliser			1.C.I.b.i.(b) Straight Liquid Inorganic ?? Fertiliser			1.C.I.b.ii. Liquid Inorganic Compound Fertiliser			1.C.I.b.ii. Liquid Inorganic Compound Fertiliser		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	1 Major or minor macronutrient ONLY			1 to 3 Major macronutrients only OR 1 Major macronutrient and 1 or several Minor macronutrient			Mix of NPK only			Mix of Mg, Ca, S, Na only		
PROPORTION	**% w/w**	0%												
CLAIMED FUNCTION														
POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Cadmium (Cd)	mg/kg DM		0	3	FALSE	0	3	FALSE	0	3	FALSE	0	3	FALSE
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	2	FALSE	0	2	FALSE
Mercury (Hg)	mg/kg DM		0	1	FALSE	0	1	FALSE	0	1	FALSE	0	1	FALSE
Nickel (Ni)	mg/kg DM		0	100	FALSE	0	100	FALSE	0	100	FALSE	0	100	FALSE
Lead (Pb)	mg/kg DM		0	120	FALSE	0	120	FALSE	0	120	FALSE	0	120	FALSE
Inorganic Arsenic (As inorg.)	mg/kg DM													
Total Arsenic (As)	mg/kg DM		0	40	FALSE	0	40	FALSE	0	40	FALSE	0	40	FALSE
Copper (Cu)	mg/kg DM		0	600	FALSE	0	600	FALSE	0	600	FALSE	0	600	FALSE
Zinc (Zn)	mg/kg DM		0	1500	FALSE	0	1500	FALSE	0	1500	FALSE	0	1500	FALSE
Biuret (C2H5N3O2)	g/kg DM		0	12	FALSE	0	12	FALSE	0	12	FALSE	0	12	FALSE
Perchlorate (ClO4)	mg/kg DM		0	50	FALSE	0	50	FALSE	0	50	FALSE	0	50	FALSE
As/Micronutr.	*mg/kg Micronutr.*													
Cd/P2O5	*mg/kg P2O5*		0	60	TRUE	0	60	TRUE	0	60	TRUE	0	60	TRUE
Cd/Micronutr.	*mg/kg Micronutr.*													
Pb/Micronutr.	*mg/kg Micronutr.*													
Hg/Micronutr.	*mg/kg Micronutr.*													
Ni/Micronutr.	*mg/kg Micronutr.*													
PATHOGENS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Salmonella spp.	CFU/25 g													
Escherichia coli	CFU/1 g													
Enterococcae	CFU/1 g													
Listeria monocytogenes	CFU/25 g													
Vibrio spp	CFU/25 g													
Shigella spp	CFU/25 g													
Staphylococcus aureus	CFU/25 g													
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g													
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g													
OTHERS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE	0	0,5	TRUE
Nitrogen from NH4NO3	% RM	0,00												
1 mm grain size proportion	% RM	0,00												
Neutralising value (equivalent CaO)	-	0,00												
Neutralising value (equivalent HO-)	-	0,00												
Reactivity (hydrochloric test)	%	0,00												
Reactivity (6 month incubation test)	%	0,00												
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00												
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00												
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00												

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			1.C.II. INORGANIC MICRONUTRIENT FERTILISER																					
			1.C.II.a. INORGANIC STRAGHT MICRONUTRIENT FERTILISER																1.C.II.b. INORGANIC COMPOUND MICRONUTRIENT FERTILISER					
			1.C.II.a.i. Micronutrient ?? fertiliser			1.C.II.a.ii. Micronutrient based fertiliser			1.C.II.a.iii. Micronutrient solution/suspension fertiliser			1.C.II.a.iv. Micronutrient chelate fertiliser			1.C.II.a.viii. Micronutrient complex fertiliser			1.C.II.b.i Solid inorganic compound micronutrient fertiliser			1.C.II.b.ii Liquid inorganic compound micronutrient fertiliser		
			FALSE			FALSE			FALSE			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	No more than 1 micronutrient			more than 1 micronutrient			more than 1 micronutrient			Chelating agent fulfilling ther requirements of CMC 01			Complexing agent fulfilling ther requirements of CMC 01			Mix of B, Co, Cu, Fe, Mn, Mo or Zn			Mix of B, Co, Cu, Fe, Mn, Mo or Zn		
PROPORTION	**% w/w**	**0%**																						
CLAIMED FUNCTION																								
Fertiliser	(double clic to select)	☐	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE	Yes		FALSE
Liming materials	(double clic to select)	☐																						
Soil improver	(double clic to select)	☐																						
Growing medium	(double clic to select)	☐																						
Inhibitor	(double clic to select)	☐																						
Plant biostimulant	(double clic to select)	☐																						
GENERALITIES			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Form	Solid/Liquid	Solid	Solid		TRUE	Solid		TRUE	Liquid		FALSE	Solid		TRUE									
Dry matter (%DM)	% RM	0																						
Organic matter (%OM)	% RM	0																						
Organic Carbon (%Corg)	% RM	0																						
NUTRIENTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Total Nitrogen (N)	% RM	0,00																						
Total Phosphorus pentoxide (P2O5)	% RM	0,00																						
Total Potassium oxide (K2O)	% RM	0,00																						
Ammonia (NH4)	% RM	0,00																						
Nitrate (NO3)	% RM	0,00																						
Organic Nitrogen	% RM	0,00																						
Total Magnesium (MgO)	% RM	0,00																						
Total Calcium (CaO)	% RM	0,00																						
Total Sulphur (SO3)	% RM	0,00																						
Total Sodium (Na2O)	% RM	0,00																						
Total Boron (B)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Cobalt (Co)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Copper (Cu)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Iron (Fe)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Manganese (Mn)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Molybdenum (Mo)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Total Zinc (Zn)	% RM	0,00	10	100	FALSE	5	100	FALSE	2	100	FALSE	5	100	FALSE	5	100	FALSE							
Microelements in oxide or hydroxid form	yes/no	No																						
Part of chelated micronutrient	% Micronutrient	0,00				0	80	TRUE				80	100	FALSE	0	80	TRUE							
Part of complexed micronutrient	% Micronutrient	0,00				0	80	TRUE				0	80	TRUE	80	100	FALSE							
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***																						
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***																						
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***																5	100	FALSE	2	100	FALSE

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			1.C.II. INORGANIC MICRONUTRIENT FERTILISER																					
			1.C.II.a. INORGANIC STRAGHT MICRONUTRIENT FERTILISER																1.C.II.b. INORGANIC COMPOUND MICRONUTRIENT FERTILISER					
			1.C.II.a.i. Micronutrient ?? fertiliser			1.C.II.a.ii. Micronutrient based fertiliser			1.C.II.a.iii. Micronutrient solution/suspension fertiliser			1.C.II.a.iv. Micronutrient chelate fertiliser			1.C.II.a.viii. Micronutrient complex fertiliser			1.C.II.b.i Solid inorganic compound micronutrient fertiliser			1.C.II.b.ii Liquid inorganic compound micronutrient fertiliser		
			FALSE			FALSE			FALSE			FALSE			FALSE			FALSE			FALSE		
		GLOBAL	No more than 1 micronutrient			more than 1 micronutrient			more than 1 micronutrient			Chelating agent fulfilling ther requirements of CMC 01			Complexing agent fulfilling ther requirements of CMC 01			Mix of B, Co, Cu, Fe, Mn, Mo or Zn			Mix of B, Co, Cu, Fe, Mn, Mo or Zn		
PROPORTION	**% w/w**	**0%**																						
CLAIMED FUNCTION																								
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	
Cadmium (Cd)	mg/kg DM																							
Hexavalent Chrome (Cr VI)	mg/kg DM																							
Mercury (Hg)	mg/kg DM																							
Nickel (Ni)	mg/kg DM																							
Lead (Pb)	mg/kg DM																							
Inorganic Arsenic (As inorg.)	mg/kg DM																							
Total Arsenic (As)	mg/kg DM																							
Copper (Cu)	mg/kg DM																							
Zinc (Zn)	mg/kg DM																							
Biuret (C2H5N3O2)	g/kg DM																							
Perchlorate (ClO4)	mg/kg DM																							
As/Micronutr.	*mg/kg Micronutr.*		0	1000	*FALSE*	0	1000	*FALSE*	0	1000	*FALSE*	0	1000	*FALSE*	0	1000	*FALSE*	0	1000	*FALSE*	0	1000	*FALSE*	
Cd/P2O5	*mg/kg P2O5*																							
Cd/Micronutr.	*mg/kg Micronutr.*		0	200	*FALSE*	0	200	*FALSE*	0	200	*FALSE*	0	200	*FALSE*	0	200	*FALSE*	0	200	*FALSE*	0	200	*FALSE*	
Pb/Micronutr.	*mg/kg Micronutr.*		0	600	*FALSE*	0	600	*FALSE*	0	600	*FALSE*	0	600	*FALSE*	0	600	*FALSE*	0	600	*FALSE*	0	600	*FALSE*	
Hg/Micronutr.	*mg/kg Micronutr.*		0	100	*FALSE*	0	100	*FALSE*	0	100	*FALSE*	0	100	*FALSE*	0	100	*FALSE*	0	100	*FALSE*	0	100	*FALSE*	
Ni/Micronutr.	*mg/kg Micronutr.*		0	2000	*FALSE*	0	2000	*FALSE*	0	2000	*FALSE*	0	2000	*FALSE*	0	2000	*FALSE*	0	2000	*FALSE*	0	2000	*FALSE*	
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	
Salmonella spp.	CFU/25 g																							
Escherichia coli	CFU/1 g																							
Enterococcae	CFU/1 g																							
Listeria monocytogenes	CFU/25 g																							
Vibrio spp	CFU/25 g																							
Shigella spp	CFU/25 g																							
Staphylococcus aureus	CFU/25 g																							
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g																							
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g																							
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	
Unintentional phosphonates	% HPO3	0,00	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*	
Nitrogen from NH4NO3	% RM	0,00																						
1 mm grain size proportion	% RM	0,00																						
Neutralising value (equivalent CaO)	-	0,00																						
Neutralising value (equivalent HO-)	-	0,00																						
Reactivity (hydrochloric test)	%	0,00																						
Reactivity (6 month incubation test)	%	0,00																						
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00																						
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00																						
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00																						

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2. PFC CONFORMITY			2. LIMING MATERIAL			3. SOIL IMPROVER						4. GROWING MEDIUM		
			2. Liming material ()			3.A. Organic Soil Improver			3.B. Inorganic Soil Improver			4. Growing medium		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL				95% Organic matter + peat, lignite, leonardite (optional)						EU fertilising product other than soil, for plant, mushrooms or algae growing		
PROPORTION	**% w/w**	0%												
CLAIMED FUNCTION														
Fertiliser	(double clic to select)	☐												
Liming materials	(double clic to select)	☐	Yes		FALSE									
Soil improver	(double clic to select)	☐				Yes		FALSE	Yes		FALSE			
Growing medium	(double clic to select)	☐										Yes		FALSE
Inhibitor	(double clic to select)	☐												
Plant biostimulant	(double clic to select)	☐												
GENERALITIES			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Form	Solid/Liquid	Solid												
Dry matter (%DM)	% RM	0				20	100	FALSE						
Organic matter (%OM)	% RM	0							0	12	TRUE			
Organic Carbon (%Corg)	% RM	0				7,5	100	FALSE	0	7	TRUE			
NUTRIENTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Total Nitrogen (N)	% RM	0,00												
Total Phosphorus pentoxide (P2O5)	% RM	0,00												
Total Potassium oxide (K2O)	% RM	0,00												
Ammonia (NH4)	% RM	0,00												
Nitrate (NO3)	% RM	0,00												
Organic Nitrogen	% RM	0,00												
Total Magnesium (MgO)	% RM	0,00												
Total Calcium (CaO)	% RM	0,00												
Total Sulphur (SO3)	% RM	0,00												
Total Sodium (Na2O)	% RM	0,00												
Total Boron (B)	% RM	0,00												
Total Cobalt (Co)	% RM	0,00												
Total Copper (Cu)	% RM	0,00												
Total Iron (Fe)	% RM	0,00												
Total Manganese (Mn)	% RM	0,00												
Total Molybdenum (Mo)	% RM	0,00												
Total Zinc (Zn)	% RM	0,00												
Microelements in oxide or hydroxid form	yes/no	No												
Part of chelated micronutrient	% Micronutrient	0,00												
Part of complexed micronutrient	% Micronutrient	0,00												
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***												
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***												
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***												

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2. PFC CONFORMITY			2. LIMING MATERIAL			3. SOIL IMPROVER						4. GROWING MEDIUM		
			2. Liming material ()			3.A. Organic Soil Improver			3.B. Inorganic Soil Improver			4. Growing medium		
			FALSE			FALSE			FALSE			FALSE		
		GLOBAL				95% Organic matter + peat, lignite, leonardite (optional)						EU fertilising product other than soil, for plant, mushrooms or algae growing		
PROPORTION	% w/w	0%												
CLAIMED FUNCTION														
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	1,5	FALSE	0	2	FALSE
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2	FALSE	0	2	FALSE	0	2	FALSE	0	2	FALSE
Mercury (Hg)	mg/kg DM		0	1	FALSE	0	1	FALSE	0	1	FALSE	0	1	FALSE
Nickel (Ni)	mg/kg DM		0	90	FALSE	0	50	FALSE	0	100	FALSE	0	50	FALSE
Lead (Pb)	mg/kg DM		0	120	FALSE	0	120	FALSE	0	120	FALSE	0	120	FALSE
Inorganic Arsenic (As inorg.)	mg/kg DM					0	40	FALSE	0	40	FALSE	0	40	FALSE
Total Arsenic (As)	mg/kg DM		0	40	FALSE									
Copper (Cu)	mg/kg DM		0	300	FALSE	0	300	FALSE	0	300	FALSE	0	200	FALSE
Zinc (Zn)	mg/kg DM		0	800	FALSE	0	800	FALSE	0	800	FALSE	0	500	FALSE
Biuret (C2H5N3O2)	g/kg DM													
Perchlorate (ClO4)	mg/kg DM													
As/Micronutr.	*mg/kg Micronutr.*													
Cd/P2O5	*mg/kg P2O5*													
Cd/Micronutr.	*mg/kg Micronutr.*													
Pb/Micronutr.	*mg/kg Micronutr.*													
Hg/Micronutr.	*mg/kg Micronutr.*													
Ni/Micronutr.	*mg/kg Micronutr.*													
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp.	CFU/25 g					0	0	FALSE				0	0	FALSE
Escherichia coli	CFU/1 g					0	1000	FALSE				0	1000	FALSE
Enterococcae	CFU/1 g					0	1000	FALSE				0	1000	FALSE
Listeria monocytogenes	CFU/25 g													
Vibrio spp	CFU/25 g													
Shigella spp	CFU/25 g													
Staphylococcus aureus	CFU/25 g													
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g													
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g													
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	1	TRUE	0	0,5	TRUE	0	0,5	TRUE
Nitrogen from NH4NO3	% RM	0,00												
1 mm grain size proportion	% RM	0,00	70	100	FALSE									
Neutralising value (equivalent CaO)	-	0,00	15	100	FALSE									
Neutralising value (equivalent HO-)	-	0,00	9	100	FALSE									
Reactivity (hydrochloric test)	%	0,00	10	100	FALSE									
Reactivity (6 month incubation test)	%	0,00	50	100	FALSE									
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00												
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00												
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00												

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RESET	2. PFC CONFORMITY			5. INHIBITOR								
				5.A. Nitrification Inhibitor			5.B. Denitrification Inhibitor			5.C. Urease Inhibitor		
				FALSE			FALSE			FALSE		
			GLOBAL	EU fertilising product other than soil, for plant, mushrooms or algae growing			EU fertilising product other than soil, for plant, mushrooms or algae growing			EU fertilising product other than soil, for plant, mushrooms or algae growing		
PROPORTION	**% w/w**		**0%**									
CLAIMED FUNCTION												
Fertiliser	(double clic to select)		☐									
Liming materials	(double clic to select)		☐									
Soil improver	(double clic to select)		☐									
Growing medium	(double clic to select)		☐									
Inhibitor	(double clic to select)		☐	Yes		*FALSE*	Yes		*FALSE*	Yes		*FALSE*
Plant biostimulant	(double clic to select)		☐									
GENERALITIES				**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Form	Solid/Liquid		Solid									
Dry matter (%DM)	% RM		0									
Organic matter (%OM)	% RM		0									
Organic Carbon (%Corg)	% RM		0									
NUTRIENTS				**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Total Nitrogen (N)	% RM		0,00									
Total Phosphorus pentoxide (P2O5)	% RM		0,00									
Total Potassium oxide (K2O)	% RM		0,00									
Ammonia (NH4)	% RM		0,00									
Nitrate (NO3)	% RM		0,00									
Organic Nitrogen	% RM		0,00									
Total Magnesium (MgO)	% RM		0,00									
Total Calcium (CaO)	% RM		0,00									
Total Sulphur (SO3)	% RM		0,00									
Total Sodium (Na2O)	% RM		0,00									
Total Boron (B)	% RM		0,00									
Total Cobalt (Co)	% RM		0,00									
Total Copper (Cu)	% RM		0,00									
Total Iron (Fe)	% RM		0,00									
Total Manganese (Mn)	% RM		0,00									
Total Molybdenum (Mo)	% RM		0,00									
Total Zinc (Zn)	% RM		0,00									
Microelements in oxide or hydroxid form	yes/no		No									
Part of chelated micronutrient	% Micronutrient		0,00									
Part of complexed micronutrient	% Micronutrient		0,00									
Sum Major Macroelements (N+P2O5+K2O)	*% RM*		***0,00***									
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*		***0,00***									
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*		***0,00***									

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			5.A. Nitrification Inhibitor			5.B. Denitrification Inhibitor			5.C. Urease Inhibitor		
			FALSE			FALSE			FALSE		
		GLOBAL	EU fertilising product other than soil, for plant, mushrooms or algae growing			EU fertilising product other than soil, for plant, mushrooms or algae growing			EU fertilising product other than soil, for plant, mushrooms or algae growing		
PROPORTION	**% w/w**	0%									
CLAIMED FUNCTION											
POLLUTANTS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Cadmium (Cd)	mg/kg DM										
Hexavalent Chrome (Cr VI)	mg/kg DM										
Mercury (Hg)	mg/kg DM										
Nickel (Ni)	mg/kg DM										
Lead (Pb)	mg/kg DM										
Inorganic Arsenic (As inorg.)	mg/kg DM										
Total Arsenic (As)	mg/kg DM										
Copper (Cu)	mg/kg DM										
Zinc (Zn)	mg/kg DM										
Biuret (C2H5N3O2)	g/kg DM										
Perchlorate (ClO4)	mg/kg DM										
As/Micronutr.	*mg/kg Micronutr.*										
Cd/P2O5	*mg/kg P2O5*										
Cd/Micronutr.	*mg/kg Micronutr.*										
Pb/Micronutr.	*mg/kg Micronutr.*										
Hg/Micronutr.	*mg/kg Micronutr.*										
Ni/Micronutr.	*mg/kg Micronutr.*										
PATHOGENS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Salmonella spp.	CFU/25 g										
Escherichia coli	CFU/1 g										
Enterococcae	CFU/1 g										
Listeria monocytogenes	CFU/25 g										
Vibrio spp	CFU/25 g										
Shigella spp	CFU/25 g										
Staphylococcus aureus	CFU/25 g										
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g										
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g										
OTHERS			**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**	**MIN**	**MAX**	**CHECK**
Unintentional phosphonates	% HPO3	0,00	0	0,5	*TRUE*	0	0,5	*TRUE*	0	0,5	*TRUE*
Nitrogen from NH4NO3	% RM	0,00									
1 mm grain size proportion	% RM	0,00									
Neutralising value (equivalent CaO)	-	0,00									
Neutralising value (equivalent HO-)	-	0,00									
Reactivity (hydrochloric test)	%	0,00									
Reactivity (6 month incubation test)	%	0,00									
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00	20	100	*FALSE*						
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00				20	100	*FALSE*			
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00							20	100	*FALSE*

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2. PFC CONFORMITY			6. PLANT BIOSTIMULANT						7. FERTILISING PRODUCT BLEND		
RESET			6.A. Microbial Plant Biostimulant			6.B. Non-microbial Plant Biostimulant			7. Fertilising Product Blend		
CMC / Show all CMC / Hide wrong PFC			FALSE			FALSE			FALSE		
		GLOBAL	Product with the sole aim oif improving nutrient use efficiency, tolerance to abiotic stress, quality traits or nutrient availability			Product with the sole aim oif improving nutrient use efficiency, tolerance to abiotic stress, quality traits or nutrient availability			Mix of 1 to 6 PFC		
PROPORTION	**% w/w**	**0%**									
CLAIMED FUNCTION											
Fertiliser	(double clic to select)	☐							At least 2 of them		FALSE
Liming materials	(double clic to select)	☐									
Soil improver	(double clic to select)	☐									
Growing medium	(double clic to select)	☐									
Inhibitor	(double clic to select)	☐									
Plant biostimulant	(double clic to select)	☐	Yes		FALSE	Yes		FALSE			
GENERALITIES			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Form	Solid/Liquid	Solid									
Dry matter (%DM)	% RM	0									
Organic matter (%OM)	% RM	0									
Organic Carbon (%Corg)	% RM	0									
NUTRIENTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Total Nitrogen (N)	% RM	0,00									
Total Phosphorus pentoxide (P2O5)	% RM	0,00									
Total Potassium oxide (K2O)	% RM	0,00									
Ammonia (NH4)	% RM	0,00									
Nitrate (NO3)	% RM	0,00									
Organic Nitrogen	% RM	0,00									
Total Magnesium (MgO)	% RM	0,00									
Total Calcium (CaO)	% RM	0,00									
Total Sulphur (SO3)	% RM	0,00									
Total Sodium (Na2O)	% RM	0,00									
Total Boron (B)	% RM	0,00									
Total Cobalt (Co)	% RM	0,00									
Total Copper (Cu)	% RM	0,00									
Total Iron (Fe)	% RM	0,00									
Total Manganese (Mn)	% RM	0,00									
Total Molybdenum (Mo)	% RM	0,00									
Total Zinc (Zn)	% RM	0,00									
Microelements in oxide or hydroxid form	yes/no	No									
Part of chelated micronutrient	% Micronutrient	0,00									
Part of complexed micronutrient	% Micronutrient	0,00									
Sum Major Macroelements (N+P2O5+K2O)	*% RM*	***0,00***									
Sum Major and minor Macroelements (N+P+K+Mg+Ca+S+Na)	*% RM*	***0,00***									
Sum Microelements (B+Co+Cu+Fe+Mn+Mo+Zn)	*%RM*	***0,00***									

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2. PFC CONFORMITY			6. PLANT BIOSTIMULANT						7. FERTILISING PRODUCT BLEND		
			6.A. Microbial Plant Biostimulant			6.B. Non-microbial Plant Biostimulant			7. Fertilising Product Blend		
			FALSE			FALSE			FALSE		
		GLOBAL	Product with the sole aim oif improving nutrient use efficiency, tolerance to abiotic stress, quality traits or nutrient availability			Product with the sole aim oif improving nutrient use efficiency, tolerance to abiotic stress, quality traits or nutrient availability			Mix of 1 to 6 PFC		
PROPORTION	% w/w	0%									
CLAIMED FUNCTION											
POLLUTANTS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Cadmium (Cd)	mg/kg DM		0	1,5	FALSE	0	1,5	FALSE			
Hexavalent Chrome (Cr VI)	mg/kg DM		0	2,0	FALSE	0	2,0	FALSE			
Mercury (Hg)	mg/kg DM		0	1,0	FALSE	0	1,0	FALSE			
Nickel (Ni)	mg/kg DM		0	50,0	FALSE	0	50,0	FALSE			
Lead (Pb)	mg/kg DM		0	120,0	FALSE	0	120,0	FALSE			
Inorganic Arsenic (As inorg.)	mg/kg DM		0	40,0	FALSE	0	40,0	FALSE			
Total Arsenic (As)	mg/kg DM										
Copper (Cu)	mg/kg DM		0	600,0	FALSE	0	600,0	FALSE			
Zinc (Zn)	mg/kg DM		0	1500,0	FALSE	0	1500,0	FALSE			
Biuret (C2H5N3O2)	g/kg DM										
Perchlorate (ClO4)	mg/kg DM										
As/Micronutr.	*mg/kg Micronutr.*										
Cd/P2O5	*mg/kg P2O5*										
Cd/Micronutr.	*mg/kg Micronutr.*										
Pb/Micronutr.	*mg/kg Micronutr.*										
Hg/Micronutr.	*mg/kg Micronutr.*										
Ni/Micronutr.	*mg/kg Micronutr.*										
PATHOGENS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Salmonella spp.	CFU/25 g		0	0	FALSE	0	0	FALSE			
Escherichia coli	CFU/1 g		0	0	FALSE	0	1000	FALSE			
Enterococcae	CFU/1 g		0	10	FALSE	0	1000				
Listeria monocytogenes	CFU/25 g		0	0	FALSE						
Vibrio spp	CFU/25 g		0	0	FALSE						
Shigella spp	CFU/25 g		0	0	FALSE						
Staphylococcus aureus	CFU/25 g		0	0	FALSE						
Anaerobic plate count unless the microbial plant biostimulant is an aerobic bacterium	CFU/1 g		0	1,E+05	FALSE						
Yeast and mould count unless the microbial plant biostimulant is a fungus	CFU/1 g		0	1000	FALSE						
OTHERS			MIN	MAX	CHECK	MIN	MAX	CHECK	MIN	MAX	CHECK
Unintentional phosphonates	% HPO3	0,00	0	0,5	TRUE	0	0,5	TRUE			
Nitrogen from NH4NO3	% RM	0,00									
1 mm grain size proportion	% RM	0,00									
Neutralising value (equivalent CaO)	-	0,00									
Neutralising value (equivalent HO-)	-	0,00									
Reactivity (hydrochloric test)	%	0,00									
Reactivity (6 month incubation test)	%	0,00									
Reduction of annomiacal nitrogen oxidation	% NH3 oxidation reduc. compared to negative Control	0,00									
Reduction of nitrous oxide release	% N2O release reduc. compared to negative Control	0,00									
Reduction of urea hydrolysis	% CH4N2O hydrolysis reduc. compared to negative Control	0,00									

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FERTIMANURE

Appendix 3: BBF comparison to French regulation and standard

		NF U 42-001-1* Mineral fertiliser		FU U 44-051 Organic amendment		CDC Dig Agricultural digestate		Mandatory Other product		NETHERLANDS									
										NL-AS Amm. Sulph.		NL-LK Liquid K fert.		NL-SC Soil conditioner		NL-WP Wet P-rich fert.		NL-DP Dried P-rich fert.	
										NF U 42-001-1		CDC Dig		NF U 44-051		NF U 44-051		NF U 44-051	
Parameter	unit	Min	Max	Min	Max	Min	Max	Min	Max	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation
pH	-									5,5	1,2	8,3	0,2	8,5	0,4	8,1	0,2	8,0	
conductivity (EC)	mS/cm									94,0	137,0	2,7	0,3	2,1	0,5	2,6	0,5	5,0	
Density	kg/l									1,2	0,0	1,0	0,1	0,4	0,1	1,1	0,1	-	
Dry matter	g/kg									327,0	56,0	41,0	8,2	271,0	60,0	293,0	119,0	900,0	
Organic Matter	g/kg			200,0	1000,0					349,0	65,0	24,0	7,1	217,0	37,0	83,0	13,0	900,0	
Organic C	g/kg									0,9	0,2	14,0	4,1	126,0	22,0	48,0	7,6	147,0	
Total N	g/kg	30,0	1000,0							66,0	9,9	3,1	1,0	6,5	1,2	6,2	0,8	19,0	
Amm. N	g/kg									62,0	8,9	1,8	0,7	2,4	0,7	3,5	0,4	11,0	
NO3-N	g/kg																		
Total P	g/kg	30,0	1000,0							0,2	0,0	0,4	0,1	2,3	0,6	3,1	1,1	9,5	
Total K	g/kg									0,2	0,2	5,0	0,4	4,9	0,5	4,6	0,8	14,0	
Total N+P+K	g/kg	180,0	1000,0							66,4	10,1	8,5	1,5	13,7	2,3	13,9	2,7	42,5	
Ca	g/kg									0,2	0,1	0,9	0,2	5,4	1,6	14,0	3,8	44,0	
Mg	g/kg									0,0	0,0	0,5	0,1	2,3	0,6	2,7	0,9	8,4	
Na	g/kg									0,0	0,0	0,7	0,1	0,4	0,4	0,5	0,1	1,6	
S	g/kg									73,0	10,0	0,4	0,1	1,7	0,2	1,5	0,3	4,6	
Cu	mg/kg TS			0,0	300,0	0,0	600,0			0,5	0,2	5,4	2,7	14,0	6,7	19,0	4,8	59,0	
Zn	mg/kg TS			0,0	600,0	0,0	1000,0			1,8	0,9	29,0	20,0	92,0	51,0	108,0	36,0	331,0	
Fe	mg/kg TS									5,8	4,9	140,0	41,0	631,0	284,0	1493,0	459,0	4582,0	
Mn	mg/kg TS									1,0	0,5	30,0	16,0	60,0	21,0	300,0	162,0	900,0	
Cd	mg/kg TS	0,0	3,0	0,0	3,0	0,0	1,5			0,1	0,1	0,0	0,0	0,1	0,0	0,1	0,0	0,2	
Ni	mg/kg TS	0,0	120,0	0,0	60,0	0,0	50,0			0,9	0,1	0,4	0,1	1,0	0,5	1,1	0,4	26,0	
Pb	mg/kg TS	0,0	150,0	0,0	180,0	0,0	120,0			0,7	0,5	0,1	0,0	0,6	0,2	3,5	0,0	3,5	
Cr	mg/kg TS	0,0	120,0	0,0	120,0	0,0	120,0			0,7	0,6	0,4	0,2	1,6	0,9	6,4	1,8	20,0	
Hg	mg/kg TS	0,0	2,0	0,0	2,0	0,0	1,0			0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
As	mg/kg TS	0,0	60,0	0,0	18,0	0,0	40,0			0,1	0,1	0,1	0,0	0,1	0,1	0,4	0,1	1,3	
Al	mg/kg TS																		
Cr VI	mg/kg TS					0,0	2,0												
Salmonella spp.	unit/25g			0,0	0,0	0,0	0,0												
Escherichia coli	CFU/g					0,0	1000,0			<3		25,0		9500,0		<3			
Enterococcaceae	CFU/g					0,0	1000,0			<3		11000,0		11000,0		<3			
PAH	mg/kg TS			0,0	6,0	0,0	6,0												
Cl	g/kg																		

		NF U 42-001-1* Mineral fertiliser		FU U 44-051 Organic amendment		CDC Dig Agricultural digestate		Mandatory Other product		SPAIN									
										ES-DSC Biodried solid fraction		ES-PA P from ashes		ES-AM Amm. Sulph.		ES-NC Nutrient-rich		ES-AA AA-based biostim.	
										NF U 44-051		NF U 42-001-1		NF U 42-001-1		NF U 44-051		Mandatory marketing**	
Parameter	unit	Min	Max	Min	Max	Min	Max	Min	Max	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation
pH	-									7,1	0,1	11,9		6,5		7,7	0.5		
conductivity (EC)	mS/cm									3,1	0,6			56,6		23,0	1.0		
Density	kg/l									0,4				1,0		1,0		1,0	
Dry matter	g/kg									502,0	199,0	1000,0		46,7		33,2	0,1	82,0	1,2
Organic Matter	g/kg			200,0	1000,0					448,0	180,0					22,4	0,5	984,6	0,4
Organic C	g/kg									251,0	101,0					12,6	0,3		
Total N	g/kg	30,0	1000,0							11,4	4,3			19,9		3,8	0,1	45,0	5,0
Amm. N	g/kg									3,1	3,0			19,9		2,8	0,1		
NO3-N	g/kg																		
Total P	g/kg	30,0	1000,0							2,7	0,8	66,4	9,0	<1		0,5	0,1	<1	
Total K	g/kg									5,0	1,9	75,4		<1		1,8	0,0	1	
Total N+P+K	g/kg	180,0	1000,0							19,1	7,0	141,8	9,0	19,9	0,0	6,1	0,2	45,0	5,0
Ca	g/kg									11,2	2,4	10,0		12,4		1,1	0,2		
Mg	g/kg									2,9	0,6	149,6		<1		0,4	0,1	<1	
Na	g/kg									2,3	0,8	36,2		<1		1,1	0,5	<1	
S	g/kg									5,9	2,3	35,0		<1		0,4	0,0		
Cu	mg/kg TS			0,0	300,0	0,0	600,0			61,6	3,9	770,0		<0.1		232,0	51,0		
Zn	mg/kg TS			0,0	600,0	0,0	1000,0			819,1	547,8	2000,0		<0.1		992,0	78,0		
Fe	mg/kg TS													<0.1					
Mn	mg/kg TS													<0.1					
Cd	mg/kg TS	0,0	3,0	0,0	3,0	0,0	1,5			59,7	3,1					<0.5			
Ni	mg/kg TS	0,0	120,0	0,0	60,0	0,0	50,0			4,4	2,6					10,0			
Pb	mg/kg TS	0,0	150,0	0,0	180,0	0,0	120,0			4,4	2,6					<5			
Cr	mg/kg TS	0,0	120,0	0,0	120,0	0,0	120,0			<10						<10			
Hg	mg/kg TS	0,0	2,0	0,0	2,0	0,0	1,0			<0.4						<0.4			
As	mg/kg TS	0,0	60,0	0,0	18,0	0,0	40,0			<2						2,5			
Al	mg/kg TS																		
Cr VI	mg/kg TS					0,0	2,0												
Salmonella spp.	unit/25g			0,0	0,0	0,0	0,0			0,0	0,0			0,0		0,0			
Escherichia coli	CFU/g					0,0	1000,0			<10				0,0		<10			
Enterococcaceae	CFU/g					0,0	1000,0			3700,0				0,0		600,0			
PAH	mg/kg TS			0,0	6,0	0,0	6,0			0,2	0,0								
Cl	g/kg									2,6	0,2								

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FERTIMANURE

										GERMANY				BELGIUM					
		NF U 42-001-1* Mineral fertiliser		FU U 44-051 Organic amendment		CDC Dig Agricultural digestate		Mandatory Other product		DE-BC Biochar		DE-AP Monoamm. Phosphate		BE-AN Amm. Nitrate		BE-AS Amm. Sulph.		BE-AW Amm. Water	
										Mandatory marketing**		NF U 42-001-1		NF U 42-001-1		NF U 42-001-1		NF U 42-001-1	
Parameter	**unit**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Mean**	**Standart deviation**	**Mean**	**Standart deviation**	**Mean**	**Standart deviation**	**Mean**	**Standart deviation**	**Mean**	**Standart deviation**
pH	-									12,3		4,0		6,0	0,6	5,7	1,1	10,3	0,8
conductivity (EC)	mS/cm									16,1	2,0								
Density	kg/l									0,5	0,1	1.8±0.3	0,3	1,3	0,1	1,2	0,1	1,1	0,0
Dry matter	g/kg									996,0	1,7	990,0		390,8	63,2	289,1			
Organic Matter	g/kg			200,0	1000,0					522	24,0	<1.0		<1		<1			
Organic C	g/kg									393,0	124,0	0,0		0,1	0,0	0,8	0,1	0,6	0,2
Total N	g/kg	30,0	1000,0							10,1	1,5	122,0		153,1	26,4	74,4	8,4	158,2	27,9
Amm. N	g/kg									0,1	0,1	122,0		76,2	18,1	74,3	8,1	154,9	31,8
NO3-N	g/kg									0,0		0,0		77,4	15,0	-			
Total P	g/kg	30,0	1000,0							30,4	2,6	198,0		0,1	0,0	0,1	0,0	0,0	0,0
Total K	g/kg									95,0	23,4	0,0		0,6	0,2	0,7	0,2	0,9	0,2
Total N+P+K	g/kg	180,0	1000,0							135,5	27,5	320,0		153,7	26,6	75,1	8,6	159,1	28,1
Ca	g/kg									22,9	1,5	0,1		0,4	0,1	0,6	0,2	0,3	0,1
Mg	g/kg									6,7	0,3	3,6		0,1	0,0	0,0	0,0	0,1	0,0
Na	g/kg									8,2	0,7	0,0		0,6	0,1	0,8	0,1	0,4	0,2
S	g/kg									2,5	0,1	0,0		0,4	0,1	81,3	11,8	0,6	0,1
Cu	mg/kg TS			0,0	300,0	0,0	600,0			51,3		0,0		1,2	0,7	2,2	0,9	3,4	0,9
Zn	mg/kg TS			0,0	600,0	0,0	1000,0			358,5		0,0		3,4	1,3	5,5	2,4	8,6	3,1
Fe	mg/kg TS									3402,0		0,0		12,3	4,1	18,2	5,8	22,8	4,3
Mn	mg/kg TS									403,0		0,0		0,4	0,1	1,3	0,6	1,2	0,3
Cd	mg/kg TS	0,0	3,0	0,0	3,0	0,0	1,5			0,1		0,0		<0.028		<0.028		<0.028	
Ni	mg/kg TS	0,0	120,0	0,0	60,0	0,0	50,0			6,9		0,0		0,2	0,1	15,2	8,6	0,3	0,1
Pb	mg/kg TS	0,0	150,0	0,0	180,0	0,0	120,0			1,9		0,0		0,1	0,1	0,1	0,1	0,9	0,6
Cr	mg/kg TS	0,0	120,0	0,0	120,0	0,0	120,0			11,0		0,0		0,1	0,0	3,5	0,4	0,3	0,0
Hg	mg/kg TS	0,0	2,0	0,0	2,0	0,0	1,0			0,0		0,0		<0.003		<0.003			
As	mg/kg TS	0,0	60,0	0,0	18,0	0,0	40,0			0,5		0,0		<0.1		<0.1			
Al	mg/kg TS																		
Cr VI	mg/kg TS					0,0	2,0			0,1		0,0							
Salmonella spp.	unit/25g			0,0	0,0	0,0	0,0			-		0,0							
Escherichia coli	CFU/g					0,0	1000,0			<10		0,0							
Enterococcaceae	CFU/g					0,0	1000,0												
PAH	mg/kg TS			0,0	6,0	0,0	6,0			3,0		0,0							
Cl	g/kg									17,0		0,0							

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										FRANCE					
		NF U 42-001-1* Mineral fertiliser		FU U 44-051 Organic amendment		CDC Dig Agricultural digestate		Mandatory Other product		FR-BC Biochar		FR-AS Amm. Sulph.		FR-LK Liquid K fert.	
										Mandatory marketing**		NF U 42-001-1		CDC Dig	
Parameter	unit	Min	Max	Min	Max	Min	Max	Min	Max	Mean	Standart deviation	Mean	Standart deviation	Mean	Standart deviation
pH	-									10,9	1,8	4,8	1,1	8,5	0,1
conductivity (EC)	mS/cm									14,7	1,1	199,1		41,9	
Density	kg/l									0,2	0,0	1,1	0,0	1,0	
Dry matter	g/kg									979,0	19,8	302,9	148,5	15,7	4,5
Organic Matter	g/kg			200,0	1000,0					298,0	21,2	<1		6,1	2,8
Organic C	g/kg											<1		3,0	1,4
Total N	g/kg	30,0	1000,0							23,2	2,7	47,9	0,6	2,3	1,1
Amm. N	g/kg									<1		47,9	0,6	1,3	0,3
NO3-N	g/kg														
Total P	g/kg	30,0	1000,0							23,8	1,5	<1		0,1	0,0
Total K	g/kg									79,5	13,2	<1		2,8	0,2
Total N+P+K	g/kg	180,0	1000,0							126,5	17,3	47,9	0,6	5,2	1,3
Ca	g/kg									35,0	2,0	13,7		0,1	
Mg	g/kg									17,5	2,6	<0.002		0,1	
Na	g/kg									13,4		-		0,2	
S	g/kg									7,2	1,1	130,6	13,4		
Cu	mg/kg TS			0,0	300,0	0,0	600,0			175,0	33,3	<2		107,8	92,4
Zn	mg/kg TS			0,0	600,0	0,0	1000,0			838,7	100,9	<2		231,0	74,6
Fe	mg/kg TS									2020,0		21,8		<0.48	
Mn	mg/kg TS									-		<2		-	
Cd	mg/kg TS	0,0	3,0	0,0	3,0	0,0	1,5			<0.18		<0.245		<0.12	
Ni	mg/kg TS	0,0	120,0	0,0	60,0	0,0	50,0			86,6	115,1	<0.29		2,9	1,3
Pb	mg/kg TS	0,0	150,0	0,0	180,0	0,0	120,0			<3.2		<0.76		<2.97	
Cr	mg/kg TS	0,0	120,0	0,0	120,0	0,0	120,0			24,6	19,0	<0.29		3,3	1,6
Hg	mg/kg TS	0,0	2,0	0,0	2,0	0,0	1,0			<0.13		<0.0245		<0.12	
As	mg/kg TS	0,0	60,0	0,0	18,0	0,0	40,0			<1.3		<0.245		1,6	0,1
Al	mg/kg TS														
Cr VI	mg/kg TS					0,0	2,0			<0.32		<0.10		1,5	0,1
Salmonella spp.	unit/25g			0,0	0,0	0,0	0,0			0,0		0,0		<400	
Escherichia coli	CFU/g					0,0	1000,0			<10		<10		3986,0	
Enterococcaceae	CFU/g					0,0	1000,0			<23		<10		0,0	
PAH	mg/kg TS			0,0	6,0	0,0	6,0			1,3		<0.05			
Cl	g/kg									10,3	2,8	<0.01		23,8	5,4

*simplified to take into account any kind of fertilizer

**limitation are based on nutrient/pollutant flow

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FERTIMANURE

INNOVATIVE NUTRIENT RECOVERY FROM SECONDARY SOURCES-PRODUCTION OF HIGH-ADDED VALUE FERTILISERS FROM ANIMAL MANURE

PROJECT COORDINATOR

Fundació Universitària Balmes (Spain)

CONSORTIUM

Ghent University (Belgium)
Wageningen Environmental Research (The Netherlands)
University of Milan (Italy)
Leitat (Spain)
GreenWin (Belgium)
European Landowners Organisation (Belgium)
IPS Konzalting (Croatia)
Fraunhofer (Germany)
Dorset Green Machines (The Netherlands)
Prinsen Dairy Company (The Netherlands)
French Chamber of Agriculture (France)
Cooperativa Plana de Vic (Spain)
AlgaEnergy S.A. (Spain)
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RITTMO Agroenvironnement (France)
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PROJECT WEBSITE:

https://www.fertimanure.eu

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7. Brief project summary

The mission of the FERTIMANURE project is to provide innovative solutions (technology, end-products, and business models) that solve real issues, ie the manure challenge, and help farmers with the challenges that they are currently facing. FERTIMANURE will develop, integrate, test and validate innovative nutrient management strategies so as to efficiently recover and reuse nutrients and other products with agronomic value from manure, to ultimately obtain reliable and safe fertilisers that can compete in the EU fertiliser market.

The FERTIMANURE project will cover both technological and nutrient management approaches. The technological side will be addressed with the implementation of 5 innovative & integrated on-farm experimental pilots for nutrient recovery in the most relevant European countries in terms of livestock production (Spain, France, Germany, Belgium, The Netherlands), whereas nutrient management will be addressed through 3 different strategies adapted to mixed and specialised farming systems:

Strategy #1 with on-farm production and use of bio-based fertilisers (BBF)(1) , **Strategy #2** with on-farm BBF production and centralised tailor-made fertilisers (TMF)(2) production, and **Strategy #3** with on-farm TMF production and use.

Definition of Bio-based fertilisers (BBFs): *Bio-based fertilisers (BBFs) are fertilising products or a component to be used in the production of (Tailor-Made) Fertilisers that are derived* ***from biomass-related resources.***

The BBFs of FERTIMANURE are "obtained through a ***physical, thermal/thermo-chemical, chemical, and/or biological processes for the treatment*** *of manure or digestate that result into a change in composition due to a change in concentration of nutrients and their ratios compared to the input material(s) in order to get better marketable products providing farmers with nutrients of sufficient quality".*

However, just separation of manure in a solid and liquid fraction (as first processing step) is excluded. These products are not conceived as a BBF, although they are valuable sources to supply nutrients on agricultural land.

LIST OF BBFs Produced in FERTIMANURE

Number	BBF-code	BBF product description
1	NL-AS	Ammonium sulphate solution
2	NL-LK	Liquid K-fertiliser
3	NL-SC	Soil conditioner
4	NL-WP	Wet organic P-rich fertiliser
5	NL-DP	*90% dried organic P rich fertiliser (calc)*
6	ES-NC	Nutrient-rich concentrate
7	ES-DSC	Bio-dried solid fraction
8	ES-PA	Phosphorous (ashes)
9	ES-AM	Ammonium salts
10	ES-AA	AA-based biostimulants
11	DE-AS	Ammonium sulphate solution (liquid)
12	DE-BC	Biochar (solid)
13	DE-AP	Ammonium phosphate on perlite (solid)
14	BE-AN	Ammonium nitrate
15	BE-AS	Ammonium sulphate
16	BE-AW	Ammonium water
17	FR-BC	Biochar
18	FR-AS	Ammonium sulphate
19	FR-LK	Liquid K-fertiliser

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Definition of Tailor-Made Fertilisers (TMFs): *A tailor-made fertiliser (TMF) is a customized fertiliser that meets with the nutrient requirements of a specific crop by taking into account the soil type, soil fertility status, and growing conditions and fertilisation practises.*

The TMFs obtained in FERTIMANURE are produced from BBFs (produced from manure or digestate and/or other recovered fertilising products that are available) and/or mineral fertilisers (MF) (and/or biostimulants).

Fully crop specific TMFs can be defined and centrally produced assuming e.g. a sufficient nutrient status of a soil type and no additional fertilisation practice.

However, on farm level the soil-crop requirements will be different due to another nutrient status of the soil and the fact that often manure/digestate will be applied on the fields which has to be taken into account as nutrient supplier. Consequently, the composition of the TMF (combination of BBF and MF) that will be used by the farmer can differ from the one produced in a centralised way.

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