

D6.2 Evaluation of bio-fertiliser prototypes against their compliance with EU organic legislation



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Document Summary

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Abstract

Organic farming imposes severe restrictions on the use of fertilisers. For example, it strictly excludes the use of easily soluble mineral fertilisers. Animal-based fertilisers, such as products produced from waste and/or by-products from fishery, fish and seafood processing as well as aquaculture are a valuable source of Nitrogen, Phosphorous and Potassium, playing a crucial role in crop nutrition. They can be seen as promising candidates for fertilising products providing the required nutrients, while keeping the concept of sustainability and circularity at core. With the aim of determining whether the 8 bio-based fertilisers (BBF) developed throughout Sea2Land may finally also be used in organic farming, FiBL Europe pursued an evaluation on their compliance with the EU organic legislation. The evaluation was mainly based on documentation provided by the project partners in charge of the development of the relevant products. Finally, the evaluation revealed that 3 (UNI1, UNI3, CAT1) of the 8 products comply with the relevant legislation for EU organic production. The other 5 products were found to not be compliant with the latter. For one product (FER3) the non-compliance mainly resulted from the addition of easily soluble nitrogen in the form of urea. This is considered a gross non-compliance and there is little chance that this material will ever get authorized for organic production. For the other products (BR, FSP, FMP, OA1), the project team considers that the non-compliance is not of a fundamental nature and sees a chance that the relevant materials might get authorized for organic production in the future, if Annex II of reg. (EU) 2021/1165 is amended accordingly.

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Glossary

BBF: Bio-based fertiliser

CATAR : Institut national polytechnique de Toulouse, Toulouse INP

D: Deliverable

FERTINAGRO: Fertinagro Biotech, S.L.

FPR: Regulation (EU) 2019/1009 on EU fertilising products

GRONN: GRØNN GJØDSEL AS

INIA: Instituto de Investigaciones Agropecuarias

K: Potassium

N: Nitrogen

NIBIO: Norsk Institutt for Bioekonomi

NPK: Nitrogen Phosphorus Potassium

NUTRI: NUTRILOOP OU

P: Phosphorus

TRL: Technology Readiness Level

UNIVPM: Universita Politecnica Delle Marche

UVIC : Universitat de Vic – Universitat Central de Catalunya

1 Introduction

1.1 Background

In order to optimally meet the needs of crops and animals and to keep them healthy, farmers, both conventional and organic farmers need a wide range of inputs. In general, such inputs are materials which may be used in agriculture or food processing, such as fertilisers, soil conditioners, plant protection products, cleaning agents and disinfectants products for the control of animal parasites, feed materials, feed additives, food additives and food processing aids (The European Input List, 2018).

Inputs for use in organic production are usually very much different from the majority of conventional fertilisers. Organic farming emphasises aspects such as naturalness, best environmental practices, a high level of biodiversity and the preservation of natural resources. Overall organic farming imposes severe restrictions on the use of easily soluble mineral fertilisers. (Background Paper - Organic Food in the EU, 2018). Animal-based fertilisers, such as products produced from waste and/or by-products from fishery, fish and seafood processing as well as aquaculture are a valuable source of Nitrogen, Phosphorous and Potassium, playing a crucial role in crop nutrition. They can be seen as promising candidates for fertilising products providing the required nutrients, while keeping the concept of sustainability and circularity at core. (Composition & Quality Report Of Tailor Made Biobased Fertilisers, 2024) To this end, the products produced in the project will be evaluated with regard to their legal compliance for use in organic farming as part of this Deliverable 6.2.

1.2 Scope of this report

On EU level, organic production is regulated by reg. (EU) 2018/848 and its implementing regulation (EU) 2021/1165. In the context of fertilisers, soil conditioners and nutrients - those type of inputs that are relevant for the Sea2Land project - Annex II of regulation (EU) 2021/1165 establishes a positive list of materials/substances that may legally be used to compose such products. The Sea2Land project has developed a set of fertilisers and biostimulants, by re-cycling fishery by-products in different pilot plants located in different geographical areas. Deliverable D 6.2 encompasses the evaluation of 8 fertiliser products, developed throughout the Sea2Land project, against their compliance with the mentioned legislation.

As this deliverable exclusively deals with fertilisers and related products, the term input in this document only refers to the latter. Other inputs as mentioned under point 1.1 are not

in the scope of this project and not concerned by this document. Also, the project Sea2Land aims at producing advanced bio-based fertiliser products (BBF products, hereinafter `the products`) to be supplied to all kind of farming systems. By contrast this deliverable exclusively focuses on the evaluation of the products` compliance for use in organic farming systems.

It is to be noted that the classification and denomination of fertilisers according to national legislation may vary between countries. Further to that various member states enforce national organic regulations, implementing and specifying provisions for organic farming in the respective member state. Such legislation may also specify additional requirements or even further restrict the use of inputs for organic farming. These national laws were not considered in the evaluations pursued in terms of the SEA2LAND project. It is recommended that producers/distributors examine the national requirements of target markets at an early stage.

2 Materials and methods

2.1 Fertiliser products subject to this deliverable

The Sea2Land project, has established seven case studies in six different geographical areas, representative for the European Fishery Sector: the Baltic sea, Cantabrian sea, Adriatic sea, North sea, Atlantic sea, Mediterranean sea. Initially a total of 26 prototypes were developed and tested for production. For various process-specific and economic reasons, 8 prototypes were able to reach an advanced Technology Readiness Level (TRL). For these 8 products, compliance with EU organic legislation was evaluated in this deliverable. A detailed summary of the different case studies will be given in the report of deliverable D 7.2, while the products composition and quality aspects are reported in deliverable D 6.1.

The below table gives an overview on the prototypes that have been in the pipeline in the very initial phase (26) and the 8 products that reached an advanced TRL and will hence be considered for further development, subjected to N dynamics testing under controlled conditions, as well as soil incubation tests and test to measure gaseous emission. (Composition & Quality Report Of Tailor Made Biobased Fertilisers, 2024) The products, with upscaling potential, are marked in bold.

Table 1. Overview on total developed and tested prototypes (26) and prototypes that reached and advances TRL (8, marked in bold).

Task	Area	Lead	Final BBF product	Code	Form	Recommended category (D 6.1)
3.1	Baltic Sea	NUTRI	1) Foliar fertiliser	FS	l	Plant biostimulant
			2) Bokashi pellet	BP	s	Organic fertiliser
			3) Vermicompost and/or substrate	VER	s	Growing media/soil improver
3.2	Cantabrian Sea	FERTINAGRO	1) Amino acids, organic matter and humic acids	FER1	s	Plant biostimulant
			2) Foliar fertiliser with N and amino acids	FER2	l	Plant biostimulant
			3) NPK solution with aminoacids	FER3	l	Organic fertiliser (with potential biostimulant effect)
			4) Foliar fertiliser with amino and humic acids	FER4	l	Plant biostimulant
			5) Fertiliser with humic acids	FER 5	l	Plant biostimulant
3.3	Adriatic Sea	UNIVPM	1) Hydrolysate	UNI1	l	Organic fertiliser (with potential biostimulant effect)
			2) Biochar-compost composite	UNI2	s	Growing media/soil improver
			3) Chitin-rich fertiliser	UNI3	l	Organic fertiliser
			4) Calcium Carbonate	UNI4	s	Liming material
4.1	North Sea	NIBIO (GRONN)	1) Fish sludge pelleted fertiliser	FSP	s	Organic fertiliser
			2) Fish mix pelleted fertiliser	FMP	s	Organic fertiliser
4.2	Atlantic Sea	CATAR	1) Protein fraction	CAT1	s	Organic fertiliser
			2)Amino acids and peptides	CAT2	l	Plant biostimulant
			3)Protein fraction_upgraded	CAT3	s	Organic fertiliser
			4)Amino acids and peptides_upgraded	CAT4	l	Plant biostimulant
4.3	Mediterranean Sea	UVIC	1) Nutrient-rich concentrate	NRC1	l	Organic fertiliser
			2) Organic amendment	OA1	s	Organic fertiliser
4.4	Freshwater plant	UVIC	1) Nutrient-rich concentrate	NRC2	l	Not qualified

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			2) Organic amendment	OA2	s	Organic fertiliser
	Chilean sea	INIA	1) Peptone	Pep	s	Organic fertiliser
			2) Salmon bones flour	SBF	s	Organic fertiliser
			3) Dried fish sludge	DFS	s	Not qualified
			4) Compost	Com	s	Growing media/soil improver

2.2 Evaluation and relevant legal baseline

2.2.1 Compliance with EU organic regulation

Organic production in the EU is governed by Council Reg. 2018/848. This regulation establishes general and specific principles that essentially aim at the promotion of environmental protection and health while maintaining biodiversity and build consumer trust in organic products. The legislative framework governing all areas of organic production encompasses general aspects that not exclusively but also apply to inputs and their components. Examples include the prohibition of the use of GMOs, ionising radiation as well as the use of hormones. Specifically, to inputs the law establishes the general ban to use mineral nitrogen fertilisers, strictly limits the use of artificial fertilisers and aims at reducing the overall use of external inputs. (Organic Production and Products, 2022).

In the context of fertilization, the Implementing Reg. 2021/1165 contains more specific requirements. Annex II of reg. (EU) 2021/1165 (hereinafter referred to simply as Annex II) contains a positive list of fertilisers, soil conditioners and nutrients that may be used in organic production. This Annex II is the main and central legal source for the evaluation of products developed throughout Sea2Land in terms of D6.2. For ease of reference an excerpt of Annex II relevant for the products and materials developed throughout Sea2Land is shown in Appendix 1 of this document.

2.2.2 Compliance with relevant aspects of the EU regulation on fertilising products

The new EU regulation on fertilising products reg. (EU) 2019/1009 (hereinafter `FPR`) aims at reducing the environmental impact of fertilisers, limit their risk on human health as well as reduce Europe's dependency on imported fertilisers. It provides a harmonized legal baseline to encourage organic (in the chemical sense) and waste-based fertilisers in the EU. (New EU Rules Prepare The Ground For More Use Of Organic And Waste-based Fertilisers, 2022)

Fertilisers for organic farming do not have to comply with this regulation per default. They can be commercialised upon other legal baselines, such as national legislation. For certain materials, however, Annex II requires compliance with the FPR. Examples include specific requirements and restrictions for rock phosphates, gypsum, basic slag, potassium salts, elemental sulphur, inorganic micronutrients, organic rich sediments, biochar recovered struvite and precipitated phosphates.

The evaluations done in this deliverable also considered whether any of the materials are subject to complementary requirements evolving from the interlinkage of the Annex II (reg. (EU) 2021/1165) with the EU fertilising products reg. (EU) 2019/1009. However, the product review showed that this was not the case for any of the products subjected to evaluation in D 6.2.

An overall evaluation of the products compliance with the EU fertilising products reg. (EU) 2019/1009 has been carried out through deliverable D 6.1.

2.2.3 Considerations related to the principles of organic farming

As outlined in the previous chapters, organic farming and the corresponding legislation are based on the principles of organic farming, highlighting aspects such as respect for nature`s systems and cycles and the responsible use of natural resources (Regulation (EU) 2018/848). The evaluations done in this deliverable also considered whether the materials comply with the relevant principles.

2.3 Documentary baseline for the evaluation

The product evaluation was pursued upon the following documentation, provided by the designated representative of the respective pilot plant

- **Data collection form**, containing detailed information on a product composition and product characteristics.
- **Flowcharts on manufacturing**, as available
- **Complementary information** collected during the product specific exchange (clarification of open questions)
- **Technical datasheets**, as available
- **Material safety datasheets**, as available
- **Analysis reports**, either commissioned by relevant pilot plant or provided by the University of Ghent, as summarized in Deliverable D 6.1 Composition & Quality Report Of Tailor Made Biobased Fertilisers, 2024)

2.3.1 Comments related to legal and documentary baseline

The compliance of the relevant products has been evaluated upon the products` composition and manufacturing. Other documentation, as cited above, has been reviewed for plausibility checks as well as to verify certain aspects of the products` composition.

This document reflects a preliminary assessment, that has been effected on the information provided on the relevant products. As some products, according to the project partners are subject to further optimisation, this document reflects a status quo compliance. Any adjustments of which FiBL Europe was not informed in due time or which were made after submission of the evaluation basis can/could not be considered.

As legislation is subject to change, this document may have limited validity, after such legislative changes are implemented. For certain materials, additional legislation may apply. For example, the regulations (EU) No 1069/2009) and No 142/2011 must of be respected where relevant. Their compliance has not been assessed in the context of this deliverable.

3 Evaluation of compliance with EU organic legislation

3.1 Evaluation results

Note: parts given in *italics* reflect quotations from the EU organic legislation, mainly Annex II of reg. (EU) 2021/1165.

3.1.1 Bokashi pellet (BP) - Organic fertiliser

Table 2. Evaluation of Bokashi pellet.

Bokashi pellet (BP);	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	Component 1: Salmon scraps, aerobically fermented	currently not authorized	none	aerobically fermented animal by-products may be used in the form of biogas digestate (further restrictions apply). However, this product is not a biogas digestate.
	Component 2: Source separated, aerobically fermented food waste (HoReCa); subject to a closed and monitored collection system accepted by the Estonian public administration	authorized with limitation, to composting or biogas production.	"Composted or fermented bio-waste (Directive 2008/98/EC of the European Parliament and of the Council (2))";	"product obtained from separate bio-waste collection at source, which has been submitted to composting or to anaerobic fermentation for biogas production only ; vegetable and animal bio-waste only when produced in a closed and monitored collection system, accepted by the Member State maximum concentrations in mg/kg of dry matter: cadmium: 0,7; copper: 70; nickel: 25; lead: 45; zinc: 200; mercury: 0,4; chromium (total): 70; chromium (VI): not detectable".
	Component 3: Tree leaves (garden cuttings)	authorized	"Products and by-products of plant origin for fertilisers".	"e.g.: oilseed cake meal, cocoa husks, malt culms"

	<u>Component 4: Wood ash</u> (from wood not chemically treated)	authorized	"Wood ash"	"(from wood not chemically treated)"
Evaluation result	May not be used in organic farming in given composition, due to non-compliance of component 1 and 2 with the current version of Annex II of reg. (EU) 2021/1165. Possibilities for amending Annex II are outlined in chapter 4 of this report.			

3.1.2 NPK solution with amino acids (FER3) - Organic fertiliser (with potential biostimulant effect)

Table 3. Evaluation of NPK solution with amino acids (FER3).

NPK solution with aminoacids (FER3);	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1: Fish viscera hydrolysate</u>	authorized	"Products or by-products of animal origin as (...) Hydrolysed proteins (2)"	"(2) Not to be applied to edible parts of the crop"
	<u>Component 2: NPK compound fertiliser (0-40-40)</u>	depends on composition.	no details provided yet.	
	<u>Component 3: Urea</u>	not authorized		Article 5 of reg. (EU) 2018/848, outlining some General Principles of organic farming, limits the use of external inputs to " <u>low solubility mineral fertilisers</u> ". Urea is a <u>highly soluble</u> N source, and therefore not authorized.
Evaluation result	May not be used in organic farming in given composition, due to non-compliance of component 3. Additional questions remain regarding the possible authorization of component 2.			

3.1.3 Hydrolysate (UNI1) - Organic fertiliser (with potential biostimulant effect)

Table 4. Evaluation of Hydrolysate (UNI1).

Hydrolysate (UNI1)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1</u> : Concentrated hydrolyzed proteins from fishery-by products.	authorized	"Products or by-products of animal origin as (...) Hydrolysed proteins (2)"	"(2) Not to be applied to edible parts of the crop"
Evaluation result	May be used in organic farming. Restriction: the product must not be applied to the edible parts of the crop.			

3.1.4 Chitin-rich fertiliser (UNI3) – Organic fertiliser

Table 5. Evaluation of Chitin-rich fertiliser (UNI3).

Chitin-rich fertiliser (UNI3)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1</u> : Concentrated hydrolyzed proteins from fishery-by products.	authorized	"Products or by-products of animal origin as (...) Hydrolysed proteins (2)"	"(2) Not to be applied to edible parts of the crop"

	<u>Component 2: Chitin</u>	authorized	"Chitin (Polysaccharide obtained from the shell of crustaceans)"	"obtained from organic aquaculture or from sustainable fisheries, in accordance with Article 2 of Regulation (EU) No 1380/2013"
Evaluation result	May be used in organic farming. Restrictions: 1) the product must not be applied to the edible parts of the crop. 2) Chitin must be "obtained from organic aquaculture or from sustainable fisheries, in accordance with Article 2 of Regulation (EU) No 1380/2013".			

3.1.5 Fish sludge pelleted fertiliser (FSP) – Organic fertiliser

Table 6. Evaluation of Fish Sludge pelleted fertiliser (FSP)

Fish sludge pelleted fertiliser (FSP)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1: Fish sludge</u> (fish faeces, biofilter sludge) from water mesh filtering in recirculation fish farm, dried, pelleted.	currently not authorized		
Evaluation result	May not be used in organic farming in given composition, due to non-compliance of the main component with the current version of Annex II of reg. (EU) 2021/1165. Possibilities for amending Annex II are outlined in chapter 4 of this report. In the context of terrestrial animal husbandry manure from "factory farming" is forbidden. This requirement has so far not been applied to aquaculture systems. In case that fish sludge gets included into Annex II, similar restrictions might be implemented.			

3.1.6 Fish mix pelleted fertiliser (FMP) – Organic fertiliser

Table 7. Evaluation of Fish Mix Pelleted Fertiliser (FSP)

Fish mix pelleted fertiliser (FSP)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1: Blood meal</u>	authorized	"Products or by-products of animal origin as (...) Blood meal"	
	<u>Component 2: Fish sludge</u> (fish faeces, biofilter sludge) from water mesh filtering in recirculation fish farm, dried, pelleted.	currently not authorized	Fish sludge may in the wider sense be associated to the entry "Liquid animal excrements". However, fish sludge per definition may also contain excess feed materials, not covered by the term "excrements"	"use after controlled fermentation and/or appropriate dilution; factory farming origin forbidden"
	<u>Component 3: Bone meal</u>	authorized	"Products or by-products of animal origin as (...) Bone meal or degelatinised bone meal"	
	<u>Component 4: Sodium sulphate</u> (natural, mined)	natural forms authorized	"Stone meal, clays and clay minerals"	The relevant mentioning for this component is "stone meal"
	<u>Component 5: Polyhalite</u> (natural, mined)	authorized	"Stone meal, clays and clay minerals"	The relevant mentioning for this component is "stone meal"
Evaluation result	<p>May not be used in organic farming in given composition, due to non-compliance of the main component with the current version of Annex II of reg. (EU) 2021/1165. Possibilities for amending Annex II are outlined in chapter 4 of this report.</p> <p>In the context of terrestrial animal husbandry manure from "factory farming" is forbidden. This requirement has so far not been applied to aquaculture systems. In case that fish sludge gets included into Annex II, similar restrictions might be implemented. Sodium sulphate is allowed in natural forms only (e.g. mined minerals).</p>			

3.1.7 Protein fraction (CAT1) - Organic fertiliser

Table 8. Evaluation of Protein Fraction (CAT1)

Protein powder (CAT1)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1:</u> Hydrolyzed protein powder ; produced from fish carcasses (aquaculture) through enzymatic hydrolysis, extrusion and drying	authorized	"Products or by-products of animal origin as (...) Hydrolysed proteins (2)"	"(2) Not to be applied to edible parts of the crop"
Evaluation result	May be used in organic farming. Restriction: the product must not be applied to the edible parts of the crop.			

3.1.8 Organic amendment (OA1) – Organic fertiliser

Table 9. Evaluation of Organic Amendment (OA1)

Organic amendment (OA1)	main components	authorization for organic production	Legal base (Annex II, Reg. (EU) 2021/1165)	Restriction / Comment
	<u>Component 1:</u> Fish sludge* , subsequently processed	currently not authorized		

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Evaluation result (based on assumption made)	May not be used in organic farming in given composition, due to non-compliance of the main component with the current version of Annex II of reg. (EU) 2021/1165. Possibilities for amending Annex II are outlined in chapter 4 of this report. In the context of terrestrial animal husbandry manure from "factory farming" is forbidden. This requirement has so far not been applied to aquaculture systems. In case that fish sludge gets included into Annex II, similar restrictions might be implemented.
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*Provisional composition to be confirmed.

3.2 Summary of evaluation results

3 of the 8 products developed throughout the Sea2Land project **may be used** in organic production.

Table 10. Overview evaluation results.

BBF product code	Evaluation outcome
BP	may not be used in organic farming
FER3	may not be used in organic farming
UNI1	may be used in organic farming; restrictions apply
UNI3	may be used in organic farming; restrictions apply
FSP	may not be used in organic farming
FMP	may not be used in organic farming
CAT1	may be used in organic farming; restrictions apply
OA1	may not be used in organic farming

For one product (FER3) the non-compliance results from the addition of easily soluble nitrogen in the form of urea. In the project team's opinion, this is a gross non-compliance and there is little chance that this material will ever get authorized for organic production.

For the other products (BR, FSP, FMP, OA1), the project team considers that the non-compliance is not of a fundamental nature and sees a chance that the relevant materials might get authorized for organic production in the future, if Annex II of reg. (EU) 2021/1165 is amended accordingly.

Relevant adjustments would mainly concern the restriction of **aerobically fermented fish by-products and food waste** (concerning BP). Currently fish and food waste digestates are only permitted if the fermentation performed serves biogas production. That means that under current legislation, not the relevant material itself, but the purpose of the process determines the suitability of a particular material for use in organic farming. Furthermore, it is considered relevant to explore the suitability of **fish sludge** (concerning FSP, FMP, OA1) for use in organic farming. It is to be noted that in the context of terrestrial animal husbandry, manure from "factory farming" is forbidden. This requirement has so far not been applied to aquaculture systems. In the context of the suitability assessment of fish sludge it should also be discussed whether any such restriction is useful and practicable at all.

4 Conclusions and recommendations

Nitrogen, Phosphorous and Potassium are essential nutrients, playing a crucial role in crop nutrition. Animal-based fertilisers are a valuable source of these elements. Several types of animal-based fertilisers may currently be used in organic farming. 3 products evaluated in this deliverable (UNI1, UNI3, CAT1) are considered compliant with relevant requirements established by the EU organic legislation, in particular Annex II of reg. (EU) 2021/1165. One product (FER3) does not comply with the relevant legislation nor the principles of organic production and can therefore not be used in organic production. The remaining four products (BR, FSP, FMP, OA1) appear to be in line with the principles of organic farming, but could only be used in organic production after adaptation of Annex II of reg. (EU) 2021/1165. If these fertilisers will be upscaled and made available on the market, it is advisable to request a relevant change of Annex II. A dedicated form for making such requests is made available at the European Commission's website¹. Requests can be made by the competent authorities for organic production of the EU Member States and have to be addressed to the European Commission. Usually, the European Commission will submit such requests to the Expert Group for Technical Advice on Organic Production (EGTOP), advising on EU rules for organics being effective, proportionate and finally also up-to date with any technical advances in the field. Subsequently EGTOP will produce a technical evaluation which is made available on the European Commission's website. In case of a positive evaluation outcome, the European Commission and Member States will consider changing Annex II (Co-operation And Expert Advice For Organic Farming, n.d.), which may then provide a legal baseline for the use of the aforementioned materials.

¹https://agriculture.ec.europa.eu/document/download/af99954b-2dce-4699-84c9-5d2930a246ec_en?filename=dossier-annex-ii-fertilisers_en.docx

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Annex 1 - Excerpt from Annex II of reg. (EU) 2021/1165

Table 11. Excerpt from Annex II of reg. (EU) 2021/1165, listing relevant materials in the context of the evaluation of the 8 BBF products evaluated in this deliverable.

Name Compound products or products containing only materials listed hereunder	Description, specific conditions and limits
Composted or fermented bio-waste (Directive 2008/98/EC of the European Parliament and of the Council (2))	product obtained from separate bio-waste collection at source, which has been submitted to composting or to anaerobic fermentation for biogas production only vegetable and animal bio-waste only when produced in a closed and monitored collection system, accepted by the Member State maximum concentrations in mg/kg of dry matter: cadmium: 0,7; copper: 70; nickel: 25; lead: 45; zinc: 200; mercury: 0,4; chromium (total): 70; chromium (VI): not detectable
Biogas digestate containing animal by-products co-digested with material of plant or animal origin as listed in this Annex	animal by-products (including by-products of wild animals) of category 3 and digestive tract content of category 2 (categories as defined in Regulation (EC) No 1069/2009) factory farming origin forbidden the processes have to be in accordance with Regulation (EU) No 142/2011 not to be applied to edible parts of the crop
Products or by-products of animal origin as below: Blood meal Hoof meal Horn meal Bone meal or degelatinised bone meal Fish meal Meat meal Feather, hair and skin meal ('chiquette') Wool Fur (1) Hair Dairy products Hydrolysed proteins (2)	(1) Maximum concentration in mg/kg of dry matter of chromium (VI): not detectable (2) Not to be applied to edible parts of the crop
Products and by-products of plant origin for fertilisers	e.g.: oilseed cake meal, cocoa husks, malt culms
Wood ash	from wood not chemically treated after felling
Stone meal, clays and clay minerals	
Chitin (Polysaccharide obtained from the shell of crustaceans)	obtained from organic aquaculture or from sustainable fisheries, in accordance with Article 2 of Regulation (EU) No 1380/2013

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