FERTIMANURE

Deliverable

Project Acronym: FERTIMANURE

Project full name: Innovative nutrient recovery from secondary sources – Production of high-added value FERTIlisers from animal MANURE

Grant Agreement No. 862849

D7.4. EIP Practice Abstracts

Project start date	January 1st, 2020
Duration in months	48
Deliverable due date	June 30th, 2021
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Work package concerned	7
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Contributor(s)	ELO

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This project has received funding from
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Preface

The FERTIMANURE project's main objective is to develop, integrate, test, and validate innovative nutrient management strategies to efficiently recover mineral nutrients and other relevant products with agronomic value from animal manure, to finally obtain reliable and safe fertilisers that can compete in the European fertilisers market.

The aim of the EIP practice abstract is to ensure uptake by farmers by outlining the benefits and practical recommendations for the use of the produced BBF and TMF.

The resulting innovative knowledge and easily accessible end-user material from this project will feed into the EIP AGRI (The agricultural European Innovation Partnership) website for broad dissemination. The end-user material to be produced contains a substantial number of summaries for practitioners in the EIP common format ("practice abstracts"), including the characteristics of the project (e.g., contact details of partners, etc.). A full package of practice abstracts will be produced by FERTIMANURE, containing all the outcomes/recommendations which are ready for practice. A total target number of 12 practice abstracts is foreseen for the project, which are expected to be delivered in 3 different sets of 4 practice abstracts each: M18, M36 and M48.

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Document History

Date	Author	Action	Status
June 17th 2021	Marie-Christine Berger (ELO) and Jocelyn Pringle (ELO)	1st draft revision	Draft
June 18th 2021	Rodrigo Arandi - Klee (GWIN)	2nd draft revision	Draft
June 18th 2021	Yael Brusca (UVIC)	3rd draft revision	Draft
June 18th 2021	Anna Lloveras (LEITAT)	4th draft revision	Draft
June 24th 2021	Marie-Christine Berger (ELO) and Jocelyn Pringle (ELO)	5th draft revision	Draft
January 29th 2022	Micaela Cosgrove	1st draft including reviewers' comments	Draft
February 1st, 2022	Laia Llenas	Reviewed version, approved by UVIC	Approved by the PC

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Summary

This document contains under WP7 "Dissemination and Communication" the first part of Task 7.4 *EIP Practice abstracts*. The first four abstracts are included which are due to be submitted in Month 18. The topics include the objectives of the FERTIMANURE project, changes to the EU fertiliser regulation and how these will impact bio-based fertilisers, the activities of the on-farm pilots, and the existing nutrient imbalances across Europe.

The aim of the EIP practice abstract is to ensure uptake by farmers by outlining the benefits and practical recommendations for the use of the produced BBF and TMF.

The resulting innovative knowledge and easily accessible end-user material from this project will feed into the EIP AGRI (The agricultural European Innovation Partnership) website for broad dissemination. The end-user material to be produced contains a substantial number of summaries for practitioners in the EIP common format ("practice abstracts"), including the characteristics of the project (e.g., contact details of partners, etc.). A full package of practice abstracts will be produced by FERTIMANURE, containing all the outcomes/recommendations which are ready for practice. A total target number of 12 practice abstracts is foreseen for the project, which are expected to be delivered by ELO in 3 different sets of 4 practice abstracts each: M18, M36 and M48.

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Content

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List of Abbreviations

BBFs	Bio-based fertiliser
TMFs	Tailor-made fertiliser
EU	European Union
CE	Conformité Européenne

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1. Introduction

The FERTIMANURE project's main objective is to develop, integrate, test, and validate innovative nutrient management strategies to efficiently recover mineral nutrients and other relevant products with agronomic value from animal manure, to finally obtain reliable and safe fertilisers that can compete in the European fertilisers market.

This document contains under WP7 "Dissemination and Communication" the first part of Task 7.4 *EIP Practice abstracts*. The first four abstracts are included which are due to be submitted in Month 18. The topics include the objectives of the FERTIMANURE project, the activities of the on-farm pilots, changes to the EU fertiliser regulation and how these will impact bio-based fertilisers, and the existing nutrient imbalances across Europe. This is the first version of the Practice Abstracts, so we have produced them in English because they still need to be approved by the European Commission. As soon as the Practice Abstracts are approved by the EU, they will be sent to the EIP-AGRI, as stated in the Excel file, and also, they will be translated to all consortium languages. It is important to mention that the information of the common format for interactive innovation projects, in excel format, is presented in this deliverable by taking into account the mandatory and recommended fields.

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2. EIP-AGRI Common format

Project Identification

Please indicate whether the information refers to a multi-actor project or a thematic network	Multi-actor project

Project Information

Project identifier (see INSTRUCTIONS)	2020H2020_862849_FERTIMANURE
Title of the project in native language (*can be the language of the coordinator / one of the partners - otherwise repeat the title in English*)	Innovative nutrient recovery from secondary sources – Production of high-added value FERTIlisers from animal MANURE
Title of the project in English (*provide the project ACRONYM + short title within the characters limit*)	FERTIMANURE - Innovative nutrient recovery from secondary sources – Production of high-added value FERTIlisers from animal MANURE
Geographical location	
Country (*of the coordinator*)	ES
Main geographical location (NUTS3) (of coordinator - *for geolocalisation on map*)	ES511 - Barcelona
Editor of the text: person/organisation responsible for delivering the text	European Landowners Organization

Project coordinator (lead-partner) according to the cooperation/consortium agreement:

Name	Fundacio Universitaria Balmes (UVic-UCC)
Address	Carrer Perot Rocaguinarda 17, VIC Barcelona 08500
E-mail	laia.llenas@uvic.cat
Telephone	0034 93 881 61 68

Project period:

start year (YYYY)	2020
end year (YYYY)	2023

Project status: ongoing (after selection of the project) or completed (after final payment)	Ongoing

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Main **funding source** (Rural development programme, H2020, or other EU, national/regional or private funds)	H2020
Total budget of the project (total costs - in euros)	8.394.170,75
Objective of the project in English: what problems/opportunities does the project address that are relevant for the practitioner/end-user, and how will they be solved? - (300-600 characters, word count – no spaces)	Develop, integrate, test and validate innovative Nutrient Management Strategies to efficiently recover mineral nutrients and other relevant products with agronomic value (organic amendments and biostimulants) from animal manure, to finally obtain reliable and safe fertilisers that can compete in the European fertilizers market.
Description of project activities in English: (max 600 characters, word count – no spaces): short summary highlighting main project activities.	The main project activities include setting up 5 on-farm experimental pilots, which have been designed to offer replicable, viable and sustainable solutions for valorising the main types of livestock wastes. These pilots will produce bio-based fertilisers which will further be used to create tailor-made fertilisers to compete with current synthetic fertilisers on the market.

Project Partners

	Name	Address	E-mail	Telephone	Type of partner
project coordinator (lead partner) *from PROJECT INFORMATION*	Fundacio Universitaria Balmes (UVic-UCC)	Carrer Perot Rocaguinarda 17, VIC Barcelona 08500	laia.llenas@uvic.cat	+34938816168	research institute
project partner	Universiteit Gent (UGent)	SINT PIETERSNIEUWSTRAAT 25,	erik.meers@ugent.be aurore.assaker@ugent.be	+3292645950	research institute

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	Name	Address	E-mail	Telephone	Type of partner
		GENT9000, Belgium			
project partner	STICHTING WAGENINGEN RESEARCH (WENR)	DROEVENDAAL SESTEEG 4, WAGENINGEN 6708 PB, Netherlands	oscar.schoumans@wur.nl	+31317486446	research institute
project partner	UNIVERSITA DEGLI STUDI DI MILANO (UMIL)	Via Festa Del Perdono 7,MILANO 20122	fabrizio.adani@unimi.it	+390250316545	research institute
project partner	ACONDICIONAMIENTO TARRASENSE ASSOCIACION (LEITAT)	CARRER DE LA INNOVACIO 2, TERRASSA 08225, Spain	mjorba@leitat.org	+34937882300	research institute
project partner	POLE GREENWIN (GWin)	RUE AUGUSTE PICCARD 20, GOSSELIES 6041 ,Belgium	rodrigo.arandi@greenwin.be	+32470945425	SME
project partner	European Landowners Organization (ELO)	RUE DE TREVES 67,BRUXELLES 1040, Belgium	legal@elo.org	+3222343000	NGO
project partner	IPS KONZALTING DOO ZA POSLOVNE USLUGE (IPS)	DR. ANTESTARCEVICA 66, SISAK GRAD SISAK 44000, Croatia	ams@ips-konzalting.hr	+385989953630	SME
project partner	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTENFORSCHUNG E.V. (Fraunhofer)	HANSASTRASSE 27C, MUNCHEN 80686,Germany	juan.gutierrez@umsicht.fraunhofer.de	+499661908439	research institute
project partner	DORSET GREEN MACHINES BV (DORSET)	WEVERIJ 26, AALTEN 7122MS, Netherlands	e.haaring@dorset.nu	+31543475355	SME
project partner	MAATSCHAP J.G EN J.A. PRINSEN (APF)	BORCULOSEWEG 42, HAARLO7273 SJ, Netherlands	arjan@groot-zevert.nl	+31651249107	SME
project partner	ASSEMBLEE PERMANENTE DES CHAMBRES D'AGRICULTURE (APCA)	AVENUE GEORGE V 9, PARIS 8 75008, France	ka-ho.yim@apca.chambagri.fr	+33153571118	other
project partner	AGRARIA PLANA DE VIC I SECCIO DE CREDIT SCCL (CPV)	CARRETERA BARCELONA-PUIGCERDA KM 70.4, GURB BARCELONA 08503, Spain	gmuns@planadevic.cat	+34938852213	other

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	Name	Address	E-mail	Telephone	Type of partner
project partner	ALGAENERGY SA (ALGE)	AVENIDA DE EUROPA 19, ALCOBENDASMADRID 28108, Spain	jmg@algaenergy.es	+34914902020	SME
project partner	FERTINAGRO BIOTECH SL (FERT)	CALLE BERLIN POLIGONO LA PAZ185, TERUEL 44195, Spain	bego.arrufat@tervalis.com	+34978623077	other
project partner	RECH INNOV TRANSFERT TECHN MAT FERT ORG (RITTMO)	37 RUEDE HERRLISHEIM, COLMAR 68000, France	laure.metzger@rittmo.com	+33389804700	research institute
project partner	AGRIFUTUR SRL (AGRI)	VIA CAMPAGNOLE 8, ALFIANELLO 25020,Italy	roberto.kron-morelli@agrifutur.it	+390309934776	SME
project partner	DEPARTAMENT D'AGRICULTURA, RAMADERIA, PESCA I ALIMENTACIO (DARP)	GRAN VIA DE LES CORTS CATALANES 612-614, BARCELONA 08007, Spain	carlos.ortiz@gencat.cat	+34973220868	other
project partner	FERTILIZERS EUROPE (FertilizersEU)	AVENUE DES NERVIENS 9-31,BRUXELLES 1040, Belgium	tiffanie@fertilizerseurope.com	+322663315146	other
project partner	INSTITUTO NACIONAL DE TECNOLOGIA AGROPECUARIA (INTA)	Rivadavia 1439, BUENOS AIRES 1033, Argentina	crespo.diana@inta.gob.ar	+5411967932100	research institute

Audiovisual material

Title/description (in English)	URL	Additional comments
FERTIMANURE project website	https://www.fertimanure.eu/en/	Main communication and dissemination channel of the project
FERTIMANURE explanatory video	https://www.fertimanure.eu/en/publication/consult/12	General video explaining the most important aspects of the FERTIMANURE project
FERTIMANURE leaflet	https://www.fertimanure.eu/en/publication/consult/6	Communication material that explains the what, mission and objectives, circular economy strategy, on-farm pilots, aims of the project, parnters

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Title/description (in English)	URL	Additional comments
		involved, contacts, EU funding phrases
FERTIMANURE region cards	https://www.fertimanure.eu/en/publication/consult/17	Compilation of data related to all the manure generation and management costs in Barcelona (Spain), Achterhoek (The Netherlands), Oberpfalz (Germany), Flanders (Belgium), Grand Est and Brittany (France) and Italy.
FERTIMANURE explanatory videos subtitles in all of the consortium languages	https://www.youtube.com/channel/UCQbTLK1UpW6pREsNwH_lv1Q	The videos will be published in the YouTube channel. All of them will be uploades the 1st week of July at the latest - subtitles in Catalan, Croatian, Dutch, French, German and Italian.

Keywords

Keyword - category 1	Fertilisation and nutrients management
Keyword - category 2	Waste, by-products and residues management
Keyword - category 3	Agricultural production system

Websites

Title/description	URL	Additional comments
FERTIMANURE official project website	http://fertimanure.eu	-

Links to other website(s) hosting information on the project (results) that are available after the project has ended, by preference using the existing local/regional/national communication channels that practitioners most often use.

Title/description	URL	Additional comments
Repositori Institucional de la UVIC	http://repositori.uvic.cat/handle/10854/6620	-

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3. EIP Practice abstract 1

Short title:

H2020 FERTIMANURE project objectives

Short summary for practitioners (in English):

FERTIMANURE (Innovative nutrient recovery from secondary sources - Production of high-added value FERTIlisers from animal MANURE) aims to develop, integrate, test and validate innovative nutrient management strategies to efficiently recover mineral nutrients and other relevant products with an agronomic value from animal manure. This will create reliable and safe fertilisers that can compete in the European fertilisers market.

The main project results are:

- Developing and assessing innovative technological approaches for more sustainably producing homogeneous and standardised fertiliser products from an organic origin (BBFs and TMFs).
- Implementing 5 different on-farm experimental pilots in key EU countries for the livestock sector: Spain, France, Germany, The Netherlands, and Belgium.
- Develop new business models that are synergic with other economic sectors.

These results will be replicable in different contexts at the EU level as well as internationally and therefore are expected to encourage new policies and initiatives in nutrient and manure management and have a direct impact on the EU Circular Economy Strategy.

PROJECT WEBSITE:

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4. EIP Practice abstract 2

Short title:

Changes to the EU fertiliser regulation will allow for harmonization of criteria for organic materials for fertilising purposes (including BBFs) across the Member States

Short summary for practitioners (in English):

In the EU, the 2003/2003 regulation will be repealed by the 2019/1009 regulation to allow harmonisation between the Member States by having compliance criteria that set out the safety and quality specifications required for a product to be on the free market. The new regulation will also cover organic and organo-mineral fertilisers, soil improvers, inhibitors, plant biostimulants, growing media or blends that are not covered under the 2003/2003 regulation and allow them to be on the open market. The 2019/1009 regulation introduces limits for toxic contaminants such as cadmium. It is the first of its type developed within the Circular Economy Package of the European Commission. It will allow for a high level of soil protection and reduce environmental and health-related risks. The new regulation will provide manufacturers with the opportunity to modify their products to requirements to bear the CE mark and enter the open market. The alternative is that the products comply with only the national legislation and are restricted in the EU countries they can distribute the product to.

FERTIMANURE is going to produce different fertilising products from animal manure. Because the final aim of the project will be to obtain safe and quality products that can compete in the EU fertilisers market, the project will check if the developed products meet the requirements to trade fertilisers within the EU. Harmonisation of criteria is essential to this process so that BBF production and sales go through a less complicated process. This enables easier access to produce and procure organic-based fertilisers across the EU for farmers. Additionally, all the data regarding the quality and performance of FERTIMANURE BBFs shall provide relevant policy information based on scientific data.

PROJECT WEBSITE:

https://www.fertimanure.eu

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5. EIP Practice abstract 3

Short title:

Innovative on-farm pilots to recover nutrients from manure

Short summary for practitioners (in English):

Livestock farms are mostly intense producers, and therefore large amounts of manure by-products are created in these localised areas. Thus, the available agricultural land for manure application is limited, leading to an excess of manure that cannot be used for local agriculture. Knowledge about the amounts of manure and nutrients generated through manure is crucial for evaluating valorisation strategies towards improved management. However, information on actual management practices of all flows is not easily accessible or tracked in some countries.

This is why FERTIMANURE has built and implemented five on-farm pilots using innovative technological approaches to valorise manure in Spain, France, Germany, The Netherlands and Belgium, which will be complemented by creating potential business models and exploitation plans. The analysis of nutrient flows between different components of the agro-ecosystem is a necessary first step in characterising each region and understanding the particular opportunities and challenges faced.

The on-farm pilots' activities have been specifically designed to offer replicable, viable and sustainable solutions for valorising the main types of livestock wastes (liquid slurries and solid manures): pig slurry, cattle manure, cattle slurry, and poultry manure. A total of 19 bio-based fertilisers (BBFs) will be produced at the five pilots. These BBFs will be further used to produce and assess tailor-made fertilisers. Therefore, the project aims to recover nutrients and commercial bio-based and tailor-made fertilisers that can compete on the market with current synthetic fertilisers—providing farmers with an opportunity to use waste and integrate more into circular economy practices.

PROJECT WEBSITE:

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6. EIP Practice abstract 4

Short title

Existing nutrient imbalances in European regions

Short summary for practitioners (in English):

Knowledge about the current nutrient imbalances in European regions is essential to predict where the nutrients recovered in FERTIMANURE can contribute best to agriculture's long-term sustainability. FERTIMANURE has performed a nutrient imbalance analysis, focusing mainly in those EU regions were the pilots are installed.

Nations such as the Netherlands and Spain have recently had an intensification of animal production, causing a high production of manure and, consequently, a nutrient surplus. At present, measures to reduce the nutrient surplus in the Netherlands are primarily closed on a regional, national or Northwest European level. The high density of livestock production in Spain is primarily concentrated in the Northeast (pig and poultry) and Northwest (cattle), which complicates the distribution of the nutrients as fertiliser.

In Germany and France, there are considerable differences between regions of nutrient inputs from manure; the Northwest and Southeast regions of Germany have a significant input of nitrogen and phosphorus from manure, whereas the other areas have to apply mineral fertiliser to compensate for the lack of nitrogen and phosphorus from manure. The centre and north of France are more devoted to cereal and oil crop production and receive the minimum amount of nutrients from manure.

Agricultural land in the northern regions of Belgium is mainly used for livestock production. In contrast, cereal and industrial crop production is primarily found in the country's south. Therefore, the northern regions are characterised by higher nutrients from animal sources.

For producers, it is essential to close the nutrients loop, considering and addressing the different needs of their regions. For that, accurate data is essential in forming policy and assessing appropriate fertiliser needs of regions, and this is dependent on local, national and EU data being consistent.

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7. Discussion

FERTIMANURE (Innovative nutrient recovery from secondary sources - Production of high-added value FERTIlisers from animal MANURE) will create reliable and safe fertilisers that compete in the European fertiliser market—having results that are replicable in different contexts at the EU level as well as internationally. From this, it can be expected that new policies and initiatives in nutrient and manure management will be furthered and directly impact the EU Circular Economic Strategy.

Through innovative technological approaches which valorise manure in Spain, France, Germany, The Netherlands and Belgium, a stronger system can form through analysis of nutrient flows between different components of the agro-ecosystem is a necessary first step in characterising each region and understanding the particular opportunities and challenges faced. To support the production of biobased fertilisers, a regulation intended to bridge the gaps between EU and national legislation is essential to reduce the need for additional national legislation and increase harmonisation across the EU.

8. Conclusions

The deliverable includes the first four EIP Practice abstracts under Task 7.4 for the FERTIMANURE project. Each abstract highlights project objectives, activities, regulations affecting project activities and knowledge about current nutrient imbalances across Europe. At the same time, they outline the benefits and practical recommendations for using bio-based and tailor-made fertilisers to ensure the uptake by farmers. 8 additional practice abstracts will be produced during M36 and M48.

9. Recommendations

Not applicable

Annexes

Not applicable

References

Not applicable

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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)
Fertinagro Biotech (Spain)
RITTMO Agroenvironnement (France)
Agrifutur (Italy)
Departament d'Agricultura, Ramaderia, Pesca I Alimentació (Spain)
Fertilizers Europe (Belgium)
Instituto Nacional de Tecnología Agropecuaria (Argentina)

PROJECT WEBSITE:

https://www.fertimanure.eu

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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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