D 6.1 - Inventory and integrated assessment of the EU regulations related to the production and application of bio-based fertilisers

WP6, T6.1 Inventory and integrated assessment of the EU regulations related to production and application of bio-based fertilisers

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Table of Contents

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 101000752.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 101000752.

List of Tables

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 101000752.

Abbreviation list

ADEME	Agency for the Environment and Energy Management**
AGEC	Anti-waste Law for a Circular Economy
ANSES	French Agency for Food, Environmental and Occupational Health & Safety
BBF	Bio-based Fertilisers
CERFA	Administrative Form
CMC	Component Material Category
CRM	Critical Raw Materials
DGCCR	French Ministry of economy and finance (Directorate-General for Competition, Consumer Affairs and Prevention)
ECHA	European Chemicals Agency
EFSA	European Food and Safety Authority
EU	European Union
ETM	Metallic Trace Element
FAVV	Federal Agency for the Safety of the Food Chain
FPR	Fertilising Products Regulation
IPAC	Portuguese Institute for Accreditation
IPCC	Integrated Pollution Prevention and Control
IPQ	Portuguese Institute for Quality
MAFOR	Fertilising Materials of Residual Origin
MFSC	Fertilising Materials and Crop Supports
MPN	Most Probable Number
MS	Member States
NAB	National Accreditation Body
NANDO	New Approach Notified and Designated Organisation
NEBIH	Hungarian Food Safety Agency
NPK	Nitrogen-Phosphorus-Potassium
PAH	Poly Aromatic Hydrocarbons
PFC	Product Function Categories
REACH	Registration, Evaluation, Authorisation, and Restriction of Chemicals
EU RTD	European Research and Technological Development
SDS	Safety Data Sheet
TFEU	Treaty on the Functioning of the European Union
WFD	Waste Framework Directive
WW	Waste Water
WWTP	Waste Water Treatment Plant

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1 Executive Summary

WP6 'Policy implications at regional/national and European level' and D6.1 'Inventory and integrated assessment of the EU regulations related to production and application of bio-based fertilisers' is a legal advisory and legal road map for European Research and Technological Development (EU RTD) partners, who have the sole responsibility to select and apply either the national policies or Reg. EU 2019/1009 (FPR) or both, to define the legal base for their innovative new products that are technically/legally certainly different case by case and partner by partner.

As a result of the collective effort of contributing beneficiaries (3R, CARTIF, APCA, UGent, NTUA, SDU, UCPH, UNITO, VEOLIA, UC, ITACYL) in the targeted mapping of an existing national, regional and local policy framework that has relevance for the nutrient recovery taking into consideration inter alia the REACH regulation and the regulation on CE marketable fertilising products (Fertilising Products Regulation (FPR) (EU) 2019/1009) that was enforced in July 2022, D6.1 acts as a guide in bridging the integrated WalNUT technological solutions with market and user acceptance.

D6.1 is mainly for those RTD partners who are developing market competitive technologies and products to be demonstrated at TRL5 on a large scale. It is a user-friendly document with active links to the regulations.

This desk-based research is complemented by targeted interviews with key stakeholders in the scope of D1.4'Barriers on Bio-based fertilisers (BBF)' development of WP1 'Mapping current nutrient recovery balance in European WW treatment systems.

The findings of the activities carried out under Task 6.1 were summarised in a report on Policy baseline analysis, including an inventory of policies (Table 4-3), a detailed analysis that will cover the development directions of various policies, trends, drivers, obstacles, gaps, shortcomings and comparison of policies across countries, to identify key similarities and differences (Section 3: Assessment of EU Member States' regulations), and Section 5: Prospects for future policy development.

D 6.1 is complemented by an Excel file containing the EU and Member State policy framework parameters and requirements regarding target pollutants, (i.e. pharmaceutical residuals, illicit drugs, microbiological pathogens and any other potential hazards) which may be detected in the WWTP sewage and shall be considered as potential contamination in the BBFs.

In Section 1 an assessment of EU Regulations for the lawful application of innovative bio-based fertilising products is presented, emphasising Reg (EU) 2019/1009 that was implemented on 16th July 2022.

Section 2 consists of Table 4-3 entitled 'Inventory of the EU Member States' regulations related to the production and application of bio-based fertilisers'.

In Section 3 Regulations of Spain, France, Belgium, Italy, Greece, Denmark, Hungary, Portugal are assessed.

In Section 4 there is a list of Notified bodies designated to inform the European Commission and the other Member States of the conformity and the conformity assessment of an EU fertilising product (Table 6-10). The respective organisations for the conformity of fertilising products (either national or CE-labelled) of France are presented in Table 6-11, Hungary in Table 6-12 and Portugal in Table 6-13.

In Section 5 the prospects of future policy development are discussed, according to the integrated assessment of EU Member States' fertilising products regulations.

Keywords: Bio-based fertilisers, policy framework

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2 Introduction

2.1 Purpose, scope and target group

The wide range of WalNUT RTD actions requires a wide range of legal knowledge. The content of D6.1 will stand as the legal road map for WalNUT Partners to start their own RTD action planning.

The WalNUT is a showcase of the full potential of WW treatment and utilisation as a raw material for bio-based fertilisers production of a wide range of lawfully qualified products that meet with regulation requirements. The target is to establish a concrete view of their market positioning.

Some of the long-term aims of the European Union are:

- Placement of secondary raw materials on the EU fertiliser market to protect primary raw materials.
- Enable recycled organic fertilisers and soil amendments (composts and digestate products) to access the EU internal market so that they can compete on an equal level with mineral fertilisers.
- Introduction of harmonised EU rules for products.

The attempt to replace non-renewable mineral fertilisers, with bio-based fertilisers from nutrient recovery practices on waste water streams needs should be regulated by a concise policy framework at a national (EU-MS) and the EU level. This transition is currently guarded and facilitated by the FPR (Reg. EU 2019/1009).

WalNUT is developing the necessary concepts and technological solutions to re-design the value and supply chains of nutrients from Waste Water (WW) streams that wide range of different inputs containing and wide range of different contents that require a wide range of technological processes.

WalNUT's new technology, methods and innovative product development results will be adapted to Reg. (EU) 2019/1009 and shall also meet the requirements of EU-MS regulations, governance policies, regulatory framework and citizens' engagement to effectively reduce the environmental / climate impact of current disposal of waste water.

WalNUT's D6.1 'Inventory and integrated assessment of the EU regulations related to the production and application of bio-based fertilisers' targets to report any fertilising products' regulation differentiations between each EU-MS and the EU. This will facilitate both the free distribution of fertilising products and the market competitive recovery of bio-based fertilisers from waste water streams.

Moreover, D6.1 lays the basis for a common understanding between:

a) Policy makers,

b) WalNUT partners in waste water producing industries and nutrient recovery technology institutes and

c) WalNUT bio-based fertilising product end-users,

for sustainable solutions towards the recovery, authorisation and application of market - competitive bio-based fertilisers from WW streams.

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2.2 Contribution of WalNUT partners

Under the coordination of 3R-BioPhosphate Ltd. (3R), project partners mentioned in Table 2-1 carried out a targeted mapping and analysis of existing and forthcoming EU, national, regional and local policy framework that has relevance to the utilisation of products' derived from nutrient recovery practices for fertilisation purposes, taking into consideration inter alia the REACH regulation and the regulation on CE marketable fertilising products (Regulation (EU) 2019/1009) that was enforced in July 2022, along with the EU Member states regulations and the regulation (EU) 2019/515 of the European Parliament and of the council of 19 March 2019 on the mutual recognition of goods lawfully marketed in another Member State and repealing Regulation (EC) No 764/2008, that in some cases are even stricter than Reg. 2019/1009 (e.g. for Potentially Toxic Elements (PTEs) and Poly-aromatic Hydrocarbons (PAHs)). Furthermore, project partners gathered the policy framework regarding additional target pollutants, such as pharmaceutical residuals, illicit drugs, microbiological pathogens and any other potential hazards, which may be detected in the WWT sewage and shall be considered as potential contamination in the bio-based fertilisers. The analysis aims to the establishment of a solid knowledge base for EU and MS policy support. The national, regional and local level assessment was not limited to those countries, in which the WalNUT pilot actions are implemented (Spain, Belgium, Hungary and Greece) but included other European countries as well (France, Italy, Denmark and Portugal).

Table 2-1: Contribution of WalNUT partners

WP6 Leader:	Contribution
3R-BioPhosphate Ltd. (3R)	Coordination of Task 6.1, Co-supervision of D6.1 Revision of D6.1 Integrated assessment of fertilising products regulations in Hungary
WalNUT Partners:	Contribution
FUNDACION CARTIF (CARTIF), VEOLIA SERVICIOS LECAM SOCIEDAD ANONIMA UNIPERSONAL (VEOLIA), INSTITUTO TECNOLOGICO AGRARIO DE CASTILLA Y LEON (ITACYL)	Integrated assessment of fertilising products regulations in Spain
ASSEMBLEE PERMANENTE DES CHAMBRES D'AGRICULTURE (APCA)	Integrated assessment of fertilising products regulations in France
UNIVERSITEIT GENT (UGent)	Integrated assessment of fertilising products regulations in Belgium
NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA (NTUA)	The lead beneficiary of D6.1 Integrated assessment of fertilising products regulations in Greece
SYDDANSK UNIVERSITET (SDU), KOBENHAVNS UNIVERSITET (UCPH)	Integrated assessment of fertilising products regulations in Denmark
UNIVERSITA DEGLI STUDI DI TORINO (UNITO)	Integrated assessment of fertilising products regulations in Italy
UNIVERSIDADE DE COIMBRA (UC)	Integrated assessment of fertilising products regulations in Portugal

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2.3 Relation to other activities in the project

The desk-based research for the scanning of fertilising products - relevant policies was complemented by targeted interviews with key stakeholders. During the elaboration of interviews in the framework of Task 1.2 'European status and barriers on nutrient recovery technologies and bio-based fertilisers' (Table 2-1), WalNUT partners were also asked about the fertilising products' policy framework they have to comply with and the difficulties they have to overcome in managing nutrient recovery products for fertilisation purposes. The gathered information was analysed to provide a comprehensive overview of the regulatory framework and ongoing new regulation concepts.

Moreover, at a later stage of the WalNUT project, partners may ask from WP6 coordinator and lead beneficiaries for legal advice/consultation adapted to their specific pilot plant case. For this input request, actual case content will be required to make any legal considerations and provide WalNUT partners with the necessary support.

The D6.1 stands as an inventory and integrated assessment of the EU regulations related to the production and application of bio-based fertilisers, which is most importantly serving as a legal road map to the WalNUT pilot plant developers through all activities, most importantly in the development of the WP3, WP4, WP5 and WP7 whose market creative practical and lawful results need to be strongly highlighted in the WP8.

The aim is to bridge over applied science, industry, market drivers and policymakers with TRL5 actions to make a common understanding about the sustainable solutions for the market competitive recovery of BBFs from WW streams, aiming to lawfully replace non-renewable mineral fertilisers that require a wide range of application of the EU and MS regulations, incl. Authority permits for large - scale WP4 demonstrations.

Table 2-2: Relation to other activities in the project

Task	Description
Task 1.2 European status and barriers to nutrient recovery technologies and bio-based fertilisers	The simultaneous elaboration of Tasks 1.2 and 6.1 facilitated the formation of the WalNUT Questionnaires for the interview of WalNUT stakeholders and other EU contributors to the nutrient recovery practices from waste water streams. The lack of consistency in the fertilising products' regulatory framework is considered the main barrier to the recovery, authorisation, distribution and application of market competitive bio-based fertilisers from WW streams.

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3 Assessment of EU Regulations for the application of innovative bio-based fertilising products

3.1 Regulation (EU) 2019/1009 of the European Parliament and the Council on CE marketable fertilising products

In the FPR EU (2019/1009) (EUROPA-Lex, 2022), a fertilising product is defined by its Product Function Category (PFC, type of product/fertiliser) and the Component Material Category (CMC, allowed input materials). This regulation sets out criteria covering safety, quality and labelling that all fertilising products must meet so that they can be freely traded throughout the EU.

The FPR concerns all fertilisers (inorganic and organic) and biostimulants, except sludge and/or compost of sludge and biodegradable waste from biodegradable waste management. This regulation also gives directions for the establishment of an evaluation body responsible for monitoring the compliance of fertilisers as will be discussed in Paragraph 6 of D6.1 'Notified bodies'.

The key points and benefits of this regulation are as follows:

- The FPR facilitates sales for producers of organic and reclaimed fertilisers through harmonised quality standards for all types of fertilisers that can be traded throughout the European Union.
- More choices for farmers, and fewer health and environmental risks for consumers.
- The maximum cadmium level of < 1.5 mg/kg applicable to organic fertilisers and other bio fertilisers will ensure a high level of soil protection and reduce health and environmental risks while allowing manufacturers to adapt their production process to comply with the new limits.
- The "low cadmium content" < 20 mg/kg organic-mineral fertilisers provide a higher level of soil protection and reduce health and environmental risks compared to the high cadmium content mineral fertilisers.
- Promotes the use of organic and biological/waste-based fertilisers.
- Promotes increased use of recycled materials for fertiliser production, contributing to the development of the circular economy while reducing dependence on imported nutrients.
- Facilitates market access for innovative, organic fertilisers, which would give farmers and consumers more choices and encourage green innovation.
- The FPR establishes EU-wide quality, safety and environmental criteria for "EU" fertilisers.
- Strengthen consumer confidence by ensuring the safety of fertilisers about human health and the environment (especially toxic elements and organic contaminants).
- As distributors and importers are close to the market, they should be involved in market surveillance by competent national authorities.
- Full harmonisation of the internal market would eliminate all costs related to mutual recognition and/or divergent national rules and ensure a uniform level of protection for human health and the environment.

To avoid creating additional barriers to the marketing of established secondary raw materials in national markets, the regulation foresees an 'optional harmonisation'. It is important to understand that, contrary to most other product harmonisation measures in EU law, the FPR does not prevent non-harmonised fertilisers from being available on the internal market following national law.

Compliance with harmonised rules is therefore optional and required only for products, intended to be CE-marked when made available on the market. This Regulation, therefore, does not apply to products which are not CE-marked when made available on the market.

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The FPR applies to products which are placed on the market as fertilisers designated 'EC fertiliser'. It is therefore mainly applied towards the regulation of the status of fertilisers derived from nutrient recovery, such as struvite, biochar and P-ashes, as well as ammonium salts.

Struvite from (municipal) waste water is also included as CMC12: Precipitated phosphate salts and derivates. As struvite may contain varying compositions and concentrations of a wide range of pharmaceutical residuals, illicit drugs and human/animal pathogens, which might frequently change, extended tracing actions are to be considered.

Furthermore, the regulation also links to the end-of-waste status, as established by the Waste Framework Directive.

'Article 19 This Regulation lays down criteria following which material that constitutes waste, as defined in Directive 2008/ 98/EC, can cease to be waste if it is contained in a compliant EU fertilising product. In such cases, the recovery operation under this Regulation shall be performed before the material ceases to be waste, and the material shall be considered to comply with the conditions laid down in Article 6 of that Directive and therefore to have ceased to be waste from the moment that the EU declaration of conformity was drawn'.

Establishing criteria for fertilisers, which were recovered from waste, would thus mean that these products obtain the end-of-waste status.

With the pre-final STRUBIAS report (19/09/2019) (Phosphorus platform, 2022), JRC made an important step towards the incorporation of CMC 13: Thermal oxidation materials and derivates and CMC 14: Pyrolysis and gasification materials in Regulation EU 2019/1009.

The criteria in Regulation EU 2019/1009 for precipitated phosphate salts and derivates are:

- A minimum P_2O_5 content of 16% of the dry matter content (dried at 40 °C);
- A maximum organic carbon content of 3 % of the dry matter content (dried at 40 °C);
- No more than 3 g/kg dry matter of macroscopic impurities in the form of organic matter, glass stones, metals and plastics above 2 mm;
- No presence of Salmonella spp. In a 25 g fresh mass sample;
- No presence of Escherichia coli or Enterococcaceae in a concentration of more than 1000 CFU/g fresh mass;
- No more than 6 mg/kg of dry matter of PAH;
- No presence of Clostridium perfrigens in a concentration of more than 100 CFU/g fresh mass;
- No presence of Ascaris sp eggs in a 25 g fresh mass.

Ammonium salts correspond to the PFC C.I. (b) (i) Straight liquid inorganic macronutrient fertiliser if the N-concentration > 5 %.

Compost and digestate manufacturers can decide whether to label their products with the CE mark: they can either freely trade their CE-marked products on the internal market following common European rules, or simply market their non-CE-marked products according to national rules.

Manufacturers of these product groups have to demonstrate that their products comply with environmental and health requirements (limit values for physical and chemical contaminants) to display the CE mark on their products.

The European Compost Network submitted new European transformation parameters for composting animal by-products to the European Food and Safety Authority (EFSA). If alternative methods will not be adopted, it is unlikely that any compost or digestate including kitchen waste will be placed as a CE-marked fertilising product on the European market.

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The final fertilising products can be placed on the market according to a specific conformity assessment procedure. If compost (CMC3) or digestate (CMC5) from waste materials are used in organic fertiliser, solid improver or growing media an external conformity assessment, including process and product control by a notified body will be obligatory.

The (EU) 2021/2088 CMC14 amending Annexes II, III and IV to Regulation (EU) 2019/1009 of the European Parliament and of the Council to add pyrolysis and gasification materials as a component material category in EU fertilising products. CMC14 is including ABC Animal Bone Char (BioPhosphate) and biochar products as well.

The obligations of importers and traders are comprehensively regulated in Articles 8 and 9 of the new FPR. The core idea is that only compliant EU fertilisers may be placed on the market. Importantly, importers and distributors are obliged to inform the market surveillance authorities (and possibly other economic operators involved) if a product poses a risk to human, animal or plant health or the environment. These economic operators also have other obligations, such as verifying that the manufacturer has provided the necessary documentation and information on their fertilising product. They must also ensure that storage and transport conditions do not affect the compatibility of EU fertilisers with the new EU Fertiliser Regulation as long as the products fall within their jurisdiction. The obligations of the two economic operators also differ on closer inspection, as the importer has more extensive obligations. It should be emphasised, for example, that the importer must indicate his identification data on the packaging of the EU fertiliser (or the accompanying document).

In connection with the new (EU) 2019/1009, CEN already published 82 new Technical Specifications on fertilising products for CE marking and continuously developing new TS's, incl. CEN analytical standards for PAHs as well, are currently under CEN development and are expected to be published shortly.

3.2 The Waste Framework Directive 2008/98/EC

The Waste Framework Directive (WFD) is a European Union Directive concerned with "measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use".

Whereas sludge from the treatment of urban waste water is considered to be waste and included in the list of waste, code 19 08 05, as established by the Commission decision of 3 May 2000 (2000/532/EC), this directive also foresees in the end-of-waste status for products, recovered from waste.

Article 6 states:

'Certain specified waste shall cease to be waste within the meaning of point (1) of Article 3 when it has undergone a recovery, including recycling, operation and complies with specific criteria to be developed following the following conditions: (a) the substance or object is commonly used for specific purposes; (b) a market or demand exists for such a substance or object; (c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products, and the use of the substance or object will not lead to overall adverse environmental or human health impacts. The criteria shall include limit values for pollutants where necessary and shall take into account any possible adverse environmental effects of the substance or object.'

As mentioned above, if a CMC and/or PFC would be foreseen for materials that are recovered from waste and these materials correspond to a PFC, including the criteria, this amounts to end-of-waste criteria for fertilisers, recovered from waste.

The end-of-waste status of a product offers advantages to the company that wants to market this product. In Germany, for example, fertilisers made from biodegradable waste are still considered waste, even if they have

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been properly placed on the market under national law. Such products remain subject to waste legislation until they are recycled according to their purpose. If, on the other hand, a company decides to label such products at CE and market them as fertilisers, the end product is not subject to waste legislation. This means that such a product is no longer subject to the various obligations arising from waste legislation, such as the detection procedure, the use of A-marks and the restrictions on use.

The amendment is directly related to the European Commission's "end-of-waste criteria" for recycled materials.

3.3 REACH legislation

On July 1st, 2007, European Parliament entered into force Regulation 1907/2006 concerning Registration, Evaluation, Authorisation, and Restriction of Chemicals. European Chemicals Agency (ECHA) proposed this regulation to improve the protection of human health and the environment from risks that can be caused by chemicals. The second REACH objective was to enhance the competitiveness of the European Union chemicals industry.

The current legislative framework for chemicals is inadequate. It has not produced sufficient information about the effects of chemicals on human health and the environment, and where risks are identified, it is slow to assess them and introduce risk management measures. These shortcomings have potentially put human health and the environment at risk. The current system has also hampered research and innovation, causing the EU chemicals industry to lag behind its counterparts in the US and Japan in this regard. The current legislation distinguishes between so-called "existing" and "new" chemicals, based on the cut-off date of 1981. All chemicals that were put on the market before 1981 are called "existing" chemicals. In 1981, they numbered 100,106. Chemicals introduced after 1981 are termed "new" chemicals. The two most important aims are to improve the protection of human health and the environment from the hazards of chemicals and enhance the competitiveness of the EU chemicals industry. Registration capacities: 1-10 t/y, 10-100 t/y, 100-1000 t/y and above 1000 t/y.

In principle, every industry manufacturing, importing and/or placing on the market chemicals or chemically modified substances on a scale larger than 1 tonne per year (excluding food ingredients, animal feed, and medicinal products) needs to comply with this regulation. Industries are obliged to submit a dossier on the risks of produced chemicals and their safe use. Producers, importers, and downstream users have responsibilities under REACH. Importers and downstream users must follow all the precautions deriving from the above information to ensure safe transportation, use, and disposal of chemicals.

To summarize, a chemical or chemically modified substance must meet REACH compliance and requirements and need to be registered in the ECHA platform before its commercialization. Thus, the industry that produces a chemical should compile a dossier including all the appropriate safety and toxicological data and submit it to ECHA. Upon completion of the dossier inspection, the producer of the chemical can be granted permission for its commercialization. In case this procedure has been already performed by another producer (registrant) and the ECHA platform contains all the appropriate data about the chemical, only an access letter must be sent to ECHA asking for this information. ECHA will help to get in contact with the registrant who first uploaded these data. The producer will pay a fee to the registrant and get access to the dossier of the substance. The data must be kept in his facilities and be used for compiling the Safety Data Sheet (SDS) of the chemical substance.

REACH legislation has been drafted to avoid overlaps with other legislation. The information generated by REACH will enable other relevant legislation to function more efficiently.
The benefits of the REACH system are twofold: risks to human health will be reduced and environmental quality will be improved through the better and earlier identification of the properties of chemical substances. The identification of hazards and better management of risks resulting from the use of chemicals will contribute to the prevention of health problems caused by exposure to chemicals, e.g. lower occurrence of diseases and preventable deaths, and lower costs for the national health systems.

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3.4 Regulation (EU) 2019/515 for the application and simplified extension of MS Authority permit in other MS

The aim of the EU Mutual Recognition Regulation (EUR-Lex, 2022) of goods lawfully marketed in another Member State is to strengthen the functioning of the internal market by improving the application of the principle of mutual recognition and by removing unjustified barriers to trade. This regulation was published on March 29, 2019, and entered into force on April 18, 2019. By 20 April 2025, and every four years thereafter, the Commission shall carry out an evaluation of this Regulation in the light of the objectives it pursues and shall submit a report thereon to the European Parliament, the Council and the European Economic and Social Committee.

3.4.1 Free movement of goods

The internal market shall comprise an area without internal frontiers in which the free movement of goods is ensured following the Treaties. Quantitative restrictions on imports and all measures having equivalent effect shall be prohibited between the Member States. This prohibition covers all national measures which are capable of hindering, directly or indirectly, actually or potentially, the intra-Community movement of goods. The free movement of goods is ensured in the internal market by the harmonisation of rules at the Union level laying down common requirements for the marketing of certain goods or by the application of the principle of mutual recognition, as defined by the Court of Justice of the European Union, to goods or aspects of goods which are not exhaustively covered by the Union harmonisation rules.

3.4.2 Harmonisation of rules at the Union level

A well-functioning mutual recognition principle is an essential complement to the harmonisation of rules at the Union level, especially considering that many goods have both harmonised and non-harmonised aspects.

Obstacles to the free movement of goods between the Member States may be unlawfully created. In the absence of the Union harmonisation rules for goods or certain aspects of goods, the competent authority of a Member State applies national rules to goods lawfully marketed in another Member State. Accordingly, they require that the goods comply with certain technical requirements associated with designation, shape, size, weight, composition, presentation, labelling or packaging. The application of such rules to goods lawfully marketed in another Member State could be contrary to Articles 34 and 36 of the Treaty on the Functioning of the European Union (TFEU), even if the rules apply indiscriminately to all goods.

3.4.3 Mutual recognition

The principle of mutual recognition goes back to the case law of the Court of Justice of the European Union. According to this principle, Member States may not prohibit the sale on their territory of goods lawfully marketed in another Member State, even if those goods have been manufactured according to different technical rules, including goods which are not the result of a manufacturing process. However, the principle of mutual recognition is not absolute. Member States may restrict the placing on the market of goods lawfully marketed in another Member State if those restrictions are justified on the grounds referred to in Article 36 TFEU or based on other overriding reasons relating to the public interest recognised in the case-law of the Court of Justice of the European Union on the free movement of goods and if those restrictions are proportionate to the objective pursued. This Regulation obliges to justify why market access has been restricted or denied.

3.4.4 ‘National technical rule’ definition

For this Regulation, "national technical regulation" means any laws, regulations or administrative provisions of a Member State which have the following characteristics:

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(a) It concerns goods or aspects of goods which are not subject to harmonisation at the Union level;

(b) It either prohibits the making available on the market in that Member State of goods or of a particular type or requires de facto or de jure compliance with the provision when goods or of a particular type are made available on that market; and

(c) It does at least one of the following:

(i) It lays down the characteristics which goods or products of a given type must possess, such as their level of quality, performance or safety or their dimensions, including the requirements applicable to those goods about the names under which they are sold, terminology, symbols, testing and test methods, packaging, marking or labelling and conformity assessment procedures;

(ii) It imposes other requirements on goods or on goods of a particular type which affect the life cycle of the goods after they have been made available on the market in that Member State, to protect consumers or the environment, such as conditions of use, recycling, reuse or disposal, where those conditions may significantly affect either the composition or the nature of those goods or their making available on the market in that Member State.

3.4.5 Mutual recognition declaration

For Regulation (EU) 2019/515 of the European Parliament and of the Council, the manufacturer of goods or of goods of a given type intended to be manufactured or made available on the market in the Member State of destination may draw up a voluntary declaration of lawful marketing of goods for mutual recognition ("mutual recognition declaration") to demonstrate to the competent authorities of the Member State of destination that the goods or the goods of that type are lawfully marketed in another Member State. The manufacturer may instruct his authorised representative to draw up the mutual recognition declaration on his behalf. The mutual recognition declaration shall conform to the structure of the following Part I and Part II and shall contain all the information specified therein. The manufacturer or his authorised representative may complete the mutual recognition declaration with the information in Part I only. In this case, the information in Part II shall be completed by the importer or the distributor. Alternatively, both parts of the mutual recognition declaration may be completed by the importer or the distributor, provided that the signatory can provide the evidence referred to in Article 5(4) (a).

3.5 Other EU regulations for the lawful application of innovative bio-based fertilising products

- ECHA IPPC Integrated Pollution Prevention and Control (European Chemical Agency, 2022).
- Circular Economy Action Plan (European Commission - Environment, 2022).
- European Green Deal (European Commission - Priorities 2019-2024, 2022).
- Critical Raw Materials CRM COM (2020) (EU SCIENCE HUB, 2022) 474 Resilience Charts a Path towards greater Security and Sustainability.
- The EU environmental Liability (European Commission - Legal Compliance, 2022).

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4 Inventory of EU Member States' Regulations for the lawful application of innovative bio-based fertilising products

As non-renewable mineral fertilisers need to be replaced by more sustainable sources of fertilisation, it is important that the application of recovered bio-based fertilisers from wastewater streams is sustainable and in line with market requirements.

WalNUT's new technologies, methods and innovative product development results will be adapted to the regulation on CE marketable fertilising products (Reg. (EU) 2019/1009) that was enforced in July 2022 and shall also fully meet the requirements of other EU-MS regulations, governance policies and regulatory framework to effectively reduce the environmental / climate change impact. This legal analysis targets the establishment of a solid knowledge base for EU and MS policy to support WalNUT project partners during their RTD actions. The WalNUT partners will then be able to apply the EU/MS regulations and the Authority permits legal requirements for their novel technologies and products under true value market conditions that are presented with the description of the related business models in WP7.

As a result of the collective effort of contributing beneficiaries (3R, CARTIF, APCA, UGent, ICONS, NTUA, SDU, UCPH, UNITO, VEOLIA, UC, ITACYL) in the targeted mapping of an existing national, regional and local policy framework that has relevance for nutrient recovery taking into consideration inter alia the REACH regulation and the Reg. (EU) 2019/1009), Table 4-3 acts as a guide in bridging the integrated WalNUT technological solutions with market and user acceptance.

Table 4-3: Inventory of EU Member States' policies on the production and application of bio-based fertilisers

	Regulations related to the production and application of Bio-based fertilisers
Spain	Real Decreto 506/2013, de 28 de junio, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO, 2022) The objective of this Royal decree is to establish the basic regulations on fertiliser products and the necessary regulations for coordination with the Spanish Autonomous Regions. The purposes of this royal decree are to: ▪ Regulate the aspects of Reg. (EC) No. 2003/2003, of the European Parliament and of the Council, of October 13, 2003, related to fertilisers, whose implementation and development have been entrusted to the Member States. ▪ Define and classify fertiliser products, other than "EC fertilisers", that can be used in agriculture and gardening. ▪ Guarantee that the nutritional wealth and other characteristics of the fertiliser products comply with the requirements of this Royal Decree. ▪ Prevent risks to health and the environment from the use of certain products. ▪ Regulate the Registration of fertiliser products for the registration of certain products. ▪ Update the procedure for registration in the Register of fertiliser products, before placing certain products on the market. ▪ Establish the procedure for updating the annexes of this Royal Decree
	Corrección de errores del Real Decreto 506/2013, de 28 de junio de 2014, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(b), 2022). The following errors are corrected: ▪ On page 51164, annex I, table 3.6. "NK SOLIDS", in column 6 where it says: «K_2O soluble in neutral ammonium citrate and water», it should read: «K_2O soluble in water».

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	▪ On page 51166, annex I, table 3.8. "PK SOLIDS", in column 6, where it says: «P_2O_5 soluble in water», he should say: «P_2O_5 soluble in neutral ammonium citrate and water». ▪ On page 51185, annex III, GROUP 1. NATIONAL INORGANIC FERTILISERS, the table has been replaced.
	Real Decreto 535/2017, de 26 de mayo, por el que se modifica el Real Decreto 506/2013, de 28 de junio de 2017, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(c), 2022). ▪ It modifies article 17 of the RD 506/2013 and adds a fifth transitory provision on the regularisation of fertiliser products whose composition includes waste following article 17.
	Real Decreto 999/2017, de 24 de noviembre, por el que se modifica el Real Decreto 506/2013, de 28 de junio, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(d), 2011). ▪ It modifies sections 1 and 2 of article 14. Article 18b is added. ▪ It modifies the title of article 19 and section 1 of this article. ▪ A new paragraph is added at the end of article 20. ▪ It modifies the title of chapter V. ▪ It modifies paragraphs 1 and 4 of article 21. ▪ It modifies article 24. ▪ It modifies section 2 of the second final provision. ▪ Annex I is modified ▪ Annex II is modified ▪ Paragraph 4 of Annex III is modified ▪ Annex VI will be replaced by the one that appears as Annex II of this Royal Decree. ▪ In section e) of Annex VII where article 35 is mentioned, it should say "section 5 of article 31" ▪ An annex VIII is added, which appears as annex III of the present Royal Decree.
	Corrección de erratas del Real Decreto 999/2017, de 24 de noviembre, por el que se modifica el Real Decreto 506/2013, de 28 de junio, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(e), 2022) ▪ It corrects some errors of the RD 999/2017
	Orden AAA/2564/2015, de 27 de noviembre, por la que se modifican los anexos I, II, III, IV y VI del Real Decreto 506/2013, de 28 de junio sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(f), 2022) ▪ It modifies annexes I, II, III, IV and VI of the Royal Decree 506/2013
	Corrección de errores de la Orden AAA/2564/2015 (BOLETÍN OFICIAL DEL ESTADO(g), 2022) ▪ It corrects some errors of the Orden AAA/2564/2015
	Orden APA/161/2020, de 20 de febrero, por la que se modifican los anexos I, III y VI del Real Decreto 506/2013, de 28 de junio, sobre productos fertilizantes (BOLETÍN OFICIAL DEL ESTADO(h), 2022) ▪ It modifies annexes I, III y VI of the RD 506/2013
	Orden AAA/770/2014, de 28 de abril, por la que se aprueba el modelo normalizado de solicitud al Registro de Productos Fertilizantes (BOLETÍN OFICIAL DEL ESTADO(i), 2022). ▪ It approves the standardised model for the application to the Registry of Fertiliser Products ▪ It repeals Order ARM / 1336/2010, of May 11
	Orden APA/1593/2006, de 19 de mayo, por la que se crea y regula el Comité de Expertos en Fertilización (Ministerio de agricultura, pesca y alimentation, 2022) ▪ It creates and regulates the functions of the Committee of Experts in Fertilisation
	Real Decreto 1310/1990, de 29 de octubre, por el que se regula la utilización de los lodos

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	de depuración en el sector agrario (BOE, 2022). ▪ It establishes a regulatory framework that allows the production of sewage sludge and its agricultural use in Spain to be combined with the effective protection of the physical and biotic factors affected by the agricultural production process. ▪ Transposes Council Directive 86/278/CEE, on 12 June 1986
	Orden AAA/1072/2013, de 7 de junio, sobre utilización de lodos de depuración en el sector agrario (BOE(b), 2022). ▪ It updates the content of the National Registry of sewage sludge and the information that must be provided by the wastewater treatment facilities, the sludge treatment facilities and the sludge management companies that apply the treated sludge in agriculture, following the provisions of Royal Decree 1310/1990, of October 29.
	Real Decreto 261/1996, de 16 de febrero, sobre protección de las aguas contra la contaminación producida por los nitratos procedentes de fuentes agrarias (BOE(c), 2022). ▪ It establishes the measures to prevent and correct the pollution of continental and coastal waters, caused by nitrates from agricultural sources. It includes sewage sludge as fertilisers.
	Ley 22/2011, de 28 de julio, de residuos y suelos contaminados (BOE(d), 2022). ▪ Sewage sludge must be managed following the waste regulations. ▪ Application of the residue hierarchy: *Agriculture soils (valorisation)> incineration (energetic valorisation)>landfill (disposal)*
CASTILLA Y LEÓN	Orden de 26 de diciembre de 1993, de la Consejería de Presidencia y Administración Territorial, sobre creación del censo de plantas depuradoras de aguas residuales y utilización de lodos de depuración en el sector agrario (BOE(e), 2022) ▪ It standards the information and determines the competent regional authority for the collection of data on sewage sludge ➢ The regulations related to the application of sewage sludge in Castilla y León can be consulted here. On this website reference is made to European and Spanish regulations, the specific regulations applicable in Castilla y León are limited to the Order of December 236, 1993, on the creation of the regional registry of wastewater treatment plants and the use of sewage sludge in the agrarian sector.
MADRID	Orden 2070/2012, de 17 de julio, por la que se aprueba el I Programa de Actuación sobre las zonas vulnerables a la contaminación producida por los nitratos, procedentes de fuentes agrarias designadas en la Comunidad de Madrid (Comunidad de Madrid, 2022) ▪ Action Program on vulnerable areas, designated in the Community of Madrid, to pollution caused by nitrates from agricultural sources. The limits of fertiliser application to the soil are presented, as well as its prohibition in the application depending on the season or vegetative state. In addition, Order 2070/2012 is complemented with a Code of Good Agricultural Practices.
GALICIA	DECRETO 125/2012, de 10 de mayo, por el que se regula la utilización de lodos de depuradora en el ámbito del sector agrario en la Comunidad Autónoma de Galicia (Noticial Juridicas, 2022). ▪ It establishes the conditions for the application of sewage sludges in agriculture.
CATALUÑA	DECRETO 153/2019, de 3 de julio, de gestión de la fertilización del suelo y de las deyecciones ganaderas y de aprobación del programa de actuación en las zonas vulnerables en relación con la contaminación por nitratos procedentes de fuentes agrarias (Diari Oficial de la Generalitat de Catalunya, 2022). ▪ It regulates the management of soil fertilisation and the application of manure and other nitrogenous fertilisers to reduce and prevent pollution in the vulnerable areas of this region
France	▪ Rural code-legislative part
	Section 1: Definitions (Articles L.255-1) (Code rural (nouveau), 2022)
	Section 2: Launch on the market and use of the fertilising materials, the additives for

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	fertilising materials and support of media (Articles L.255-2 to L.255-13) (Code rural (nouveau)(b), 2022)
	Section 3: Measures of surveillance of the effects and the efficiency of products (Articles L.255-14 to L.255-15) (Code rural (nouveau) (c), 2022)
	Section 4: Urgent measures (Article L.255-16) (Code rural et de la pêche maritime, 2022)
	Section 5: Controls and penalties (Articles L.255-17 and L.255-18)
	▪ Rural code-regulatory part
	(Articles R.255-1 to R.255-34)
	▪ Exceptions: Fertilising materials that comply with a standard made compulsory by an order. These are, in particular, the standards NF U42-001 "fertilisers" and NF U44-051 "organic amendments" Fertilising materials (synthetic or extracted) that comply with a European Union regulation Wastes, residues or effluents from installations are defined by articles L214-1 and L511-1 of the environment code and whose use as fertilising material is subject to an authorized spreading plan or approval by the administration. This is the rule that applies to sewage sludge, the spreading of which represents about 80% of production in France and is governed by the Environmental Code and several decrees.
Belgium	Royal Decree of 28th January 2013 (Moniteur Belge, 2022) regarding marketing and use of fertilisers and soil amendments. ▪ This decree applies to the marketing and use of fertilisers, soil amendments, cultivation substrates, sewage sludge and to any product to which a specific effect to promote plant production is attributed (referred to as "products" in this Royal Decree). ▪ Annex I of this Royal Decree lists the products that may be traded in Belgium. ▪ The Minister may allow the marketing of products not listed in Annex I (following Article 5), such as struvite and recovered ammonia salts, by granting a derogation for these products. ▪ All requests for registrations have to be introduced at Federal Agency for the Safety of the Food Chain (FAVV) regarding the control and differences between fertilisers, soil amendments and activated sludge which are (or will be) on the market – Belgian level)
Flanders	Decree on the protection of water against pollution by nitrates from agricultural sources (VLAAMSE CODEX, 2022) sets the regulations regarding the production and use of fertilisers and manure, including manure-derived fertilisers. It determines obligatory declarations and registrations for manufacturers, distributors, importers and exporters (articles 23 and 24). ➢ Every year, a report is prepared. It contains figures on fertilisation on agricultural land etc. and the impact on water quality. It also contains data on chemical fertiliser use.
	Legislation regarding waste, recovery and recycling operations and end-of-waste status of recovered substances: ▪ The decree regarding the sustainable management of material cycles and waste products (European Commission - Internal Market, Industry, Entrepreneurship and SMEs, 2022) ▪ The decree of the Flemish Government established regulations regarding the sustainable management of material cycles and waste. The rules regarding the use of recovered products are detailed in the implementing Decree, called VLAREMA (Navigator, 2022).
Italy	Legislative Decree No. 75 of 2010 (GAZZETTA UFFICIALE DELLA REPUBLICA ITALIANA, 2022)Reorganization and revision of the regulations on fertilisers (national

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	fertilisers, amenders, corrective organic matrices, cultivation substrates, specific action products), under Article 13 of the law of 7 July 2009, no. 88 (17 articles and 14 annexes) and subsequent amendments (The Ministry of Agricultural, Food and Forestry Policies publishes the "Fertiliser Register" updated on December, 31st of the previous year and will be updated every year by July,1st). This Legislative Decree: ▪ Applies to the authorisation, analytical control protocols, storage, marketing, labelling and utilization of all fertilisers with relevance for the nutrient recovery from by-products that are not intended for human consumption in harmony with the regulation CE 2003/2003. ▪ establishes the Register of Fertilisers and the Register of Manufacturers (Governo Italiano, 2022) ▪ Establishes the list of fertilisers that can be used in organic production. Fertilising products may be placed on the market if they comply with: ▪ Ministerial Decree 25/2/2016, general technical criteria and standards for the agronomic use of livestock manure, waste water and digestate (46 articles and 10 annexes). ▪ Specifications according to EU 2003/2003 (for mineral fertilisers) and Legislative Decree No. 75/2010 (classification and detailed content specification with maximum allowable limits). ▪ Eu Reg. 1348/2008 (for ammonium nitrate-based fertilisers). ▪ Regulation (EC) no. 8889/2008 of the Commission, of 5 September 2008, laying down detailed rules for the application of Regulation (EC) no. 834/2007 of the Council on organic production and labelling of organic products, as regards organic production, labelling and controls (97 articles and 1 annex).
Greece	Law 1565/85(A'164) (Hellenic Republic-Ministry of Rural Development and Food, 2022)'Organisation of production and marketing of propagating material of plant species – Fertilisers' Modifications: ▪ L. 2040/92(A'70 Article 17) 'Regulation of matters under the competence of the Ministry of Agriculture and legal entities under its supervision and other provisions' ▪ L. 2326/95(A'153) 'Amendment of provisions of L. 1565/1985 and other provisions' ▪ L. 2732/99(A'154 Article 6) 'Interprofessional organizations and regulation of matters under the competence of the Ministry of Agriculture' ▪ L. 2945/01(A'223 Article 35) 'Greek national system of protection of the agricultural activity and other regulations of matters of competence of the Ministry of Agriculture' ▪ L. 3147/03(A'135 Article 32) 'Regulation of rural land issues, resolution of issues of rehabilitated and rehabilitated livestock farmers and other provisions' ▪ L. 4235/14(A'32 Article 49) 'Administrative measures, procedures and sanctions in the application of Union and national legislation to food, feed and health sectors and animal protection and other provisions under the competence of the Ministry of Rural Development and Food' ▪ L. 4384/16(A'78 Article 44) 'Agricultural Cooperatives, forms of collective organization of the rural area and other provisions' ▪ L. 4691/20(A'108 Article 3) 'Competence arrangements of the Ministry of Rural Development and Food for the upgrading and modernization of the agricultural sector and other provisions.'
Cross-Border Trading of	Joint Ministerial Decision 196033/12 'Cross-border provision of services in the Greek territory in the field of plant production inputs, following the provisions of Article 17 of

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Fertilisers	Law 3844/2010'
Import, Intra-Community Acquisition and Domestic Production of Fertilisers and Fertiliser Raw Materials	▪ Ministerial Decision 211/11449/19(B'146) Import, Intra-Community Acquisition and Domestic Production of Fertilisers and Fertiliser Raw Materials ▪ Bulletin 280008/2781/11.03.2008 'Trafficking of Fertilisers labelled EC FERTILISERS of Community production or origin' ▪ Bulletin 5170/140992/15.12.2016 'Clarifications for the control of fertilisers labelled EC FERTILISERS'
Marketing Permits for New Types of Fertilisers	▪ Joint Ministerial Decision 291180/11034/02(B' 1274) 'Marketing Permits for New Types of Fertilisers' ▪ Joint Ministerial Decision 257921/04(B'955) 'Amendment of no. 291180/11034/19-09-2002 of Ministerial Decision "Permits to circulate new types of fertilisers"' ▪ Bulletin 281349/1662/09.07.2010 'Granting a marketing authorisation for new types of fertilisers'
Readjustment of Fertiliser Trading fees	Ministerial Decision 331750/99 (B'215) 'Readjustment of Fertiliser Trading fees'
Announcement of Commencement of Trading of Fertilisers Type A & B	Bulletin 8636/139418/05.11.2014 'Implementation of the presidential decree 145/2014 "Definition of the program, the institutions and the duration of the training, which is required to have the personnel employed in the production and marketing of propagating material of cultivated plant species and the marketing of fertilisers, to be considered equally trained as the scientist in charge of these enterprises" (A'235)
Denmark	▪ Executive Order on fertiliser and soil improvers, etc. (Danish Business Authority, 2022)This Executive Order shall apply to the following products: fertilisers, compost preparations, soil amendments, growth mediums and seed stocks, cf. Section 2(1) of the Act on fertiliser and soil amendments, etc.
	▪ Decree on the use of waste for agricultural purposes (Retsinformation, 2022)The executive order lays down rules on the extent to which waste, cf. § 2, can be used for agricultural purposes without harmful effects on the environment, people, plants and animals.
	▪ Decree on the use of bio-ash for agricultural purposes (Retsinformation (b), 2022)The executive order determines the extent to which bio-ash can be used for agricultural purposes so that the consideration of environmental protection is not disregarded.
Hungary	Decree No. 36 of 2006 (V. 18.) FVM of the Ministry of Agriculture and Rural Development concerning the authorisation, storage, marketing and utilisation of yield - increasing materials (Legal Office FAOLEX, 2022)This Decree applies to the authorisation, storage, marketing and utilisation of yield-increasing materials. This Authority permit is based on the results of accredited laboratory analytics and large - scale field tests under semi - production conditions at two different Authority accredited sites in two different soil and climatic conditions with two different food crops and is usually repeated at least two or three years. The authorisation is issued by the National Food Safety Agency (NEBIH). Articles 3-9 contain detailed rules regarding the authorisation procedure. Each authorisation is valid for ten years and it is renewable. Article 10 concerns the storage of yield - increasing materials. Packaging and marketing are regulated in Articles 11-12. Control on utilisation of these products is ruled by Articles 13-15. Articles 16 and 17 regard regular and, respectively, experimental use of yield-increasing materials. As Hungary is located in a sensitive water base region, therefore the priority hazardous organic pollutant levels defined at 1 mg/kg Poly-aromatic Hydrocarbons (PAH) since

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	2005 which is much stricter than the EU 4 mg/kg PAH.
Portugal	Decreto-Lei n.º 30/2022 (Diario da republica eletronica, 2022) Establishes the rules that must comply with the placing on the market of fertilising materials, ensuring compliance with the obligations arising from Reg. (EC) No. 2003/2003 and Reg. (EU) 2019/1009.

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5 Assessment of EU Member States' regulations

5.1 Integrated assessment of fertilising products regulations in Spain

In the Spanish regulations governing fertiliser products (Royal Decree 506/2013 of 28 June and general provisions such as Royal Decree 999/2017 (BOLETÍN OFICIAL DEL ESTADO, 2022)), an organic fertiliser is defined as a product whose main function is to provide nutrients to plants. The list of nutrients, which come from carbonate materials of animal or vegetable origin, whose list is included in group 2 of Annex I:

- Organic nitrogen fertiliser of animal origin
- Organic nitrogen fertiliser of plant origin
- Organic nitrogen fertiliser of animal and vegetable origin
- Phosphate organic fertiliser of animal origin
- NPK organic fertiliser of animal origin
- NPK organic fertiliser of animal and vegetable origin
- Organic fertiliser NP of animal origin
- Organic fertiliser NP of animal and vegetable origin
- Liquid NK organic fertiliser of plant origin

In addition, the following types of credit memos are defined:

- Organic-mineral fertiliser: a product whose main function is to provide nutrients to plants, these nutrients being of organic and mineral origin, and that is obtained by mixing or combining inorganic fertilisers with carbonate materials of animal or vegetable origin or organic fertilisers.
- Biodegradable organic waste: waste or by-product of vegetable or animal origin used as raw material.
- Composting: the controlled process of aerobic and thermophilic biological transformation of biodegradable organic materials resulting in types of organic fertilisers or amendments.

For the production of fertilising products of the following groups:

- organic fertilisers),
- organic-mineral fertilisers and
- organic amendments,

only the use of raw materials of organic, animal or vegetable origin, is expressly included in the list of biodegradable organic waste in Annex IV to the Royal Decree, is permitted.

Fertilising products consisting entirely or partly of biodegradable organic waste shall comply with the requirements laid down in Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 and the relevant provisions implementing or amending that Regulation (IDAE, 2007). They must also meet the following requirements (Table 5-4):

Table 5-4: Requirements for fertilising products consisting entirely or partly of biodegradable organic waste

Parameter	Requirement
Percentage of organic nitrogen	>85 % of total nitrogen
Humidity	Granulated or pelleted fertilisers shall have a maximum moisture content of 14 %w.
Granulometry	90% of the fertiliser must pass through a 10 mm mesh.
Maximum furfural limit	For products containing lignosulphonates andsludges from the paper or sugar industry as raw material, it shall be demonstrated that the maximum furfural content limit (2 furaldehyde) does not exceed 0.05

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	%w.
Maximum polyphenols limit	For products containing raw material by-products or residues from mills, it shall be demonstrated that the polyphenol content does not exceed 0.8 %w

Products containing raw materials of organic, animal or plant origin may not exceed the maximum values for micro-organisms:

- Salmonella: absence in 25 g of processed product.
- Escherichia coli: less than 1000 MPN (Most Probable Number) per gram of processed product.

Products containing raw materials of plant origin must be free from the harmful organisms referred to in the Royal Decree 58/2005 of 21 January 2005 adopting protective measures against the introduction into and spread within the national territory and the European Community of organisms harmful to plants or plant products and against the export and transit to third countries. This is without prejudice to the specific provisions of the aforementioned Royal Decree 58/2005, of 21 January, regarding the introduction and transit of plant products.

Products made with raw materials of organic, animal or vegetable origin may not exceed the heavy metal content corresponding to classes A, B or C of Annex V to the Royal Decree.

The need to control possible risks to health and the environment arising from the use of such organic waste means that organic fertilisers and amendments, together with organic-mineral fertilisers, must have an administrative authorisation to be placed on the market, which is specified in the Register of Fertilising Products.

5.1.1 Fertiliser recommendations

Below, are summarised the fertiliser recommendations by type of crop contained in the 'Guía práctica de la fertilización racional de los cultivos en España' (Practical guide for the rational fertilisation of crops in Spain), drawn up by the Ministry of the Environment, Rural and Marine Affairs of Spain.

5.1.2 Fertilisation of winter cereals: wheat

The overall dose of nitrogen fertiliser commonly used in wheat varies between 120 and 200 kg N/ha, depending on expected yield, rainfall and cultivation techniques. According to numerous experiments carried out in Andalusia, the yield of wheat only responds significantly up to a dose of 100 kg N/ha. However, the protein content of the grain increases significantly with the dose of 150 kg N/ha, and even with the dose of 200 kg N/ha in hard wheat.

In the distribution or fractionation of the global dose of nitrogen fertiliser, the influence and importance of winter leaching must be taken into account and the fact that the greatest nitrogen needs of wheat are in the period between the tillering and the stem elongation. Small amounts of nitrogen are recommended before sowing, followed by the next application at the beginning of the tillering, and another application at the end of the tillering phase and the beginning of the stem elongation.

The following criteria should be taken into account for phosphorus and potassium fertilisation:

- Perform periodic analysis of phosphorus and potassium assimilable from the soil to observe its evolution (every 3-4 years).
- Compare the results of these analyses with the critical levels established, which are a function of soil type and cultivation techniques.
- Determine in the crop, or rather in the crop rotation, the amounts of phosphorus and potassium that are absorbed by the plants, those that can be leached and those that pass into insoluble forms.

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- The localised application in the sowing lines improves the efficiency of the fertiliser in the first year compared to a broadcast application, especially in soils with a low level of assailable phosphorus.

5.1.3 Fertilisation of spring cereals: Corn

It is recommended to apply about 1/3 of the total nitrogen in the bottom, together with phosphorus and potassium, and the rest in a blanket, when the corn is 40 cm high (8 leaves). If two blankets are made, the second one will be with the corn at 1 m of height, dividing into two parts the nitrogen that is contributed to a blanket.

Blankets should be used to adjust the nitrogen dose, as at that point crop expectations are better known.

5.1.4 Fertilisation of potato

The usual practice is to apply the full dose of phosphorus and potassium in pre-sowing, together with a small proportion of nitrogen (about 20%), a few days before sowing. The rest of the nitrogen must be supplied after 20 days of the emergence. To prevent leaching, inputs should be matched to the rate of nitrogen uptake by the plant, which is particularly important in light soils. If the plot is irrigated and the irrigation system allows it, the best method of nitrogen application is fertigation. This practice makes possible a gradual supply of nitrogen from the time of emergence until the crop covers 80% of the soil.

5.1.5 Fertilisation of tomato

A process that allows estimating the nitrogen fertiliser needs in all cases, is based on a nitrogen balance in the soil layer where most of the roots are developed, which, in general, is considered to comprise the first 60 cm of soil. This balance will take into account: extraction of N by the plant, minimum content of mineral N in the soil at the end of the crop growth, contribution to crop residues, contribution to mineral N in the soil at the beginning of the crop, mineralisation of soil organic matter, mineralisation of organicamendments and contribution to irrigation water.

Phosphate and potassium fertiliser needs can be calculated through a simplified balance of these nutrients in the soil, including the main inputs and outputs in the soil-plant system. This balance will take into account: extraction of phosphorus or potassium by the crop, the contribution of the soil reserve with assailable nutrients, the contribution of the harvest remains, the contribution of the organic amendments and fertilisers and the contribution of the irrigation water.

5.1.6 Fertilisers control procedures

The controls and inspections may be systematic, following the control plans, or extraordinary. They shall be carried out, as appropriate, at the border inspection points authorised following the Royal Decree 58/2005, of 21 January, as well as at the storage or processing plants and other premises where fertiliser products are stored or marketed (or at any time and place where such products circulate or are present).

As instruments to support the performance of the tests and controls to be carried out by the Public Administrations, the competent bodies of the Autonomous Communities shall designate the public laboratories and shall authorise, where appropriate, the private laboratories. Designated or approved laboratories shall be accredited following EN ISO/IEC 17025 and must perform the following functions:

- Analysis of samples taken during the implementation of surveillance programmes.
- The analyses, where appropriate, are referred to in Article 29.2 of Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003, in addition to the provisions of Royal Decree 506/2013 on quality control for other fertiliser products.

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5.1.7 Registration of fertiliser products

Fertiliser products falling within groups 2, 3 and 6 of Annex I (organic fertilisers, organic-mineral fertilisers and organic amendments) may be placed on the market only if they have previously been entered in the Register of Fertiliser Products of the Directorate-General for Agricultural Production and Markets of the Ministry of Agriculture, Food and the Environment.

The Register of fertilising products, attached to the Directorate-General for Agricultural Production and Markets, is intended to maintain the following information on each of the products registered:

- Trade name.
- Type of fertiliser product, as classified in Annex I.
- Manufacturer of the product, responsible for placing it on the market in Spain.
- Ingredients used in its manufacture.
- Nutrient content and other declared characteristics.
- Class of product (A, B or C) as regards its maximum heavy metal content.
- Limitations and conditions of use, if any.
- Registration number.
- Date of registration and expiry of the registration. (García-Serrano, Lucena, Ruano, & Nogales, 2009)

5.2 Integrated assessment of fertilising products regulations in France

In this section, the state of the French regulation regarding fertilisers and the various regulatory developments since 2018 regarding the return to the soil of MFSC (Fertilising Materials and Crop Supports) or MAFOR (Fertilising Materials of Residual Origin) will be discussed.

It is important to note that the Reg. (EU) 2019/1009 excludes Waste Water Treatment Plant (WWTP) sludge. This means that sludge cannot be marketed outside its country of origin. Today in France, WWTP sludge is only used in the form of raw sludge or compost, with a specific regulation. There is currently no other form in which WWTP wastewater nutrients are used in France (e.g. in the form of struvite); thus no specific regulation for them.

With the Reg. 2019/1009 MFSCs will be able to leave the waste status. This regulation introduces limit values in metallic trace elements (ETM) to be respected for all fertilisers, which are for some (for ETM and pathogens in particular) more restrictive than the national regulation. These new limit values will be those included in the safety criteria for category A1 materials in the future "common base" decree.

5.2.1 The Rural Code

The basic rule for the distribution of fertilising materials in France is the Rural Code, more specifically, Articles L255-1 to L255-18 of the legislative part and Articles R255-1 to R255-34 of the regulatory part.

The main rule is set out in Article L255-2: the import, holding for sale, offering for sale, sale, free distribution or use, under any name whatsoever on the national territory, of a fertilising material, an adjuvant for fertilising materials or crop support defined in Section 1 of this chapter is subject to obtaining a marketing authorisation. This rule will be applied in priority to any new fertilising material proposed for marketing. This authorisation is issued by the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) on examination of a complete dossier, the composition of which is established by the Order of April 1, 2020 (n°AGRG2008998A), which makes it possible to verify the agronomic interest and safety of the proposed material. The content of the file is summarized in the administrative form (CERFA) n°16073*01 (ANSES-DAMM-UIA, 2022)).

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5.2.2 Exceptions to the Rural Code

There are three exceptions to the rule of Market Authorisation, which represent the vast majority of fertilising materials distributed on the French market.These exceptions are proposed in article L255-5 of the Rural Code:

1 - Fertilising materials that comply with a standard made compulsory by an order. These are, in particular, the standards NF U42-001 "fertilisers" and NF U44-051 "organic amendments";

2 - Fertilising materials that comply with a European Union regulation, including regulation 2003/2003, which applies in particular to synthetic or extracted fertilising materials;

3 - Wastes, residues or effluents from installations defined by articles L214-1 and L511-1 of the environment code and whose use as fertilising material is subject to an authorised spreading plan or approved by the administration. This is the rule that applies to sewage sludge, the spreading of which represents about 80% of production in France and is governed by the Environmental Code and several decrees.

5.2.3 Legal developments concerning the return of Fertilising Materials and Crop Supports to the soil

Since 2015, the concept of circular economy in agriculture has been developed in France, notably with the Law on Energy Transition and Green Growth of August 2015. This law also advocates the development of methanisation.

In 2018, many questions were raised about the status of fertilising materials of residual origins (MAFOR) and the conditions of their recovery in agriculture. And since then, there has been significant regulatory activity at the national level that will strongly transform how they are valorised in agriculture.

5.2.4 Regulatory developments since 2018, which impact the agricultural sector

5.2.4.1The revision of the "Waste" Directive 2008/98/EC and its transposition into national law (AGEC law)

The revision of the "Waste" Directive 2008/98/EC of May 30, 2018, prohibits the mixing of bio waste with other types of waste. The transposition of this provision into French law was made in the Anti-waste Law for a Circular Economy (AGEC) n° 2020-105 of February 10, 2020. In addition, article 86 sets the guidelines for the revision of sludge safety criteria, the conditions for composting raw sludge and processed sludge as well as the prohibition of sludge transfer with transboundary states.

The ordinance of February 2020 on the prevention and management of waste came to present the next orders and decrees regulating:

- The conditions of management, treatment of bio-waste
- The future provisions relating to the mixing of sludge
- The revision of the safety criteria for sludge from wastewater treatment plants (WWTP).

The decree of December 11, 2021, on various adaptation and simplification provisions in the field of waste prevention and management now penalizes the mixing of source-separated bio waste with other waste. Thus, the decree of September 14, 2021 limits the quantities of green waste (bio waste sorted at source) that can be mixed with sludge from WWTP.

- As of January 1, 2022, the mass of green waste used as a structuring agent does not exceed 100% of the mass of sewage sludge and sewage sludge digestate used in the mixture.
- As of January 1, 2024, the mass of green waste used as structuring material does not exceed 80% of the mass of sewage sludge and sewage sludge digestate used in the mixture.

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- By January 1, 2026, at the latest, the Agency for the Environment and Energy Management (ADEME) shall submit a report to the Minister in charge of the Environment on the availability of green waste for the organic recovery of source-separated food waste and on the advisability of modifying the threshold defined in the preceding paragraph in light of the needs for fertilising materials that can be used in organic farming.

5.2.4.2 The status of fertilising materials and their conditions of use in agriculture

The article of the Rural Code L.255-12 introduced by Article 95 of the so-called EGAlim law n° 2018-938 of October 30, 2018, has re-established confusion on the status of MAFOR, yet widely disseminated in the field for a long time. Indeed, in the current state of the regulations, compliance with a mandatory standard does not mean the end of waste status. That is to say, for example, that a compost standard NF U44-051 or NF U44-095 has an administrative status of waste (contrary to what has been commonly disseminated in the field since the creation of these standards). From a legislative point of view, the waste producer is responsible for it until its final disposal or recovery, even when the waste is transferred for treatment to a third party (article L541-2 of the Environment Code). This implies that even if it is standardised, a compost spread on a farmer's land is under the responsibility of its producer. However, the article of the Rural Code L.255-12 introduced by article 95 of the law known as EGAlim, authorises the end of the waste status for the wastes in conformity with a standard made of compulsory application after evaluation of the National Agency for Food, Environmental and Occupational Health Safety (ANSES), except the standards on the products containing sludges of sewage treatment plant alone or in the mixture (standard NFU 44-095), which will never be able to leave the waste status.

Concerning specifically the status of fertilising materials and culture supports (MFSC), these are now regulated through the decree "Common base", currently being drafted by the Ministry of Agriculture. In this decree,MFSC are distinguished according to 3 categories:

- Category A1: fertilising materials coming out of the status of waste - benefiting from a marketing authorisation, CE marking, meeting a standard or a specification (such as fertilisers, biostimulants, growing media, amendments, etc.)
- Category A2: fertilising materials that meet a standard but cannot be removed from waste status (such as standardised composted sludge) or that have by-product status (in the case of standardised raw livestock manure)
- Category B: fertilising materials applied as part of a land application plan (such as WWTP sludges, livestock manure, non-standardised waste and other fertilising materials).

The draft decree “Common base” applied to Fertilising Materials and Crop Supports (MFSC) has been proposed in its first version in late 2020 and in its second version in November 2021. It aims in particular to define different categories of MFSC (A1, A2 and B) and for each of them provisions will be taken concerning:

- Safety criteria (taking into account emerging contaminants for sludge, for example)
- Agronomic efficiency criteria
- Marketing conditions
- Distribution
- Traceability

The objective is to ensure the quality of materials used on agricultural soils and to adapt traceability to the quality of the materials. In version 2, four draft texts are now proposed:

- A simple decree that specifies the categories of materials and the criteria to be applied,
- A decree is known as DCE, which sets out the labelling and registration control procedures,
- A decree on the harmlessness criteria which sets the values according to the harmlessness criteria and specifies the conditions of end from the status of waste,
- A “flow” decree specifies the contributions of contaminants.

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Concerning the modalities of registration and use of MFSC, it already evoked a registration of all spreadings to the plot for the 3 categories of MFSC and traceability to the plot for the category A2, which was not the case before. This implies that any spreading of standardised composts/amendments will have to be registered by the farmers. As the regulations stand, materials that meet the criteria of the A2 category (such as raw or processed and standardised land application sludge) remain under the status of "waste".

5.2.5 French experimental permit to test fertilisers on fields

5.2.5.1 French legal system for trials about non-French non-homologated fertiliser

Experiments of fertilising materials on fields are regulated in France by the Rural Code updated in 2015, notably by articles L255-2 to L255-13 of the legislative part and by articles R255-21 to R255-26 of the regulatory part. As a form of marketing authorisation, experimental permits are issued by the ANSES. Precisely:

- The General Manager of ANSES has a period of five months from the date of receipt of the complete file to notify the applicant about his decision. If the General Director of ANSES remains silent within this period, which may be extended by a request for additional information, this shall constitute a decision to refuse the requested permit.
- The experimentation permit is issued for a period that may not exceed three years.
- Any modification of experimentation conditions envisaged by the permit holder must be notified in advance to the General Director of ANSES, who may object within a period of one month from receipt of the notification.
- The experimentation permit provides whether crop products from fertiliser trials have to be consumed by humans or animals or destroyed.

5.2.5.2 Important exceptions

Article R.255-25 of the Rural Code specifies that trials on fields for research or development purposes on limited surfaces and involving a limited quantity of fertilisers, adjuvants for fertilising materials or culture supports, in the application of article L. 255-9 are exempted from the experimentation permit when they fall into one of the following categories:

- Trials carried out in a confined environment ;
- Trials carried out on new compositions or new types of formulations owned by bodies themselves approved by the Minister for Agriculture, following the conditions provided for in Article R. 253-38 of the Rural Code, or by approved persons placed under their control ;
- Tests carried out on fertilising materials, adjuvants for fertilising materials or growing media benefiting from an authorisation issued by the French authorities, by another Member State of the European Union or by bodies approved by the French Ministry of Agriculture following the conditions and procedures provided for in Article R. 253-38 of the Rural Code ;
- Tests carried out on a product otherwise legally placed on the market whose current destination is not among those mentioned in Article L. 255-1 of the Rural Code, but which could, in the future, be assigned one of these destinations, by bodies approved by the Ministry of agriculture following the conditions provided for in article R. 253-38 of the Rural Code.

5.2.5.3 File to be completed

The content of this file to ANSES is specified by regulation setting the composition of files for application for experimental permits for fertilising materials, adjuvants for fertilising materials and culture supports and by the general note for the submission of MFSC files applications, which is available on the ANSES's website. The (CERFA) 16073*01 form in French must be used: it can be found on the website of the Ministry of Agriculture and Food under "mesdémarches", or on the ANSES website. The amount of tax collected by

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ANSES is set by the French ministry of Agriculture and Food. This amount per application is 1000 € for a single product and 2000 € for several products in the same application. Precisely, needed information is notably about the fertiliser maker, the raw materials and processes used to make fertilisers, the physical, chemical and biological composition of fertilisers, the claimed agronomic impacts and uses and the conditions of use according to the recommended crops. After discussing with the ANSES, it appears that the French regulation must be applied. The WalNUT project and notably French farm fields and experimental stations of the French Chambers of agriculture would not fall in exception cases described above. Therefore, applying for an experimental permit would be necessary to perform trials on French fields but it would be hard to do so with the foreseen timetable. Due to this and in addition to lack of much needed information, the French experimental protocol would have to be thought and adapted in this context.Integrated assessment of fertilising products regulations in Belgium

The Royal Decree of 28th January 2013 applies to the marketing and use of fertilisers, soil improvers cultivation substrates, sewage sludge (out of the spectra of Regulation (EU) 2019/1009) and to any product to which a specific effect to promote plant production is attributed (referred to as "products" in this Royal Decree). It is thus a product regulation, defining which products can be considered fertilisers, soil amendments and cultivation substrates. The new limit values of the Reg (EU) 2019/1009 will be those included in the safety criteria for category A1 materials in the future "common base" decree.

The Annex I of this Royal Decree lists the products that may be traded in Belgium. The Minister may allow the marketing of products not listed in Annex I (following Article 5), such as struvite and recovered ammonia salts, by granting a derogation for these products.

These are the main categories of products that are accepted for trade and marketing in Belgium, as listed in Annex I of the Royal Decree (28/01/2013). It includes both the fertilisers with CE label, as included in 2003/2003 (and therefore implements this regulation) and nationally accepted fertilisers.

In Table 5-5 every fertiliser is detailed by: type, description, requirements and principal capacities and levels to be guaranteed.

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Table 5-5: Annex I of The Royal Decree of 28th January 2013

Annex I
CHAPTER I. Fertilisers ▪ Section I. Fertilisers with CE label ▪ Section II. Fertilisers that do not have the CE label CHAPTER II. Fertilisers based on secondary materials ▪ Section I. Fertilisers from secondary materials with CE label ▪ Section II. Fertilisers from secondary materials that don't have the CE label CHAPTER III. Soil amendments ▪ Organic Soil amendments ▪ Physical Soil amendments CHAPTER IV. Cultivation substrates ▪ Organic cultivation substrates ▪ Inorganic cultivation substrates CHAPTER V. Fertilisers with micronutrients ▪ Section I. Fertilisers with CE label ▪ Section II. Fertilisers that don't have the CE label CHAPTER VI. Fertilisers for the production of nutrient solutions for hydroponics and substrate cultivation CHAPTER VII. Related products CHAPTER VIII. Sewage sludge (out of the scope of Reg. (EU) 2019/1009)

All requests for company registrations, e.g. registration as a fertilising producer, have to be introduced at Federal Agency for the Safety of the Food Chain (FAVV) regarding the control and differences between fertilisers, soil amendments, activated sludge which are (or will be) on the market – Belgian level.

So far, in Begium, Pomagro has received a derogation for struvite (valid from 26/01/2016 till 31/01/2021). Aquafin (a partner in the WalNUT project) has no derogation for struvite, as a consequence, it is not allowed to market struvite in Belgium, nor can it be handed for free to its employees. However, it can be used as a fertiliser on Aquafin-owned property.

Ammonium salts correspond to the Product Fertiliser Category (PFC) C.I. (b) (i) Straight liquid inorganic macronutrient fertiliser if the N-concentration > 5 %. Both the ammonium nitrate and -sulphate produced in Flanders meet that N-content. However, as mentioned above, sewage sludge is not in 1 of the Component Material Categories (CMCs) of Annex II, so fertilisers recovered from waste water sludge would require a new CMC to be included.

5.2.6 Belgian legislation

Royal Decree of 28th January 2013 regarding marketing and use of fertilisers, soil amendments

- This decree applies to the marketing and use of fertilisers, soil amendments, cultivation substrates, sewage sludge and to any product to which a specific effect to promote plant production is attributed (referred to as "products" in this Royal Decree).
- Annex I of this Royal Decree lists the products that may be traded in Belgium.
- The Minister may allow the marketing of products not listed in Annex I (following Article 5), such as struvite and recovered ammonia salts, by granting a derogation for these products.

All requests for registrations have to be introduced to Federal Agency for the Safety of the Food Chain (FAVV) regarding the control and differences between fertilisers, soil amendments and activated sludge which are (or will be) on the market – in Belgian level.

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5.2.7 Flemish legislation

5.2.7.1 Legislation regarding the use of fertilising product

This legislation is important because it determines the use of the recovered product.

5.2.7.1.1 Decree on the protection of water against pollution by nitrates from agricultural sources

This Decree sets the regulations regarding the production and use of fertilisers and manure, including from manure derived fertilisers. It determines obligatory declarations and registrations for manufacturers, distributors, importers and exporters (articles 23 and 24).

Every year, a report is prepared. It contains figures on fertilisation on agricultural land etc. and the impact on water quality. It also contains data on chemical fertiliser use.

The use of fertilisers is also subject to regulations regarding the moment of fertilisation (art.8), the maximum doses (art. 13), and the application method (art. 19-22). There are both general rules, valid for all types of fertilisers and specific rules per fertiliser product. The provisions in this Decree are the implementation of the so-called "action plans" that are drawn up in the context of the Nitrates Directive and are reviewed every four years. The current action plan relates to the period 2019-2022 and also contains an annex regarding chemical fertilisers.

5.2.7.2 Legislation regarding waste, recovery and recycling operations and the end-of-waste status of recovered substances

This legislation is important because it defines the legal status of the recovered product.

5.2.7.2.1 The Decree regarding the sustainable management of material cycles and waste products

This decree coordinates all waste management legislation. Waste water sludge is considered waste (code 19 08 05, annex 2.1.1). All products derived from waste, such as struvite or ammonium salts, are to be considered as waste until established otherwise. The decree also determines the conditions for the end-of-waste status through articles 36 – 40 (see below). Treated waste water sludge and derivatives, such as struvite and ammonium salts, are eligible to be used as fertilisers, if they meet the requirements of the legislation (most requirements are related to composition) and once a raw material declaration has been obtained. This declaration establishes a use, eventually, use restrictions, and is granted for a certain time and quantity.

Aquafin (a partner of the WalNUT project) obtained a raw material declaration on 26/05/2015 for 100 tons struvite/y from digested sludge, under the following conditions:

- Yearly analysis of:
  - heavy metals: As, Cd, Cr, Cu, Hg, Ni, Pb and Zn
  - Dry matter acidity, organic matter, N, P_2O_5
  - Monocyclic aromatic hydrocarbons, benzene, toluene, ethylbenzene, xylene, styrene
  - Mineral oil
- Keeping a register of the produced and sold struvite

- Article 36 refers to products obtained after recovery processing:

waste is no longer considered to be waste if it has undergone treatment for recycling or other recovery and if it meets all of the following conditions:

i. the substance or object is intended to be used for specific purposes;

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ii. there is a market or demand for the substance or object;
iii. the substance or object complies with the technical regulations for the specific purposes stated in point i, and with the legislation and standards applicable to products;
iv. the use of the substance or object has no adverse effects on the environment or human health in general.

- Article 37 refers to by-products:

a substance or object resulting from a production process not primarily intended for the production of that substance or object can only be classified as a by-product and not as waste if the following are met:

i. it is certain that the substance or object will be used;
ii. the substance or object can be used directly without further processing other than that which is customary during normal production;
iii. the substance or object is produced as an integral part of a production process;
iv. further use is lawful, in other words, the substance or object complies with all product, environmental and health protection regulations for the specific use and will not lead to overall adverse effects on the environment or human health.

- Article 39 establishes the end-of-waste conditions: either the European criteria are implemented or, in absence of European criteria, Flanders can establish criteria

i. If necessary, the Flemish Government designates the materials following European regulations and imposes specific criteria to indicate whether the material in question can be regarded as a by-product or as a material that has reached the end-of-waste phase.
ii. If no European criteria have been established for a specific material, the Flemish Government can develop specific criteria that must guarantee that the conditions stated in Articles 36 and 37 are met.

The criteria stated in the first paragraph guarantee a high level of protection of the environment and human health and promote the prudent and rational use of natural resources. They relate to:

i. the waste material that may be used as input for the recovery operation;
ii. the permitted processing processes and techniques;
iii. the quality criteria for materials resulting from the recovery operation following the applicable product standards, including, if necessary, limit values for pollutants;
iv. the requirements that management systems must meet to demonstrate compliance with the criteria, including quality control and internal control and, where appropriate, accreditation;
v. the requirement for declaration of conformity.

In the evaluation of the overall adverse effects on the environment and human health, stated in Article 36, 4°, and Article 37, 4°, the objectives stated in Article 4, §3 are taken into account.

The Flemish Government establishes further rules for how materials are designated, and how criteria are developed for this, following paragraphs 1 and 2.

Waste that no longer counts as waste following the criteria stated in paragraphs 1 and 2, also counts as recycled or recovered in the context of achieving any recycling or recovery targets.

- Article 40 defines the raw material declaration

§1. The Flemish Government can require that a raw material declaration is issued that demonstrates that the conditions and criteria stated in Articles 36, 37 and 39 have been met. OVAM decides on applications for a raw material declaration. An appeal can be lodged against the decisions of OVAM on the issue of a raw material declaration to the Flemish minister responsible for the environment.

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The Flemish Government can lay down further rules for the procedure for issuing a raw material declaration, the handling of appeals and the conditions of a raw material declaration.

§2. For materials for which no specific criteria exist and which are not intended to be used as fuel, the holder can carry out a self-assessment based on the conditions stated in Article 36 or 37. The Flemish Government can develop rules with which the holder can verify whether a certain material should not or should no longer be regarded as waste.

§3. A natural or legal person using for the first time a material that has ceased to be waste and has not been placed on the market, or placing on the market a material for the first time since it has ceased to be waste, shall ensure that it is material meets the requirements in question, stated in the legislation on the chemicals and products.

The conditions, stated in Article 36 or 37, are met before the legislation on chemical substances and products applies to the material that should not or should no longer be regarded as waste.

5.2.8 Vlarema

The rules regarding the use of recovered products are detailed in the implementing Decree, called VLAREMA.

These are the most important elements:

- If European criteria are established, no raw material declaration is required
- VLAREMA establishes a list of materials that can be used as raw materials, with requirements regarding their composition and use. It also specifies the procedure to follow to submit a raw materials declaration.
- Annex 2.2 gives the list of materials eligible for use as raw materials under chapter 2. The first part lists the raw materials for use as fertiliser or soil improver, including the requirements. In the context of WalNUt, the following materials (Table 5-6) are relevant.
- Annex 2.3.1 lists the requirements regarding composition and use as fertiliser or product for soil improvement. Depending on the dry matter (DM) of the product, either the requirements of annex 2.3.1.A (DM $\geq$ 2 %) or the ones of annex 2.3.1.B (DM < 2%) are applicable.
- VLAREMA establishes maximum concentrations for heavy metals, polyaromatic hydrocarbons and other organic contaminants.
- The recovered fertilisers are also subject to applicable limits (concentrations of heavy metals and organic contaminants in (g/ha/y)
- For sewage sludge, in addition to the above requirements, VLAREMA dictates the authorized treatments, as well as the sampling and analysis. (annex 2.3.1.D)
- For recovered materials that are not (yet) included in the annex, OVAM has to be contacted. A raw material declaration will probably be required. This is the case for struvite and ammonium salts recovered from waste water sludge.

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Table 5-6: Relevant to WalNUT project materials in Annex 2.2 of VLAREMA

Name of the material	Origin and description	Composition
treated sewage sludge	The sewage sludge that has been biologically, chemically or thermally treated following Annex 2.3.1.D by long-term storage or by another suitable process, to significantly reduce its fermentability and the hygienic objections to its use	article 2.3.3.1, article 2.3.3.2 and a raw material declaration is required
Ammonium sulphate-solution	From a chemical (acid) air stripper	article 2.3.3.1

For products generated from the HRAS + adsorption plant, it is difficult to say at the moment what requirements are needed and what legal classification the product will have.

For ammonium salts:

- According to (EC) 2003/2003, ammonium salts are recognised as 'EC fertilisers' (category C1 No. 1, with C1: liquid straight fertilisers and No. 1: nitrogen fertiliser solution) if the N content is at least 15%. While the ammonium nitrate from the stripping wash of the plants in Flanders meets the 15% requirement, this does not apply to the ammonium sulphate, which is currently mainly produced by air washing ammonia-rich air from animal stables.

- In the new Fertiliser Regulation (EC) 2019/1009 ammonium salts correspond to the product category fertiliser (PFC) C.I. (b) (i) Liquid inorganic macronutrient straight fertiliser if the N concentration > 5 %. Both ammonium nitrate and sulphate produced in Flanders fulfil this N content. However, as mentioned above, sewage sludge is not included in 1 of the material categories (CMC) of Annex II, so fertilisers derived from sewage sludge would require a new CMC.

- There is already the possibility to market in Flanders with a raw material declaration. Please note that - as long as the CMC is not included - this only means that you cannot export it with the CE label, but as a raw material on the condition that the importing country also considers it as a raw material (and not as waste). For the marketing of ammonium salts from stripping/washing, an exemption should be granted by the ministry.

5.3 Integrated assessment of fertilising products regulations in Italy

Italian stakeholders and technical committees are currently working on a proposal to update the national Decreto Legislativo 75/2010 (Legislative Decree 75/2010). Essentially, the aim is to facilitate the transition to the new Regulation EU 1009/2019 by ensuring that all types of fertiliser designations not covered at the European level are at least covered at the national level and that all fertilisers covered by the Reg. EU 2003/2003 can also be included as fertilisers at the national level.

5.3.1 Legislative Decree 75/2010

The D. Lgs. 75/2010 is the main Italian reference legislation for fertilisers and adopts the EC regulation 2003/2003.

- It rules the placing on the market of fertilisers, soil amendments, corrective agents, and cultivation substrates and establishes the analytical control protocols.
- It establishes the Register of Fertilisers and the Register of Manufacturers (Governo Italiano, 2022)

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- It establishes the list of fertilisers that can be used in organic production.
- It contains 14 attachments: 1- fertilisers, 2- soil amendments, 3- corrective, 4- cultivation substrates, 5- organic matrices for the production of organo-mineral fertilisers, products with a specific action, 7- tolerances, 8- labelling and placing on the market, 9- ammonium nitrate, 10- insertion of new fertilisers, 11- laboratory accreditation, 12- methods of ascertaining the systematic exploitation of tolerances, 13- Fertiliser register, 14- register of fertiliser manufacturers.

The title of the fertiliser constitutes the commodity indicator of the nutrient content of the product. It is the percentage content by weight of an element in elemental form or of an oxide thereof referred to as the product as it is.

In addition to the total title, it is mandatory to indicate the forms and solubility of the nutrients. For K, the secondary nutrients and microelements, the solubility is referred to as water, while for P the examination with seven extracting agents is envisaged to express the different degrees of availability for the plant of the different phosphate forms present in the fertiliser.

As reported by art. 3 of d. lgs. 75/2010 (tolerance limits), the titles declared in EC fertilisers, national fertilisers and other fertilisers must comply with the tolerance limits established in Annex 7.

5.3.2 Labelling (Legislative Decree 75/2010):

All fertilisers placed on the market for payment or free of charge must be marked and labelled following Annex 8 of Legislative Decree 75/2010.

- Labelling SIMPLE MINERAL FERTILISER, COMPOUND MINERAL FERTILISER, ORGANIC FERTILISER, AMENDMENT, CORRECTIVE, etc. in capital letters.
- For fertilisers, the indication "EC Fertiliser" or "National Fertiliser".
- The designations of the individual fertilisers (indicating the name and chemical symbol) and the designations of their forms and/or solubility.
- The designation of the secondary elements or microelements that may be present
- The net weight or gross weight; in these cases, the tare must be indicated. The indication of the volume may be optional or indicated for certain types of products.
- Specific indications for use
- Name or company name or trademark and the address of the manufacturer established in the European Community.
- The optional indications must appear separated from the mandatory indications.

5.3.3 Release on the market (Article 4, Legislative Decree 75/2010):

1. Fertilisers may be placed on the market if the requirements laid down in Regulation (EC) No 2003/2003 and in this Decree are met.

2. The products listed in Annexes 1, 2, 5, 6 and 13, which contain in their composition processed products of animal origin, may be placed on the market if they comply with the requirements and processing standards laid down in Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 and subsequent amendments.

3. For ammonium nitrate-based fertilisers, the information provided in Decision No 1348/2008 / EC of the European Parliament and of the Council of 16 December 2008.

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5.3.4 Regulations for checking the characteristics (Article 6, Legislative Decree 75/2010):

1. Fertilisers placed on the market shall be checked for compliance with the provisions of Regulation (EC) No 2003/2003 and of this Decree.

3. The Ministry of Agricultural, Food and Forestry Policy shall publish annually the list of laboratories established on the territory of the State and capable of providing the services required to verify the conformity of the products referred to in the scope of this Decree. These laboratories must meet the requirements set out in Annex 11.

4. The Ministry of Agriculture, Food and Forestry Policy shall send to the Ministry of Economic Development, for subsequent notification to the European Commission, the list of laboratories competent to provide the necessary services for verifying the conformity of EC fertilisers.

5.3.5 Traceability

The Register of Fertilisers established by the Ministry of Agricultural and Food Policy contains a special section for fertilisers authorised for organic farming. Registration in the Fertiliser Register must be applied for by the manufacturer before placing the fertiliser on the market (Annexes 1, 2, 3, 4, 5, and 6). Manufacturers must declare the types of fertiliser they intend to produce before placing the product on the market and confirm these types regularly.

5.3.6 Insertion of new fertilisers and amendments to the annexes (Article 10, Legislative Decree 75/2010)

(1) The inclusion of new national fertilisers, soil conditioners, correcting agents, growing media, organic matrices and products with a specific action in Annexes 1, 2, 3, 4, 5 and 6, the definition of new types of fertilisers and the other amendments to Annexes 7, 8, 9, 10, 11, 12, 13 and 14 shall be made by decree of the Minister of Agriculture, Food and Forestry Policy, subject to the opinion of the Technical Advisory Committee for Fertilisers referred to in Article 9.

2. The application for the inclusion of new products or the application for the definition of new types shall be submitted to the Ministry of Agriculture, Food and Forestry Policy together with the necessary technical documentation as specified in Annex 10 and the specific information on the methods of analysis. The methods of analysis submitted in support of the application must be examined by the Commission referred to in Article 44 of Law No 82 to verify their applicability to the product to be added and to initiate the necessary measures for subsequent formalisation or not.

5.3.7 Additions to legislative decree 75/2010

The Ministry of Agriculture, Food and Forestry Policy updates Annexes 1 and 7 of Legislative Decree No. 75 of 29 April 2010 by the Decree of 21 June. The following amendments are made to Annex 1 "National Fertilisers" of Decreto Legislativo lgs. 75/2010:

- Addition of wool protein hydrolysate to the liquid organic nitrogen fertilisers (Annex 1- National fertilisers).
- Organic nitrogen fertilisers (solid and liquid) with the addition of "wool protein hydrolysate" (Amendment of Annex 7 "Tolerances", point 3.3.1).
- Nitrification inhibitors with the addition of the following product: Nitrapyrin (minimum 0.3% - maximum 0.6%. Do not exceed the maximum quantity of 500 g s.a. /ha per year). (Amendment to Annex 6 - Products with a specific action, point 2.1.1).

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5.3.8 Digestate

Digestate is regulated by:

- Law 7 August 2012, n. 134. Defining the characteristics and methods of use of digestate comparable to fertilisers of chemical origin in terms of fertilising effect and efficiency of use.
- MIPAF Decree 10/7/2013. Inclusion of digestate (including those from separately collected municipal waste) as a component of the mixed composted soil improver.
- MIPAF Decree 26/05/2015. Inclusion of the new product "dried vegetable digestate" in Annex 1 "NP organic fertilisers". Inclusion of digestate from plant materials (other than the organic fraction of municipal waste) fermented as a component of soil amendments.

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5.4 Integrated assessment of fertilising products regulations in Greece

The fertilising products that have been circulating for more than 20 years in the Greek market, were included in the provisions of the European Regulation (EC) 2003/2003 and cover 85% of the fertilisers used by Greek farmers. The agronomic value of these fertilisers has been proven both through scientific studies and their practical use. The Reg. 1009/2019/EU does not affect and does not prohibit the placing on the market of fertilising products that do not bear the CE mark, the so-called "national fertilisers" placed on the market. Instead, it allows fertilising product producers to choose to market a fertiliser product as "CE Fertiliser" or "National Fertiliser". In response to the bureaucratic conditions entailed by the new regulation (EU 1009/2019) and the non-existent European level certification network of fertiliser companies required for its implementation, it has enabled the member states to adopt internal regulations for the circulation of fertilisers. Unfortunately, until today (10.08.2022) there has not been published a Joint Ministerial Decision in Greece resulting in a fundamental legal gap. The non-issuance of this Joint Ministerial Decision goes against the terms of healthy competition, causes commercial damage to Greek member companies, will cause a reduction in jobs and will threaten the viability of many companies and especially small and medium-sized Greek businesses. At the same time, the delay in the issuance of the Joint Ministerial Decision is already causing serious shortages of fertilisers in the market, will make it difficult for Greek farmers and will have significant negative effects in terms of quality and quantity on agricultural production, ultimately causing damage to the National Economy. It is also worth noting that fertilisers of these specifications will be imported with mutual recognition from the other Member States, such as Italy and Spain, while in Greece, companies will not be able to produce and market them and, respectively, export them (Agronews, 2022).

5.4.1 Requirements for the composition of fertilisers by type of fertiliser

5.4.1.1 Composition of fertiliser

- The composition of inorganic fertilisers complies with the requirements laid down for the composition of fertilisers in Annex I of Regulation (EC) No. 2003/2003 of the European Parliament and the Council on fertilisers (EU No L 304 of 21.11.2003, p. 1-194).
- Ammonium nitrate fertilisers with a high nitrogen content comply with the requirements set out in Annex III of Regulation (EC) No. 2003/2003 of the European Parliament and the Council, as well as with the requirements of regulation Talin 'Requirements for the composition of fertilisers by type of fertiliser' of 28.05.2014.
- Fertilisers not specified in Regulation (EC) No. 2003/2003 of the European Parliament and the Council comply with the requirements set out in the annex of regulation Talin 'Requirements for the composition of fertilisers by type of fertiliser' of 28.05.2014.

5.4.1.2 Tolerance in terms of the fertiliser composition

The tolerance regarding the composition of fertilisers specified in subsections 1 (1) and (2) shall comply with the requirements laid down in Regulation (EC) No. 2003/2003 of the European Parliament and the Council.

The term 'tolerance' indicates the permitted deviation of the determined nutrient content from the specified value. Tolerance includes manufacturing, sampling and analysis inaccuracies. No deviation from the minimum and maximum content indicated in this column of the table is allowed. If no maximum content is specified in the following section, there is no maximum content limit.

- The content of the various forms of nitrogen or the deviations from the solubility of phosphorus is 1/10 of the specified content (but not more than 2 % nitrogen by mass and 0.9 % phosphorus by mass), provided that the maximum nutrient content of the components does not exceed the limit specified in this column of the table .
- In fertilisers containing micronutrients, the following deviations from the declared micronutrient content [except for boron (B) and selenium (Se)] are allowed:
  - 50 %, if the content is < 0.2 %
  - 40 %, if the content is 0.2 - 1.0 %

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- 20 %, if the content is > 1.0 - 2.0 %
- 0.4 %, if the content is > 2.0 %
- For boron (B) and selenium (Se): ±50 %.

- In fertilisers containing calcium (Ca), magnesium (Mg), sodium (Na) or sulfur (S), the following deviations from the declared content of these elements are allowed: 1/4, but not more than 0.6% of calcium (Ca), magnesium (Mg) and sodium (Na) by mass and not more than 0.4 % of sulfur (S) by mass.

- Bacterial fertilisers do not contain pathogens or other dangerous microorganisms.

5.4.2 Additional requirements for the composition of fertilisers by type of fertiliser

5.4.2.1 The minimum content of micronutrients in fertilisers

- The minimum content of micronutrients (percentage by mass) in solid and liquid mixtures (Table 5-7).

Table 5-7: The minimum content of micronutrients (percentage by mass) in solid and liquid mixtures

	Content in inorganic micro-nutrient % by mass	Content in the form of a chelate or complex % by mass
Boron (B)	0.2	0.2
Cobalt (Co)	0.02	0.02
Copper (Cu)	0.5	0.1
Iron (Fe)	2.0	0.3
Manganese (Mn)	0.5	0.1
Molybdenum (Mo)	0.02	–
Zinc (Zn)	0.5	0.1

- The minimum content of micronutrients in solid mixtures is 5 % of the fertiliser mass.
- The minimum content of micronutrients in liquid mixtures is 2 % of the fertiliser mass.
- The minimum content of micronutrients (percentage by mass) in micro-fertilisers applied outside the roots and containing major or minor nutrients (Table 5-8).

Table 5-8: The minimum content of micronutrients (percentage by mass) in micro-fertilisers applied outside the roots and containing major or minor nutrients

	Content in micronutrients (% by mass)
Boron (B)	0.010
Cobalt (Co)	0.002
Copper (Cu)	0.002
Iron (Fe)	0.020
Manganese (Mn)	0.010
Molybdenum (Mo)	0.001
Zinc (Zn)	0.002

5.4.2.2 The minimum content in phosphorus fertilisers

Phosphorous fertilisers and the raw material of phosphorous fertilisers must not contain more than 60 mg of cadmium (Cd) per 1 kg of phosphorus (P_2O_5).

Other phosphorus-containing fertilisers must not contain more than 3 mg of cadmium (Cd) per 1 kg of dry fertiliser residue.

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5.4.2.3 The minimum content in compound fertilisers

Compound fertilisers may contain up to 6 mg of added selenium (Se) per 1 kg of fertiliser.

5.4.2.4 Minimum content in liming materials

The permitted content of heavy metal compounds in lime (mg/kg) (Table 5-9) is as follows:

Table 5-9: The permitted content of heavy metal compounds in lime (mg/kg)

	Content in heavy metal compounds in lime (mg/kg)
Cadmium (Cd)	3
Mercury (Hg)	2
Lead (Pb)	100
Nickel (Ni)	100
Male (As)	50
Copper (Cu)	600
Zinc (Zn)	1500
Chromium (Cr)	50

5.5 Integrated assessment of fertilising products regulations in Denmark

The Decree on the use of waste for agricultural purposes (Miljøministeriet, 2022) lays down the rules for the extent to which waste, may be used for agricultural purposes, without adverse effects on the environment and humans, plants and animals. The rules in this order shall not apply if they conflict with the provisions of other legislation on the prevention and control of diseases among livestock, zoos or pests of plants. The order also covers waste from households, institutions and companies, including organically treated waste, process effluent and sewage sludge to the extent where this waste is intended to be used for agricultural purposes.

The order does not cover:

- Composted and non-composted waste from gardens and parks may be used for agricultural purposes without prior authorisation.
- Animal by-products and derived products are covered by Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation), apart from animal by-products and derived products that are intended for use in biogas and composting plants.
- Carcases of animals that did not die in a slaughtering process, including animals, are put down to eradicate epizootic diseases and are disposed of following Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation).
- Fields where waste is being spread for experimental purposes to assess its harmful effects on soil and crops.

5.5.1 The fertiliser application executive order

The order (Danish business authority, 2022) includes rules for handling and use of all fertilisers used in agriculture. Here it is stated that in most cases a maximum of the equivalent of 170 kg total N/ha in organic fertiliser may be used on average on the farm. It also states how much phosphorus may be used. The phosphorus limit indicates how much phosphorus may be used on average per hectare on the farm - this depends on the type of use. In addition, there are several rules for when the individual types of fertiliser can be used - the so-called "closing periods" - as well as rules for application in case of frost, snow cover, etc.

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All fertiliser must be stated in a fertiliser account, which must be prepared annually and submitted to the Danish Agency for Agriculture.

5.5.2 Waste to Soil Order

If the applied fertiliser is characterized as waste, it must also comply with the rules in the Waste to Soil Order (Miljøministeriet, 2022). Examples of this type of fertiliser are biofertiliser (wastewater sludge), potato fruit juice, dairy sludge, etc. Before application, the waste must as a minimum be analysed for dry matter, nitrogen, phosphorus, 7 heavy metals (Cd, Hg, Cr, Zn, Cu, Ni and Pb) and 4 pollutants (PAH, LAS, DEHP and NPE). If the waste complies with the strict limit values, it can be used as fertiliser.

Prior to use, a contract must be entered into with the recipient, who must designate the areas where the waste is to be used. The contract, field map and a declaration (with analysis results and a description of how the waste is to be used) are sent to the recipient's municipality, which approves the use.

After application, the quantities are reported to the Danish Agency for Agriculture, so that it is automatically included in the recipient's fertiliser account.

The recipient must be aware that there is a requirement for a maximum amount of dry matter added in waste/hectare over a 10-year period.

5.5.3 The Bio Ash Order

If there is bio ash (ash from wood and/or straw), the bio ash must, in addition to the general rules, be dispensed following the rules in the Bio Ash Order (Ministeriet for Fødevarer, Landbrug og Fiskeri, 2022). All other ash types/mixtures must be applied following the rules in the Waste to Soil Order (if they are suitable as fertiliser on agricultural soil).

The Bio Ash Order requires analysis for Phosphorus, Potassium, and 5 heavy metals (Cd, Cr, Ni, Hg and Pb). If the plant does not continuously measure for CO in the flue gas, it must also be measured for PAH. If the limit values are met, bio ash can be used as fertiliser. Prior to delivery, a contract must be entered into with the recipient. Next, it must be notified to the recipient's municipality that bio ash is applied to the farm. In connection with the notification, the contract and declaration are submitted.

After application, the quantities are reported to the Danish Agency for Agriculture, so that it is automatically included in the recipient's fertiliser account.

The recipient must be aware that there is a requirement for a maximum amount of added dry matter and cadmium in the bio ash/hectare over a 5-year period.

5.6 Integrated assessment of fertilising products regulations in Hungary

Decree No. 36 of 2006 (V. 18.) FVM (Food and Agriculture Organization of the United Nations, 2022) of the Ministry of Agriculture and Rural Development concerning the authorisation, storage, marketing and utilization of yield - increasing materials applies to the authorisation, storage, marketing, labelling and utilization of all fertiliser yield - increasing materials with relevance for the nutrient recovery from by-products that are not intended for human consumption in harmony with the regulations EU1069/2009, EU 97/78 and 142/2011. The authorisation is issued by the National Food Safety Agency (NEBIH). Articles 3-9 contain detailed rules regarding the authorisation procedure. Each authorisation is valid for ten years and it is renewable. Article 10 concerns the storage of yield - increasing materials. Packaging and marketing are regulated in Articles 11-12. Control on utilization of these products is ruled by Articles

Fertilising products may be placed on the market if:

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1) The positive effects for the soil and plants are proven demonstrated under MS Authority accredited test conditions with documented accredited laboratory sample testing and no harmful effects detected for the soil, plant, ecology, water base, environment, climate, humans and animals.

2) MS Authority permit available to place on the market and use of such identified, specified and approved products with approved and labelled content and quality.

    a. The classification and detailed content specification with maximum allowable limits is determined in the 36/ 2006 (V. 18.) FVM regulation annex.

    b. The specifications including user conditions and material safety/risk/hazard relevance, incl. environmental and fire risks and classifications, where EU 67/548, EU 1999/45 and EU 1272/2008 to be applied. Storage, packaging with comprehensive labelling information of the product (incl. properties of a substance or mixture identified and classified accordingly), shelf life date and permit validity date (10 years) are specified. Permitting Authority public announcing on its official web page the information about the authorized products.

    c. NEBIH Permitting Authority (together with other specialized Advising Regional Authorities) regularly supervising the transparent industrial manufacturing operations of the permitted fertilisers, incl. the quality and consistency of the input materials and output products, storage and all comprehensive identified labelling information aiming to inform the users.

    d. Advising Regional Authorities inspecting/supervising the industrial manufacturing operations: Environmental Protection Authority, Industrial Safety Inspection Authority, Labor Safety Inspection Authority, Human Health Protection Inspection Office, Fire Protection Authority, Water Protection Office, Transport Inspection, Custom Office, etc..

    e. The Authority inspection rights are comprehensive, incl. manufacturing operation and the life cycle of all material/product/waste streams with valid shelf life and expired shelf life warranty as well, incl. post shelf life management of the waste streams, in relevant cases.

    f. Fertilising products may be used according to the conditions defined in the permit, and special attention to be considered in sensitive water base area cases, for which the specific regulations to be applied.

36/2006. (V. 18.) FVM Annex 3 quality specifications: Comprehensive list of different types of fertiliser substances listed and quality determined from which only the representative innovative – organic fertiliser specifications are short listed in the Decree. The Hungarian industrial standards and norms in most cases traditionally related to the German DIN standards.

In the fertiliser cases, - due to the fact that the many areas in the Carpathian basin is classified as sensitive water basine (regional subsurface ground water, EU CAP and NATURA 2000 related agri environmental ecological cultivation areas), - since 2006 the national fertiliser's PAH19 content determined to <1 mg/kg (EU FPR 2019/1009 defines <6 mg/kg for PAH16 from 2022) and Cadmium to 2 mg/kg (that has not been EU regulated at all before July 16, 2022, while the national Cadmium level will be changed from 2 mg/kg to 1.5 mg/kg in 2022.). Both PAH19 and Cadmium are key performance indicators for the bio-based fertilisers. Considerations made form Cu/Zn, which to certain level are nutrients but over-limits are already as toxic metals.

5.7 Integrated assessment of fertilising products regulations in Portugal

Portugal's current regulation regarding the use of bio-fertiliser is based on Regulation (EC) No. 2003/2003. However, Portugal is going to fully adopt the new EU regulation 2019/1009, since this regulation shall be binding in its entirety and directly applicable to Portugal. Thus, the limits recommended in the EU directive 2019/1009 are considered for the Portuguese context, which may already be considered for imports to Portugal.

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In Portugal, there is no separate regional regulation for biofertilisers and, in general, legislation is national. In Portugal, it is "Direção-Geral das Atividades Económicas (DGAE)" that issues permission for the manufacturing and distribution of bio-based fertilisers. As far as we know, there is no specific policy framework regarding additional target pollutants which may be detected in the WWT sewage and shall be considered as potential contamination in the BBFs.

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6 Notified bodies

6.1 'Prior authorisation procedure'-definition

Prior authorisation procedure' means an administrative procedure under the law of a Member State whereby the competent authority of that Member State must give its formal consent, at the request of an economic operator, before goods may be made available on the market in that Member State.

6.2 EU notified body organisations

The EU notified body organisations (Table 6-10) are designated by an EU country to assess the conformity of certain products before being placed on the market.

The conformity assessment according to Regulation (EU) 2019/1009 on EU fertilising products has been designated to be carried out by a notified body. This New Approach Notified and Designated Organisation (Nando) fulfils the relevant requirements and informs the European Commission and the other Member States of the conformity of the fertilising product.

Table 6-10: List of Notified bodies designated to inform the European Commission and the other Member States of the conformity and the conformity assessment of an EU fertilising product

	Body type	Name
Hungary	NB 2806	CerTrust Kft.
Estonia	NB 2947	Inspectorate Estonia AS
Poland	NB 2949	Instytut Nadzoru Technicznego Sp. z o.o.
Netherlands	NB 2929	Kiwa VERIN B.V.
Latvia	NB 1326	LIMITED LIABILITY COMPANY LATVIAN CERTIFICATION CENTRE (LATSERT)
Poland	NB 1434	POLSKIE CENTRUM BADAN I CERTYFIKACJI S.A.
Netherlands	NB 2832	Stichting EMCI Register (trading as EMCI Register & EFCI Register)
Netherlands	NB 1749	TNO Defense, Security and Safety
Greece	NB 0906	TUV AUSTRIA HELLAS LTD
Italy		Ministero delle Politiche Agricole, Alimentari e Forestali DISR V - Servizio fitosanitario centrale, produzioni vegetali Via XX Settembre, 20 - 00187 Roma

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There are no notified bodies authorised yet in France. The Direction générale de la concurrence, de la consommation et de la répression des fraudes (DGCCRF) organised a meeting on April the 20th 2022 for the candidates as notified bodies to explain the application process. The existing organisations and their role are described in Table 6-11.

Table 6-11: List of the organisations designated to inform the European Commission and the other Member States of the conformity and the conformity assessment of an EU fertilising product in France

	National mission	Contact Information
French Ministry of agriculture	In charge of drafting the rural code. The rural code contains the main regulatory principles about fertilisers : articles L255-1 to L255-18 and R255-1 to R255-34	251 rue de Vaugirard - 75732 Paris Cedex 15 - Phone : 33 1 49 55 81 89
Agence Française de Sécurité Sanitaire des Aliments (ANSES)	Decision about market permit for fertilisers. Reference authority about fertilisers' characteristics, particularly characteristics concerning environmental and human health hazards.	14 rue Pierre et Marie Curie - 94701 Maisons-Alfort Cedex, France - Phone : 33 1 49 77 13 50
French Ministry of economy and finance (DGCCR) Directorate-General for Competition, Consumer Affairs and Prevention)	In charge of compliance control of products on national territory.	Télédoc 151 - 139, rue de Bercy - 75572 Paris Cedex 12 - Phone : 33 1 40 04 04 04

In Hungary (Table 6-12), the accreditation covers the product categories and conformity assessment procedures.

Table 6-12: List of the organisations designated to inform the European Commission and the other Member States of the conformity and the conformity assessment of an EU fertilising product in Hungary

	EC FERTILISERS – CE-marked EU FPR 2019/1009 Fertilising products HU NOTIFIED BODY 2806	NATIONAL FERTILISERS HU National Authority Ministry of Agriculture
Organisation	CerTrus Ltd., https://certrust.eu/en, 1134 Budapest, Váci út 49, Hungary,	Authority: NÉBIH National Food Safety Chain Office
VAT ID	26515645	Regulation (36/2006. (V. 18.) FVM)
NB ID	NB 2806	Limit values (as of specification)
Accredited	EN ISO/IEC 17065 - Product certification	
National Accreditation Body (NAB)	NAH	
EC Notification body	DG GROW, Brussels	
Product range	as of authorisation specifications	
Implemented	from July 16, 2022	Continuously as of MS regulations
Validity	MS27	MS and Mutual Recognition EU 2019/515

In Portugal the National Accreditation Body covers the product categories and conformity assessment procedures for CE labelled fertilisers (Table 6-13).

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Table 6-13: List of the organisations designated to inform the European Commission and the other Member States of the conformity and the conformity assessment of an EU fertilising product in Portugal

	EC FERTILISERS – CE-marked	NATIONAL FERTILISERS
Accredited	EN ISO/IEC 17020 – Inspection and EN ISO/IEC 17065 – Product certification	Regulation (EU) 2019/1009 (to be adopted soon)
National Accreditation Body (NAB)	IPAC - Portuguese Institute for Accreditation	IPQ - Portuguese Institute for Quality, Portugal National Authority (Ministry of economics)
EC Notification body	DG GROW, Brussels	

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7 Prospects for future policy development

Knowledge and innovation play an important role in helping farmers, foresters and rural communities meet current and future challenges. To confirm that relevant people are connected as well as that knowledge being accessible and sharable by all who use and produce it, effective knowledge and innovation information systems for agriculture are necessary across the EU. This will further support the development of innovative solutions that work in practice.

- Integrated technology projects covering the entire R&D cycle from concept to field trials to commercial testing; development efforts to facilitate and promote technology validation; targeted research to develop fertilisers from each waste stream and their applicability.
- Projects that may help streamline waste collection and recycling to confirm a never ending supply of raw and feedstock materials.
- Efforts to map, estimate and validate the nutrient content of side streams and biowaste, and to develop technologies for large-scale production.
- Field testing and scientific validation of bioavailability and also the impact of bio-based fertilisers on soil nutrient profiles and other environmental factors, including the potential for organic contamination, to spot the foremost appropriate bio-based fertilisers with the highest agronomic efficiency.
- Incentives for farmers and manufacturers to use and produce bio-based fertilisers that are not limited to tax breaks and tax subsidies.

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8 Conclusions

The FPR has yet to be implemented in all EU-MS. The degree of implementation ranges according to the existing fertilising products supply and demand and application processes that are specific for each EU-MS. The nutrient flow analysis and nutrient transfer model as well as the nutrient imbalance analysis at a European and national level are extensively discussed in WalNUT's D1.1 and D1.2, respectively. Moreover, the different products that can be used as bio-based fertilisers have been discussed in WalNUT's D1.3 – EU27 matrix for bio-based input streams and Nutrient Recovery technologies.

A wider choice of fertilisers can help to create an assembly of feed and food production that is more cost and resource efficient in the future.

The new EU fertiliser regulation will not only affect the fertiliser sector. The private and public sectors practising nutrient recovery will be prepared to add value to their production by contributing to the notion of environmentally friendly bio-based fertilisers.

The new EU fertiliser regulation will also minimise the workload of public authorities when the control mechanisms are fully or partially implemented at EU level.

However, the extent to which the requirements of the new EU Fertiliser Regulation (in particular the hygiene and minimum nutrient content requirements) are often met by conventional compost and fermentation products has not yet been conclusively clarified.

The practical application of the new EU Fertiliser Regulation will show whether improvements are still necessary here through delegated acts of the Commission, so that organic fertilisers actually receive easier market access through the new regulation.

As a rule, national laws are replaced by European law and its harmonised product specifications. In the case of fertilisers, the legislator deviates from this principle, taking into account the fact that some markets for fertilisers are regionally very limited. For example, recital 5 states that "This Regulation should therefore not apply to products which, when made available on the market, are not labelled with CE." This means that companies have a choice: if they want to develop more than one national territory with their product, they should apply for the CE marking and go through the required conformity assessment procedure. They no longer have to rely on the principle of mutual recognition. On the other hand, if they do not seek conformity with EU rules, or if such conformity cannot be ensured or can only be ensured to a limited extent, they will continue to have access to national markets.

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