Nutrient Management and Nutrient Recovery Thematic Network

The NUTRIMAN-Project and the NUTRIMAN Farmers platform

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IUNG-PIB

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NUTRIMAN w skrócie



- **Title:** Nutrient Management and Nutrient Recovery Thematic Network **(NUTRIMAN)**
- **Coordinator:** Edward Someus, 3R-BioPhosphate Ltd.
- **Project start: 1.10.2018, Timeframe: 36 M + 10 years**
- **Financing:** European Union Horizon 2020, RUR-15-2018, Thematic networks compiling knowledge ready for practice; Contract number: 818470
- **Web page:** https://www.nutriman.net

Consortium NUTRIMAN

Total : 18 partners from **8 EU partners**:

- **9** Research organisations
- **3** SMEs
- **4** Agricultural chambers
- **1** Association of producers
- **1** NGO

Projekt NUTRIMAN

What is NUTRIMAN?

- **NUTRIMAN is a Nitrogen and Phosphorus Thematic network compiling knowledge of "ready-for-practice" recovered bio-based fertiliser technologies, products, applications and practices for the interest and benefit of agricultural practitioners.**
- The project focuses on connecting market competitive and commercially "ready for practice" innovative results drawn from high research maturity applied scientific programmes and common industrial practices.

Story behind:

- **Urgent need to optimise resource use and smooth the transition to a knowledge-driven agriculture. To spread knowledge and information on the insufficiently exploited N/P recovery innovations (technologies, products, practices) that are already commercially and market "ready for practice" to agricultural practitioners.**
- **Target:**
- Ensuring that when in 2022 the New EU Regulation on fertilising products reaches implementation phase, agricultural practitioners will already have knowledge and use products produced as a result of recycling.
- **For whom: farmers, agricultural advisors, scientists, practitioners, business, NGOs, etc..**

Bottom-up approach

NUTRIMAN goals

Technologies and products for N / P recovery “Ready for implementation to the market "

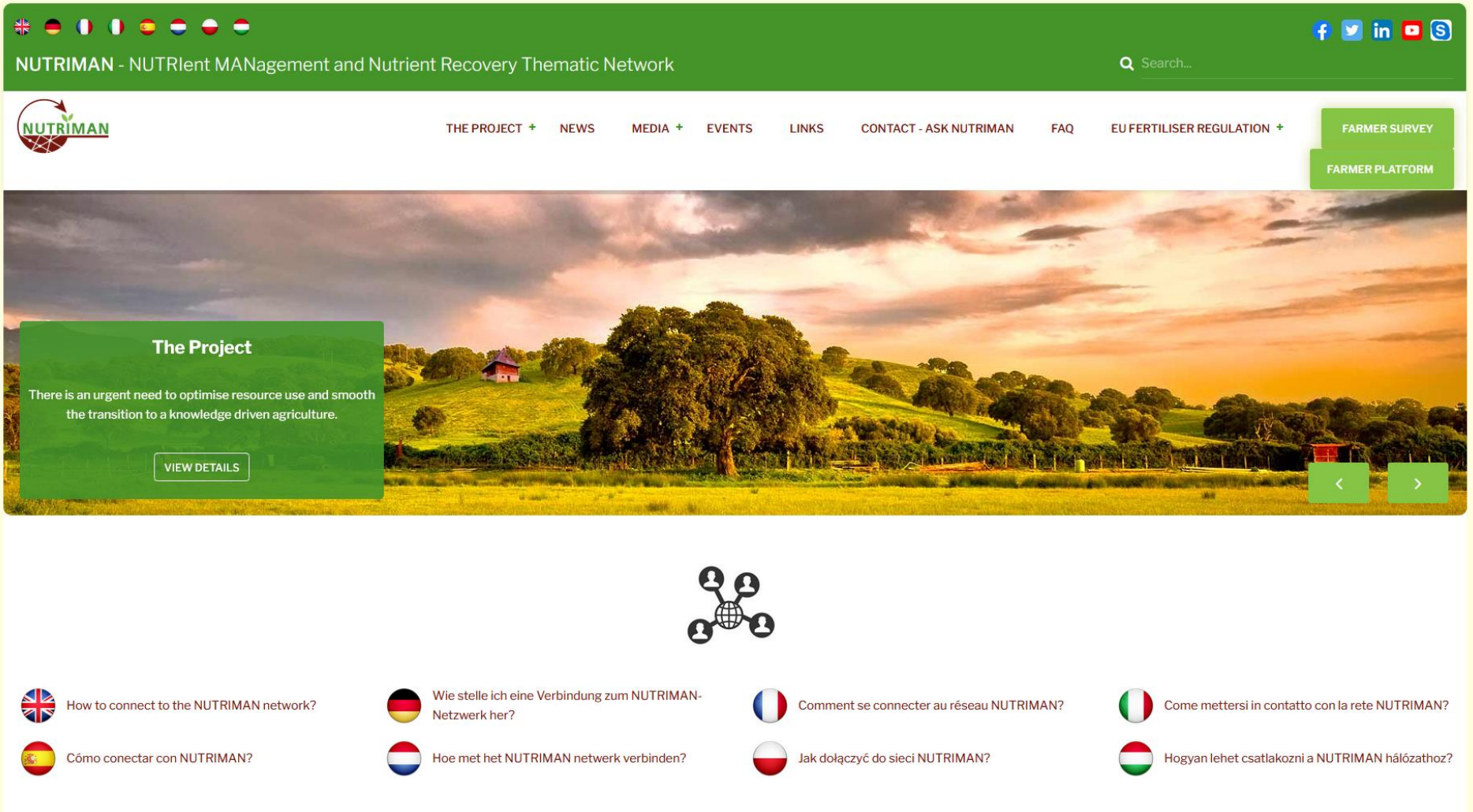
NUTRIMAN platform for farmers
Advice & Recommendation

NUTRIMAN

NUTRIMAN platform for farmers
Knowledge in practice

https://nutriman.net/farmer-platform

NUTRIMAN – nutriman.net



NUTRIMAN specific objectives:

1.To make an **inventory of matured FP7/H2020/LIFE/OGs innovative research results in the field of Nitrogen, Phosphorus and nutrient recovery** EU28 technologies, methodologies and products which are near to be put into practice, but not sufficiently known by large industrial agricultural practitioners and small scale farmers.

2.To evaluate innovative N, P nutrient recovery technologies and novel N, P fertiliser products and practices, both by experts and by the potential end-users (farmers, farmers associations, producers' organisations).

3.Dedicated and targeted communication to a various group of stakeholders to promote the action and results.

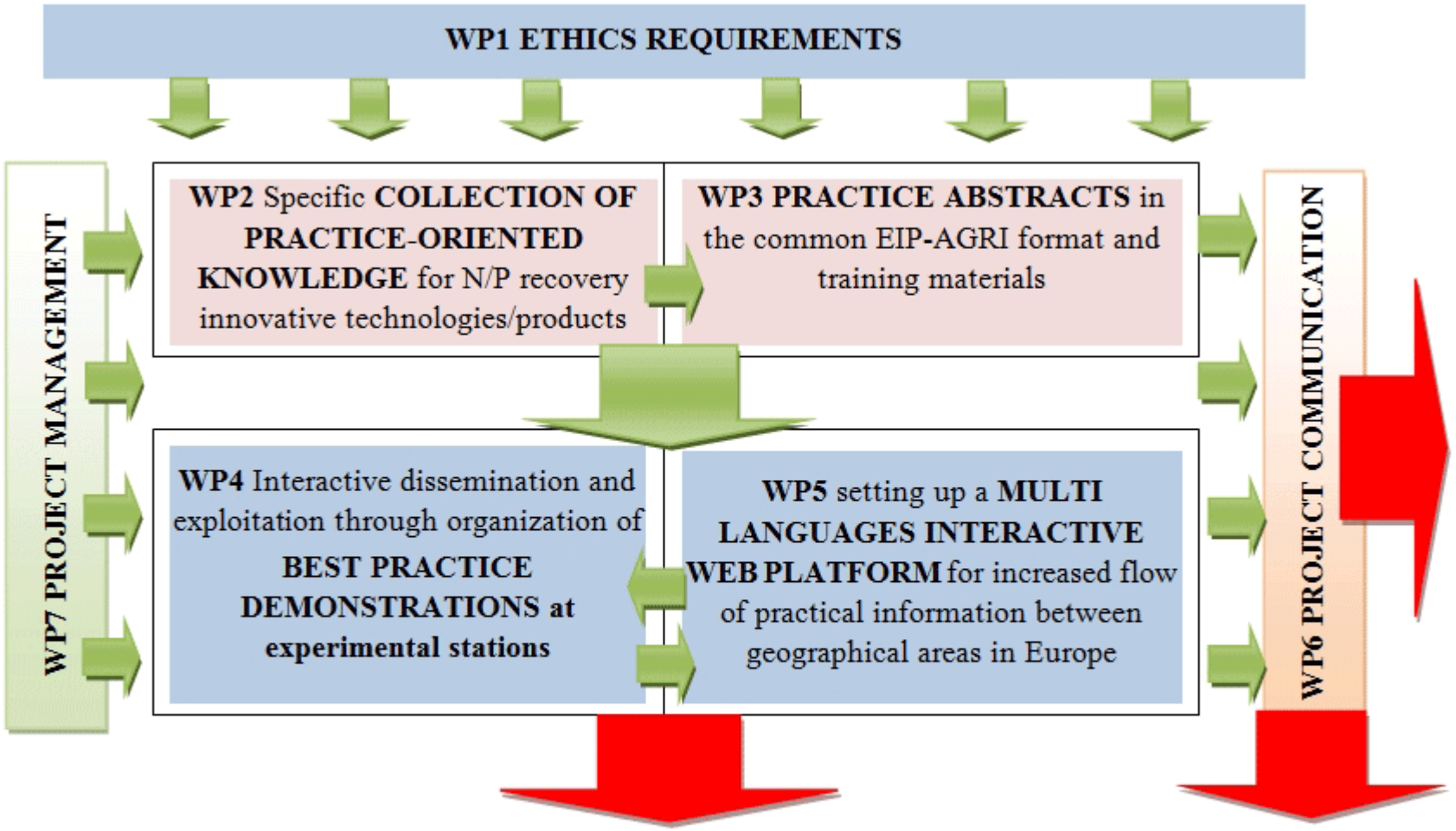
4.Increasing farmers awareness towards the revision of the Fertilisers Regulation policy. To organize legal/policy oriented education and training for farmers.

NUTRIMAN specific objectives:

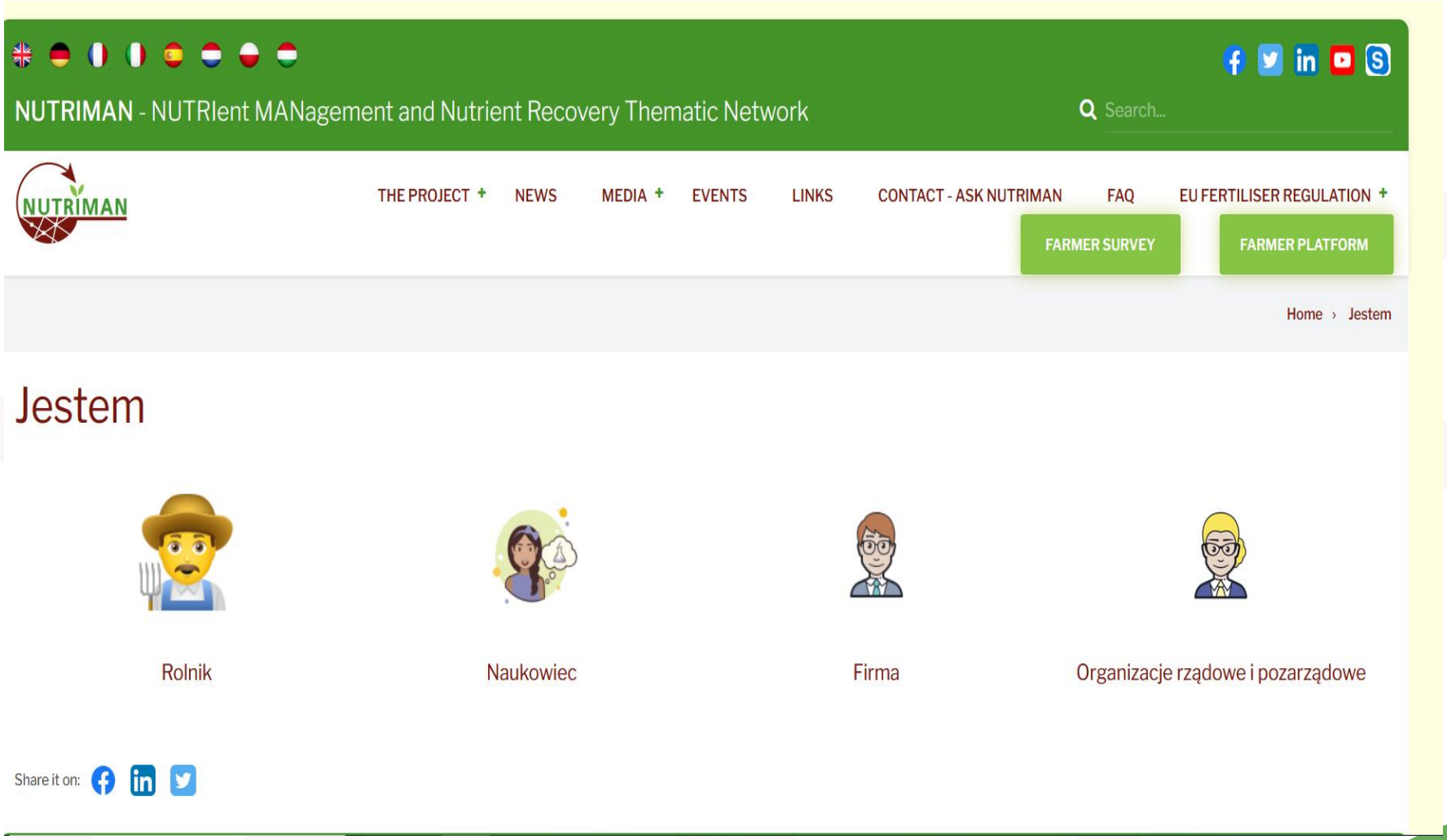
5. To spread knowledge towards agricultural practitioners about the insufficiently exploited P and N recovery innovative research results with "ready for practice" performance:

- ❑ To collect (at least 100) multi lingual (at 8 languages) **practice oriented abstracts** in EIP-AGRI form
- ❑ To develop of multi lingual (EN, FR, NL, DE, IT, ES, PL, HU) innovative fertilizer **product application and training materials**, audio-visual materials, info graphics for agricultural practitioners, farmers, farmers organizations and advisory services providers of Chambers of Agriculture.
- ❑ To set up a multi lingual (EN, FR, NL, DE, IT, ES, PL, HU) interactive **practice oriented NUTRIMAN web platform**.
- ❑ Providing cross-border **knowledge exchange** and organizing interactive dissemination and exploitation to agri practitioners and agri advisors.
- ❑ Increasing the **flow of practical information between farmers in Europe** in a geographically balanced way through engagement of EU28 Network of Chambers of Agri and Producers Organisations and efficient networking with European networks (COPA-COGECA, EUFRAS).

Work Plan


WP1 ETHICS REQUIREMENTS
WP7 PROJECT MANAGEMENT
WP2 Specific COLLECTION OF PRACTICE-ORIENTED KNOWLEDGE for N/P recovery innovative technologies/products
WP3 PRACTICE ABSTRACTS in the common EIP-AGRI format and training materials
WP4 Interactive dissemination and exploitation through organization of BEST PRACTICE DEMONSTRATIONS at experimental stations
WP5 setting up a MULTI LANGUAGES INTERACTIVE WEB PLATFORM for increased flow of practical information between geographical areas in Europe
WP6 PROJECT COMMUNICATION
Total number of farmers to be directly reached in 8 languages: >1,500,000

NUTRIMAN – nutriman.net



Farmer Platform NUTRIMAN

NUTRIMAN - NUTRIent MANagement and Nutrient Recovery Thematic Network

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Home › Farmer Platform

Farmer Platform

WELCOME on the NUTRIMAN Farmer Platform, which is a Nitrogen and Phosphorus innovative fertiliser recovery thematic network. This Farmer Platform is a continuously expanding database that will be evolutionary maintained for long term up to 2031.

Are You a Farmer interested to learn more about how bio-based and recovered phosphorous and nitrogen technologies and products can help your business? This farmer platform provides a wealth of information on market-ready nutrient recovery technologies and bio-based fertiliser products. It contains practical and user-oriented information and training materials on each innovative technology and bio-based fertiliser product, such as practice abstracts, infosheets, videos and direct contact information of the vendors. Important information is available in 8 languages.

Are You a researcher at University/RTD organisation and you are involved in novel technology and product development driven applied Research & Innovation actions where your consortium is developed innovative phosphorous and nitrogen recovery technologies and products which are already in matured phase (>TRL6) "ready for practice"? **EU FP7, H2020, LIFE, Interreg or other national/international programme result interlinks are most welcome. How to connect to farmer platform?**

Are You a Vendor with market-ready phosphorous and nitrogen recovery technologies and products and need visibility promotion? This farmer platform is providing extensive disseminating opportunity in European dimension, and You are most welcome to join. **How to connect to farmer platform?**

Selection criteria:

1. transparent basic selection criteria for publication of innovative N/P recovery technologies/products an the NUTRIMAN Farmer Platform
2. selection criteria of the best 25 available technologies and products.

If you have any question or information about nitrogen and phosphorus recovery technologies, recovered fertiliser products, applications, user and/or commercial market aspects or you would like to share with us your experience and knowledge we are very much open

Farmer Platform NUTRIMAN

NUTRIMAN Farmer Platform disclaimer: The Technology (https://nutriman.net/farmer-platform/technology) and Product pages (https://nutriman.net/farmer-platform/product) on the NUTRIMAN Farmer Platform (https://nutriman.net/farmer-platform) are publishing information and documents solely provided by the vendors of the technologies and products. The Agency, the Commission and the NUTRIMAN consortium are under no any circumstances responsible for the content and/or any use that may be made of the information it contains. The NUTRIMAN consortium collected the information about technologies and products to the best of their knowledge and belief. Any damage or claims arising from the use of technologies or products are on the sole responsibility of the vendors or producers. In all cases the comprehensive EU and/or the Member State regulations for lawful processing, applications and labeling have to be applied. The identification numbers (ID) displayed on the Farmer Platform are automatically generated by the system. The ID numbers do not represent any preference or order, they are only used as for reference. No any pictures published on the Farmer Platform may be reproduced without a written permission of the products/technologies vendors.

Technology readiness levels (TRL): https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-g-trl_en.pdf

Technology Rediness Level Guide

Select site in English

PRODUCTS TECHNOLOGIES

Or select your lanuage

Product categories

1. Compost and digestate;
2. Ash;
3. Struvite* and other P- rich products;
4. Biochar and bio-phosphate;
5. Scrubber water and mineral nitrogen concentrates.

*Struvite (magnesium ammonium phosphate) is inorganic phosphate mineral with formula: $NH_4MgPO_4 \cdot 6H_2O$ and approx. 22% P_2O_5 content obtained from precipitation processes

Product categories

Product categories

LIST ALL PRODUCTS

MAIN CATEGORY: COMPOST AND DIGESTATE (AND BIOMASS)

SUBCATEGORY	DEFINITION	FP ID LINK FOR PRODUCTS ARE IN MATURED PHASE	THEMATIC TRAINING MATERIAL
Compost	Compost is a humus-like material derived from organic waste composting as a result of the action of aerobic bacteria, fungi, and other organisms. Depending on composting method, size, intensity of the operation and the input material,a large range of qualities can be produced. Quality aspects of compost are of most importance in order to assure a proper use in agriculture. Farmers' willingness to use compost is strictly connected to various quality aspects of compost. Compost quality refers to the overall state of the compost with regard to physical, chemical and biological characteristics. These parameters are indicators of the ultimate impact of the compost on the environment. In particular, the most important parameters from the point of view of environment protection standards, public health and the soil are those related to pathogens, inorganic and organic potentially toxic compounds and stability. The specific applications for the compost use are soil improver, growing media, plant disease suppression and also other applications. Compost is commonly used as a soil amendment to increase organic matter content and fertility by improving physical, chemical and biological soil. The nutritive value of composts and their potential to enhance soil quality makes them ideal for agriculture, but may unnecessarily increase the toxic element content of the soil when applied at high dosages. Composts have the advantage to significantly increase soil organic matter (SOM) contents, a key soil quality indicator that is on the contrary declining in many regions of the world. There are many compounds within compost that influence the biological process in soil, improving the physical and chemical characteristics. Humates improve the soil structure and then the plant roots could easier penetrate. Improving root growth, the stability of trees increases and the water stess decreases.Additional benefits of compost addition to soil are promoting soil biological activity, reducing erosion losses, decreasing bulk density, improving structural stability, nutrient availability and plant uptake, increasing the water holding capacity. The use of compost is also interesting as a peat substitute, in particular after recent increasing concern on peat extraction and the damage of peat lands natural habitats by the horticulture industry that lead to the adoption of alternative substrates. However, composts can hardly be used alone as a growing media; it is necessary to do a germination test or compost analysis to determine the suitability because will be often kill or damage plants due to excessive salinity.	210 260 272 280 451 452 540 1664 1986	Thematic training on Compost Southern Europe Thematic training on Compost Northern Europe Thematic practice abstract on Compost Southern Europe Thematic practice abstract on Compost Northern Europe
Digestate	Digestate is a wet mixture obtained from anaerobic digestion process where microorganisms break down organic materials in the absence of oxygen. Digestate is a fertiliser containing all nutrients and micronutrients including nitrogen, phosphorus and potassium. Since no nutrient are lost during anaerobic digestion, farmer can close the nutrient cycle and reuse the minerals. Additionally, organic matter in digestate can build up the humus content in the soil which is particularly crucial for arid and semi-arid lands with low carbon content. The percentage of readily available nitrogen is higher in digestate compared to the same organic material in its raw form, thereby increasing its fertilising value. [1]	264 267 268 270 1665	Thematic training on Digestate Northern Europe Thematic training on Digestate Southern Europe Thematic practice abstract on Digestate Southern Europe

Product categories

MAIN CATEGORY: ASH

SUBCATEGORY	DEFINITION	FP ID LINK FOR PRODUCTS ARE IN MATURED PHASE	THEMATIC TRAINING MATERIAL
Ash	Ash is the burned-out solid residue powdery product after oxidative thermo chemical processing: oxidative combustion or semi-oxidative gasification processes. Ashes are characterized as fly ash or bottom ash or a combination thereof formed through the incineration of bio-based materials by oxidation. Ashes obtained through incineration can be post-processed with the aim to partly remove metals and metalloids, and to increase the availability of plant nutrients in the ash complexes. Ashes can be obtained from incineration plants that are specifically designed for the purpose of producing ash-based materials for further fertiliser use or they can be a production residue resulting from a process aimed at disposing waste or producing a different primary product (e.g. energy). Substantial quantities of ashes are produced via co-incineration facilities that combine the purposes of energy production with waste disposal, especially for waste materials of low calorific value or of high moisture content. Co-incineration is an economically viable and widely applied waste disposal route for many nutrient-rich wastes. [1] [1] https://susproc.jrc.ec.europa.eu/activities/waste/documents/JRC_Interim_Report_STRUBIAS_recovery_rules.pdf	321 397 401	Thematic training on ashes Thematic practice abstract on ashes

Product categories

MAIN CATEGORY: STRUVITE AND OTHER P-PRODUCT

SUBCATEGORY	DEFINITION	FP ID LINK FOR PRODUCTS ARE IN MATURED PHASE	THEMATIC TRAINING MATERIAL
Struvite	Struvite (magnesium ammonium phosphate) is inorganic phosphate mineral with formula: $NH_4MgPO_4 \cdot 6H_2O$ and approx. 22% P_2O_5 content obtained from precipitation processes. Struvite crystallizes in the orthorhombic system as white to yellowish or brownish-white pyramidal crystals or in platey mica-like forms. Magnesium ammonium phosphate, usually called struvite, is the most common salt enabling the recovery of phosphorous and nitrogen from wastewaters. Struvite is a white crystalline substance, which is considered as a slow releasing and valuable fertilizer (5-28-0-10Mg), as it is sparingly soluble under neutral and alkaline conditions but readily soluble in citric acid. Struvite precipitation is produced in alkaline conditions when the concentration of Mg^{2+}, NH_4^+ and PO_4^{3-} exceeds the solubility product. [1] A combination of physical and chemical parameters controls the complex mechanism of struvite precipitation. One of the main factors is pH, as it changes the concentration of free ions available for reaction. When pH increases, Mg^{2+} and NH_4^+ concentrations decrease, as the first one complexes with hydroxides, and the second one increases its volatilization in the form of ammonia (NH_3). On the other hand, PO_4^{3-} concentrations increase as the pH increases. pH is also involved in controlling struvite solubility, being minimal with pH values between 9 and 10.7. [2] Benefits: relative high 22% magnesium ammonium phosphate content. Challenges: low water solubility, potential pharmaceutical residuals and other contaminations. [3] [1] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/fg19_minipaper_1_state_of_the_art_en.pdf [2] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/fg19_minipaper_1_state_of_the_art_en.pdf [3] Marissa A. de Boer, Uptake of pharmaceuticals by sorbent-amended struvite fertilisers recovered from human urine and their bioaccumulations in tomato fruit (Water Research, volume 133, 15 April 2018, Pages 18-26)	208 250 251 293	Thematic training on Struvite Thematic practice abstract on Struvite
Precipitated Calcium Phosphate	Precipitated Calcium-Phosphate refers to P salt containing Ca^{2+}, e.g. $Ca_3(PO_4)_2$, $CaNH_4PO_4$, etc. produced by calcium phosphate precipitation technology. Calcium phosphate precipitation is very complex and involves various parameters. It depends on calcium and phosphate ions concentration, ionic strength, temperature, ion types and pH but also on time. When calcium hydroxide ($Ca(OH)_2$) is added to the liquid fraction and the pH increases above 10, and temperature (70°C), phosphorus precipitates as hydroxyapatite ($Ca_5(PO_4)_3OH$) or brushite ($CaHPO_4\ 2H_2O$). Depending on dosage, three different Ca-phosphates can be obtained: the highly water-soluble mono-calciumphosphate (MCP), the citric acid soluble di-calciumphoshate (DCP) and the barely soluble tri-calciumphosphate (TCP). For fertiliser application, MCP and DCP are favoured. [1] [1] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/fg19_minipaper_1_state_of_the_art_en.pdf	448	Thematic training on precipitated calcium phosphate Thematic practice abstract on precipitated calcium phosphate
Phosphoric-acid	Phosphoric-acid refers to phosphoric acid, phosphate acid and organic P acid recovered from waste streams.		
Phosphorus precipitate	Other P products with multi-substrates or complicate compositions, e.g. P absorbent produced by chemical precipitation.		

Product categories

MAIN CATEGORY: BIOCHAR AND BIO-PHOSPHATE

SUBCATEGORY	DEFINITION	FP ID LINK FOR PRODUCTS ARE IN MATURED PHASE	THEMATIC TRAINING MATERIAL
Biochar	Biochar is 450°C low temperature reductive thermal processed carboniferous material with high carbon content, produced from cellulose based plant or bio-based by-products, which is expressively made for soil functional applications, which does not have economical important level of nutrient content itself but acting as soil improver. The word "biochar" is a combination of "bio-" as in "biomass" and "char" as in "charcoal". It is obtained by charring/pyrolysing plant or bio-byproducts , via a process of heating it in the absence of oxygen. Different types of pyrolysis process used to make biochar, including slow pyrolysis, fast pyrolysis and flash pyrolysis. There are currently processes on the market which enable energy-neutral processing of pig manure or other manure to biochar as well. This is a stable recycled carboniferous material which is beneficial for the soil, containing d stable carbon which is applied to the soil. [1] The carbon content of pyrolysed chars fluctuates between 25% and 95% of the dry mass, dependent on the feedstock and process temperature used. For instance the C content of pyrolysed beech wood is around 85% while that of poultry manure is around 25%.[2] There are two major elements impacting biochar quality: primarily the carbonisation engineering design performance quality to efficiently thermal process the material and the input feed material characteristics. Biochar is used for soil improver, usually between 5 tons/ha and 20 tons/ha to reach soil improver effects. The technical and cost efficiency for the use of plant based biochar for soil improver (most importantly for water and nutrient retention) is highly depending on the biochar quality and application conditions. Plant based biochar does not have fertilizer content with economical importance. Plant based biochar is highly suitable for soil improver, that is mainly based on the high dose effects with high water and nutrient retention capacity. The combination of biochar with compost or another organic fertilizer is most encouraging for agronomic performance. Benefits: recycle bio- byproducts , soil improver – amendment - conditioning agent, reducing soil bulk density, improving aeration and water - nutrient holding capacity of soils, while reducing nutrient leaching losses. The biochar is potentially "carbon negative," taking more carbon out of the atmosphere than it puts back into it, and mitigating climate change by storing plant derived carbon in the soil in a very stable form that resists long term decomposition. Challenges: as biochar incorporation to soil is irrevocable, only high quality properly manufactured and formulated materials to be applied. In some manure biochar cases Cu/Zn over-dose concentration is challenging. As of high dose, user costs might also be high that is challenging. The risk of the flow away, wind erosion and rain leach out of the low volume weight and often dusty plant biochar must pay high attention at use in open field. Regarding the application method, it is important to be cautious when handling dry biochar because it is very dusty and should not be spread in windy conditions. [1] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_fg_nutrients_recycling_final_report_2017_en.pdf [2] https://susproc.jrc.ec.europa.eu/activities/waste/documents/JRC_Interim_Report_STRUBIAS_recovery_rules.pdf	1571	Thematic training on Biochar
Bio-Phosphate	Bio-Phosphate is 850°C high material core temperature reductive thermal processed bio-origin apatite mineral calcium-phosphate bio-fertilizer, which is in all cases made from food grade animal bone grist mono feed. Bio-Phosphate is macroporosus structured and containing approx. 92% mineral and 8% carbon with above >30% up to 35% P_2O_5 economically high concentrated nutrient density with controlled release formulations. Usual application dose: 200 kg/ha – 1,500 kg/ha. Benefits: economically high nutrient density and low dose application rate, macroporosus structure that is enhancig soil mirobiological life, bio-fertiliser with controlled nutrient release performance, mono feed based product. Challenges: new product on the market, which require higher market recognition	192	Thematic training on Biophosphate

Product categories

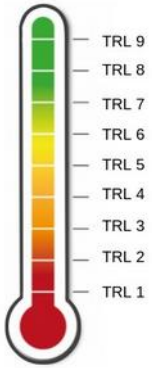
MAIN CATEGORY: SCRUBBER WATER AND MINERAL NITROGEN CONCENTRATES

SUBCATEGORY	DEFINITION	FP ID LINK FOR PRODUCTS ARE IN MATURED PHASE	THEMATIC TRAINING MATERIAL
Scrubber water	Scrubber water is the ammonia water recovered from waste stripping /evaporation process.	1527	Thematic training on Scrubber water Thematic practice abstract on Scrubber water
Ammonium nitrate/sulphate	Ammonium Nitrate/sulphate refers to ammonium nitrate/sulphate solution recovered from stripping/evaporation + scrubbing process by nitric/sulphuric acid as scrubber.	266 274 281 295 454 596 667 1529	Thematic training on Ammonium nitrate/sulphate Thematic practice abstract on Ammonium nitrate/sulphate
Mineral concentrate	Mineral concentrate is the concentrated mineral nutrients solution obtained from membrane filtration process of waste streams or from another separation technology that concentrates the N in the end-product compared to the input. Ultrafiltration + reverse osmosis, have been reported to be able producing mineral concentrate, i.e. 0.5-1 % w/w (95 % ammonia) to be used directly as NK-fertilizer. [1] [1] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/fg19_minipaper_1_state_of_the_art_en.pdf	520 593 1504 1528	Thematic training on Mineral concentrate Thematic practice abstract on Mineral concentrate
Solid manure	Livestock manure is a mixture of feces and urine, bedding material (e.g. straw, wood shavings, sawdust, sphagnum), spilt feed and drinking water, and water used for washing floors. It is a valuable fertilizer that contains a broad range of nutrients such as nitrogen (N), phosphorus (P) and potassium (K) as well as organic carbon which can be utilised by soil microorganisms. Raw manure can be processed with separation technologies that produce a solid fraction in which much of the P and dry matter (DM) and significant amounts of the N are retained. There are several technologies available for liquid and solid separation, including in-house separation such as slatted floors with cellars or channels beneath, natural sedimentation, drying, evaporation, centrifugation, pressurized separation such as screw or belt press. To increase the separation efficiency, manure can be pretreated by using additives such as brown coal, bentonite, zeolite, crystals, chitosan and efficient microorganisms. Depending on the pre-treatment and separation technologies, the obtained solid manure may contain up to 90% of organic matters with reduced volume, which results in reduced storage and transportation cost as well as reduced odors and GHG emission. Therefore, solid manure represents high potential to be used as organic fertiliser or soil amendment.	370 594 595	Thematic training on Solid manure Thematic practice abstract on Solid manure
Liquid manure	Livestock manure from house usually contains high percentage of water which consist of urine, spilt feed and drinking water as well as water for washing. During physical separation, most of water retains in the liquid fraction, together with the soluble nutrients including mineral N, orthophosphate, K, etc. This liquid manure can be used as a liquid organic fertiliser in agriculture. With post-treatments such as evaporation and membrane filtration, the nutrients in liquid manure can be concentrated and the volume can be reduced which saves the transportation cost. Additionally, acidification is used to reduce the GHG emission from liquid manure during storage, transportation and application. Normally liquid manure is injected or incorporated immediately into soil to reduce emissions. Due to the relatively low P and high mineral N&K, liquid manure has the priority to be used in regions rich in P or have restrictions on P application. https://link.springer.com/content/pdf/10.1051/agro/2009010.pdf	322 591	Thematic training on Liquid manure Thematic practice abstract on Liquid Manure

Product information

COMPOST AS SOIL IMPROVER FROM GREEN WASTE BY TUNNEL COMPOSTING

MASTER® ODPADY I ENERGIA



Input material
selectively collected biodegradable green materials – grass and leaves

Nutrient content info
N-P-K (%): maximum content 1.5-0.6-1.5.

OM: 31%

Status
Available on the market

Recommended crops
Wide range of crops, energy crops, lawns, flowers.

Application dose
15 t/ha

Type of farming
conventional

Keywords

compost carbon rich soil improver stabilized slow acting

Product description

Kompo Master 1 and Kompo Master 2 are produced in a process of tunnel composting of selectively collected green waste – grass and leaves. They differ with grass to leaves proportion and are produced in different parts of the season. It is carbon rich soil improver recommended for a wide range of crops, lawns, horticultural applications and land reclamation. The product has a loose structure and is sieved through 2 mm after composting.

The product is environmentally safe, high sanitary quality, stabilized with slow release nutrients, without chemical additions. Improves soil structure, soil water retention and organic matter content. MS Authority permitted.

Basic information

Vendor:
- Name: MASTER - ODPADY I ENERGIA Sp. z o.o.
- Contact: Bartosz Gogol
- Vendor website

Country:
Poland

Product main category:
Compost and Digestate (and biomass)

Product subcategory:
Compost

Languages

DEUTSCH
FRANÇAISE
ESPAÑOL
ITALIANO
NEDERLANDS
POLSKI
MAGYAR

Find out more

NUTRIMAN

Product info – EIP-Agri practice abstract

EIP-AGRI practice abstract

Short title:

Compost as soil improver from green waste by tunnel composting

Summary:

KOMPO MASTER 1 and KOMPO MASTER 2 are soil improvers produced in a process of tunnel composting of fully renewable materials - selectively collected grass and leaves. They are produced in fully controlled composting process with a maturation phase enabling full stabilisation of the product.

The products are carbon rich with slow nutrient release and neutral to slightly alkaline pH. It is of loose soil-like structure with dark colour and sieved through 2 mm. The product is environmentally safe, high sanitary quality, stabilized, without chemical additions and pathogen free. Improves soil structure, soil water retention and organic matter content. The soil improvers are recommended for a wide range of crops, lawns, horticultural applications and land reclamation. Recommended rates in crop production are 15 t/ha.

The Kompo Master soil improvers are market available all year round since the technologies are adjusted to feedstock availability and proportion. It is sold for approx. 2.5 €/t.

It is MS Authority permitted for conventional agriculture, horticulture and land reclamation and approved by scientific institutes as safe for humans, animals and the environment.

For more information: https://nutriman.net/farmer-platform/product/id_1664

Product info – Training material

TRAINING MATERIAL

Title:

Compost as soil improver from green waste by tunnel composting

Training:

What is the product?

Kompo Master 1 and Kompo Master 2 are produced in a process of tunnel composting of selectively collected green waste – grass and leaves. It is carbon rich soil improver recommended for a wide range of crops, lawns, horticultural applications and land reclamation. The product has a loose structure and is sieved through 2 mm after composting. The product is environmentally safe, high sanitary quality, stabilized with slow release nutrients, without chemical additions.

Who is the vendor of the product?

MASTER - Odpady i Energia Sp. z o.o. (www.master.tychy.pl) in Tychy is a modern enterprise that meets the highest expectations of customers, providing comprehensive services in the field of waste collection and management. The company specializes in waste disposal, neutralization, separate collection and renewable energy. In 2018 the company expanded its commercial offer to soil improvers KOMPO MASTER 1 and "KOMPO MASTER 2 offered to farmers and gardeners.

Which other product/technologies are provided by the vendor?

No other fertiliser products at the moment.

Which are the advantages of the products and the problems addressed?

KOMPO soil improvers are produced from natural and selectively collected resources in a fully controlled composting process and with a maturation phase enabling full stabilisation of the product. The Kompo Master soil improvers are fully market available all year round since the technologies are adjusted to feedstock availability and proportion. Nutrients are slowly released. These soil improvers are beneficial for soil structure, soil water retention and provide nutrients and carbon to soil.

Product info - infosheet

Nutrient Management and Nutrient Recovery Thematic Network • www.nutriman.net
RECOVERED FERTILISER Info Sheet

COMPOST AS SOIL IMPROVER FROM GREEN WASTE BY TUNNEL COMPOSTING

compost • carbon rich • soil improver •stabilized •slow acting

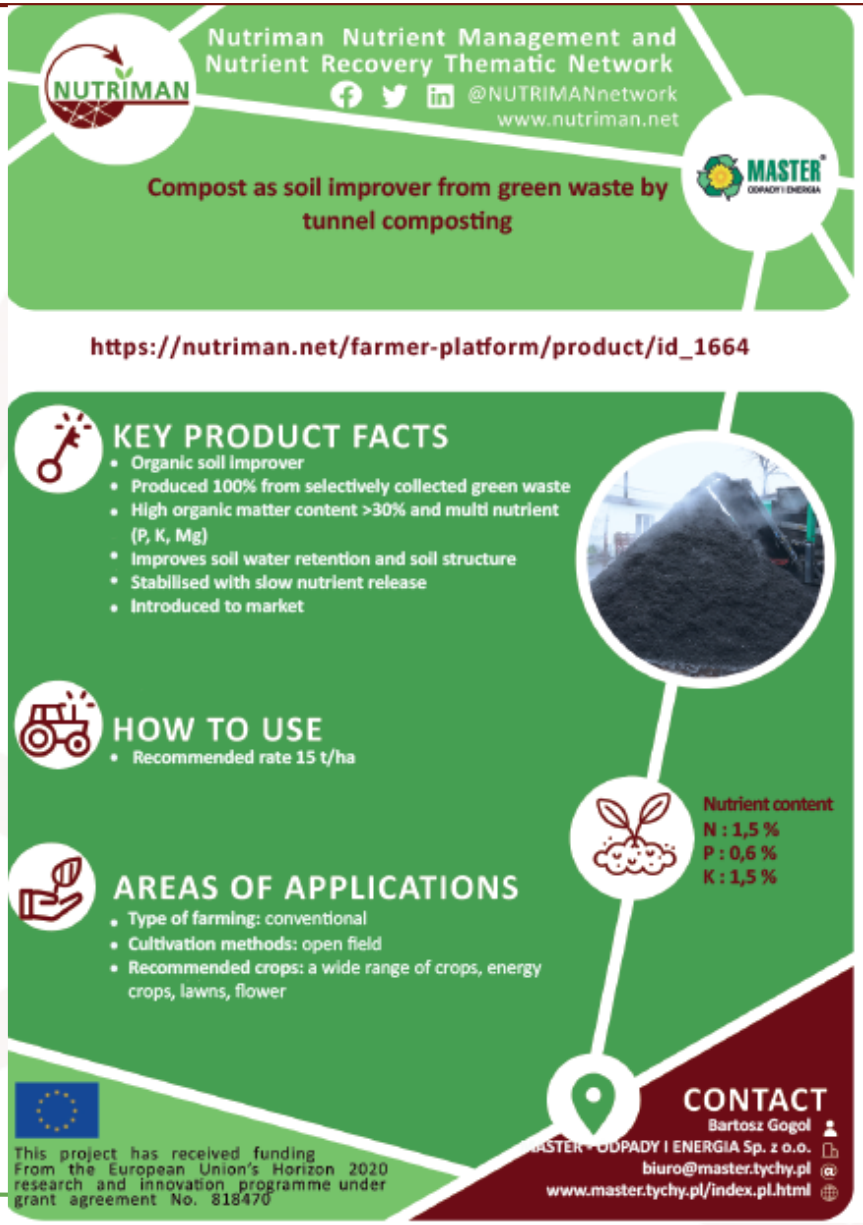
Key facts:

- → **Product Category**: organic soil improver.
- → **Input material:** selectively collected biodegradable green materials – grass and leaves.
- → **General appearance:** compost with loose structure.
- → **Nutrient Content (N-P-K %):** maximum content 1.5-0.6-1.5. OM 31%.
- → **Product status:** introduced to market.
- → **Limitation of application:** no technical limitations.
- → **Permit availability**: MS Authority permit numbers: G-678/17 (Kompo Master 1) and G-701/17 (Kompo Master 2).
- → **Geographical area:** Poland.
- → **Price range:** 2.5 €/t.

Summary:

Kompo Master 1 and Kompo Master 2 are produced in a process of tunnel composting of selectively collected green waste – grass and leaves. They differ with grass to leaves proportion and are produced in different parts of the season. It is carbon rich soil improver recommended for a wide range of crops, lawns, horticultural applications and land reclamation. The product has a loose structure and is sieved through 2 mm after composting.
The product is environmentally safe, high sanitary quality, stabilized with slow release nutrients, without chemical additions. Improves soil structure, soil water retention and organic matter content. MS Authority permitted.

Product info - infographics



Platform survey

Farmer survey

Mini Survey

How to increase the business profit of the Farmer's by smart application of novel bio-fertilizer technologies and products.

Please select your language to know more.

Products

Technologies

General Farmer Survey

Select your lanuage

Product mini survey

EN | DE | FR | ES | IT | NL | PL | HU

WHAT DO YOU THINK ABOUT THIS PRODUCT? *

- (●) I've already applied it or I'm interested to apply it.
- ( ) I'm not interested to apply it or I do not consider it a good bio-fertilizer.

WHY YOU SAID THAT THIS PRODUCT IS INTERESTING FOR YOU? (YOU CAN SELECT UP TO 5 MULTIPLE ANSWERS) *

- [ ] It has a reasonable price.
- [ ] It's high nutrient content, which is resulting low cost low dose applications.
- [ ] It's an officially Authority permitted and legally recognized product.
- [ ] It's a high quality bio-fertilizer.
- [ ] It's easy to apply in my farm.
- [ ] I've a suitable spreading equipment and I have not to buy other particular spreader.
- [ ] It's rich in nutrients for my crop needs.
- [ ] It contains several nutrients (N, P..).
- [ ] It has a good content of organic matter.
- [ ] It's characterized by a nutrient release which is good for my crop.
- [ ] If I'll buy this product I won't need too much space to store it.
- [ ] It's easy to stock it.
- [ ] It doesn't lose his agronomic features for two or three years.
- [ ] The product is formulated in a proper way to be applied on my crops.

SUBMIT

Product mini survey

EN | DE | FR | ES | IT | NL | PL | HU

WHAT DO YOU THINK ABOUT THIS PRODUCT? *

- ○ I've already applied it or I'm interested to apply it.
- ◉ I'm not interested to apply it or I do not consider it a good bio-fertilizer.

WHY YOU SAID THAT THIS PRODUCT IS NOT INTERESTING FOR YOU? (YOU CAN SELECT UP TO 5 MULTIPLE ANSWERS) *

- ☐ It's too much expensive.
- ☐ It's too low nutrient content, which is resulting costly high dose applications.
- ☐ It's not an officially Authority permitted and legally not recognized product.
- ☐ It's a low quality bio-fertilizer.
- ☐ It's difficult to apply in my farm.
- ☐ I've not a suitable spreading equipment or I don't want to buy other particular spreader.
- ☐ It's poor in nutrients for culture needs.
- ☐ It contains few nutrients (only P, or only N...)
- ☐ It hasn't a good content of organic matter.
- ☐ It's characterized by a nutrient release which is bad for my crop.
- ☐ If I'll buy this product I will need too much space to store it.
- ☐ It's difficult to store it.
- ☐ It loses his agronomic features after short time.
- ☐ The product is not formulated in a proper way to be applied on my crops.

Platform - technologies

1. Biological nutrient recovery: composting, anaerobic digestion, microalgae technology ;
2. Phosphorus precipitation from liquid manure, waste water and drain water;
3. Thermochemical nutrient recovery ;
4. Physico-chemical nitrogen recovery from manure, digestate and wastewaters: separation, stripping and membrane processes

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Opublikowano materiały szkoleniowe dotyczące wykorzystania obornika (frakcji stałej) jako nawozu

Obornik stały to polepszacz gleby o dużej zawartości suchej masy. Obornik zwierzęcy to mieszanina odchodów i moczu, materiału ściółkowego (np. słomy, wiórów z drewna, trocin, torfowca), rozlanej paszy i wody pitnej oraz wody używanej do mycia podłóg. Jest cennym nawozem o zawartości wielu składników pokarmowych, takich jak azot (N), fosfor (P) i potas (K), a także węgiel organiczny, który może być wykorzystany przez mikroorganizmy

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Opublikowano materiały szkoleniowe dotyczące wykorzystania koncentratu mineralnego jako nawozu

Koncentrat mineralny to stężony roztwór mineralnych składników pokarmowych otrzymany w procesie separacji (np. filtracji membranowej lub odparowania) strumieni odpadów, który powoduje skoncentrowanie mineralnych składników odżywczych w produkcie końcowym w porównaniu z materiałem wsadowym.

Koncentraty mineralne składają się głównie z azotu amonowego i

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**BOOKLET OF
SELECTED 25 PRACTICE ABSTRACTS**

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Nutrient Management and Nutrient Recovery Thematic Network

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