



Nutrient Management and Nutrient Recovery Thematic Network

Fertilizing products obtained
from bioeconomy processes:
BioPhosphate (ID:192)
Biochar (ID:1571)

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NUTRIMAN FARMER PLATFORM

3R technology based biochar cases



- **ID192:** High nutrient dense **Bio-Phosphate products** recovered from food grade animal bone grist with over 30% P₂O₅ content by "3R" pyrolysis process at 850°C material core.
- **ID1571: Terra-Preta biochar product** recovered from wood chips and processed by "3R" pyrolysis process at 450°C material core.
- **ID193:** 3R Recycle-Reuse-Reduce **zero emission pyrolysis technology** for phosphorus recovery from food grade animal bone grist for production of Bio-Phosphate products
 - https://nutriman.net/farmer-platform/product/id_192
 - https://nutriman.net/farmer-platform/technology/id_193
 - https://nutriman.net/farmer-platform/product/id_1571



- **WHO we are: 3R-BioPhosphate Ltd.** is a **pyrolysis – carbon refinery specialized deep-tech** SME company since 1989, originally ALSTOM subsidy JV (Lang machine Works since 1870). **CORE focus on:**
 - **Added value utilization of unexploited agricultural and food industrial biomass by-product streams** by the new generation 3R Recycle-Recover-Reuse zero emission processing technology and product developments.
 - **Recovery of the critical raw material Phosphorus from food grade animal bones**
 - **Conversion of science into industrial and commercial practice** in EU wide dimension.

3R development & scaling up



<2010: pilot concept
(**500 t/y**)



>2010-2020: field demo
(**1,000 t/y**)
 **EU co-financed**

 **BIO**PHOSPHATE
100% NATURAL

Industrialisation

2022: TRL9 international
(capacity = **20,800 t/y**)



2021: TRL8 regional
(capacity = **2,000 t/y**)

Rapid market replications in EU and global dimension



What is TERRA PRETA BIOCHAR?

BIOCHAR MATERIAL is soil improver:

- Biomass origin carboniferous material,
- Authority permitted for lawfully marketing in different open ecological soil enhancement use and
- eco-safe carbon negative applications.

BIOCHAR PRODUCT have specific quality requirements and

- a labeled and full value chain safe product,
- with producers product responsibly guarantees,
- meet the EU/MS industrial and environmental norms/standards and EU CMC14.

Authority permits required + REACH

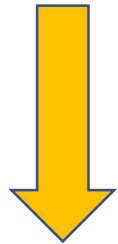
The Phosphorus Challenge



On this **Planet Earth** natural **Phosphorus** content in economical high concentration (above 30% P_2O_5 content) can be found in one substance only, that is the **apatite phosphate mineral**.

APATITE consisting two major natural forms:

35% P_2O_5



**Mined mineral or soft
rock-phosphate**

Cadmium/Uranium

contaminated

chemically processed

35% P_2O_5



**ABC Animal Bone Char
BioPhosphate**

100% Bio

100% safe

Natural & Economical

Critical Raw Material (COM) 2020/474



Customer pain points



KEY PROBLEMS with mined mineral + soft rock-phosphate = toxic contaminated

- **Hazardous Cadmium + Uranium**
- **Low Cd/U resources depleted**



KEY DRIVER to change:

new (EU)1009/2019 implemented from year >2022

Time to change into bio-based economy !

Cadmium EU limit bio cases <1.5 mg/kg !

new markets created & rapidly shaped !

P = critical raw material + high supply risk + no substitution alternative

SOLUTION = BioPhosphate

key strategic product



BIOPHOSPHATE
100% NATURAL

Key Enabling Technology

- **Recovered & RENEWABLE organic Phosphorus fertiliser, soil improver, growing media and special adsorbent.**
- **UNIQUE CHARACTERISTICS:**
 - 35% P_2O_5 + 40 % CaO (92% mineral + 8% Carbon).
 - Made from food grade category 3 cattle bones.
 - BIO-NPK-C formulated as of Users need.
 - No any contamination.
 - Natural - organic – pure - safe.
- **CONCENTRATED & ECONOMICAL**
- Recommended dose: 0.2 t/ha - 1.5 t/ha.



The Bio-Phosphate is the only concentrated organic and pure P product available that meet the new EU regulations >2022.

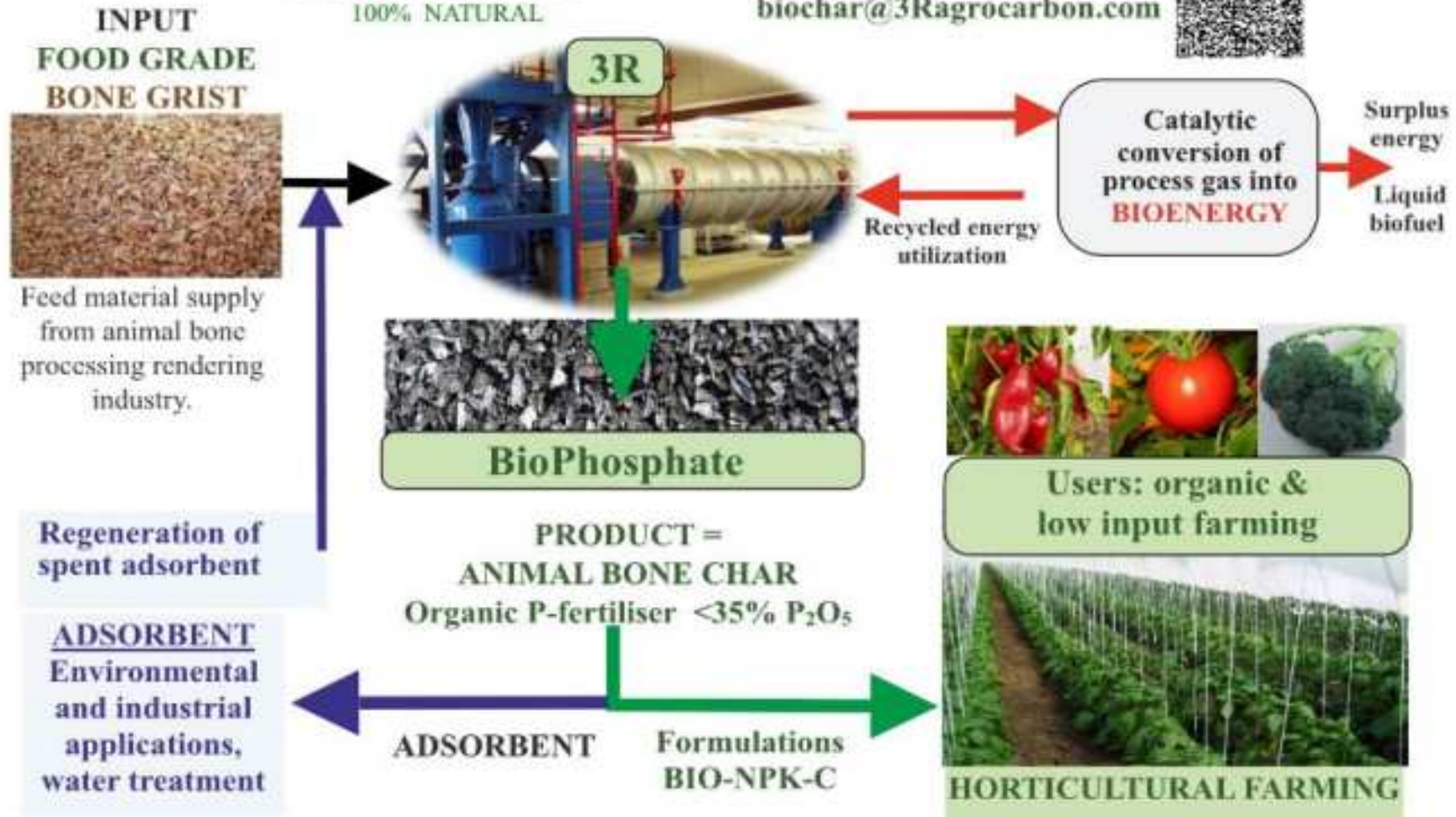
Reductive thermochemical phosphorus recovery (ID 193)

"3R" ZERO EMISSION BIOPHOSPHATE RECOVERY

BIOP_HOSPHATE
100% NATURAL

www.BioPhosphate.net

biochar@3Ragrocarbon.com



Lawful applications as of EU 1009/2019, EU 515/2019, MS permits

Efficiency tests



ABC BioPhosphate
safer - better - less costly

Leibig's Law of Minimum

❖ "The nutrient present in the least relative amount is the limiting nutrient"

Limiting nutrient
Phosphorus

❖ "even if all but one of the essential elements be present, the absence of that one constituent renders the crop barren"



Product Function
Category applications:

PFC1: Solid organic fertilizer

PFC2: Liming material

PFC3: Organic soil improver

PFC4: Growing medium

PFC6: Plant biostimulant-microbial/non microbial

PFC7: Fertilizing product blend

Mineral Phosphate fertilisers:
Phosphorus use efficiency not more than 20%

Lawful applications meet

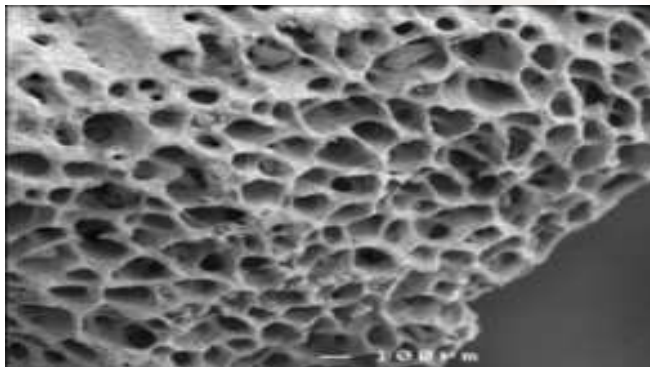
- ✓ EU1009/2019
- ✓ EU 515/2019
- ✓ EU/MS - US - AU permits
- ✓ Producer Responsibility

www.BioPhosphate.net



ID192 Proven field demonstrated

IT – IL - DE - NL - DK - SI - ES - HU - IRL - UK



BioPhosphate inside



Efficiency tests



**International tests in
different conditions,
drought tolerance test**



**High food safety
and security**



Successful in different and wide range of climatic & soil conditions

ID192: USP Unique Selling Points



- ✓ SAFE & NATURAL
- ✓ ECO CERTIFIED
- ✓ LESS COSTLY

- Prime EU Markets: DE, FR, IT, ES, A, CH.
- **EU organic farm land: 15 M ha (7.2%)**
- **EU organic sales: >€37 Billion/year.**
- Organic fruits/vegetables: >35%.
- Organic sales growth: >11%/year.

USER BENEFITS:

- ✓ Fully organic certified
- ✓ Yield improvement: >10%
- ✓ Improved fruit quality: >50%
- ✓ Decreased production costs by 15% - 25%.



- ✓ RESOURCE EFFICIENT
- ✓ MARKET COMPETITIVE
- ✓ FLEXIBLE FOR USERS

**concentrated + pure + natural +
User efficient + economical**



BIO-PHOSPHATE PRODUCT (ID192)

APPLICATION AUTHORITY PERMIT

- **National Authority in Hungary: National Food Chain Safety Office**
- MS Authority permit number: 6300/2407-2/2020 as of EU for horticultural applications & lawful marketing in the EU27. EC REACH >1000 t/y capacity: under progress. Meets the new EU Fertilising Products Regulation (EU 1009/2019) 2022 and EC Mutual Recognition Regulation 2019/515.
- **REACH: under progress >1000 t/y**

CONTACT

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100% NATURAL

Key Enabling Technology



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**The new enabling technologies and products opening
new technical, economical and environmental ways.**

**The Stone Age did not end because of World run out of stones.
The Chemical Fertilizer Age will not end because we
run out of chemical fertilizers.**



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