

# Improvement of comprehensive bio-waste transformation and nutrient recovery treatment process for production of combined natural products



## Reducing mineral fertilisers and chemicals use in agriculture by recycling treated organic waste as safe Biochar and Compost products

### THE OBJECTIVES OF THE REFERTIL

- ✓ **EU legislation support for definition of improved and safe biochar and compost standards in the EU 28.**
- ✓ **Bridge over biochar science into industrial engineering and economical full scale industrial practice.**
- ✓ **Economical scale industrial transformation of the organic bio-waste streams** from Europe's agriculture and food industries into qualified biochar and compost products.
- ✓ Improvement of **advanced, safe and comprehensive bio-waste treatment and nutrient recovery industrial process** towards zero emission conversion performance.
- ✓ Reducing of high Cadmium/Uranium contaminated mineral P-fertiliser use.
- ✓ Providing **strong policy support** to the European Commission for revision of the Fertiliser Regulation (Reg. EC No. 2003/2003.).



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## **REFERTIL** Science and Industrial Engineering to achieve results together

### MEASURABLE AND VERIFIABLE PROJECT PERFORMANCE

- ✓ **EU 28 bio-waste feed materials characterization.**
- ✓ **BAT technical-economical-environmental evaluation** of different type of biochar treatment technologies.
- ✓ Comprehensive and detailed **EU biochar and compost policy support report** (EU FERTILIZER REG. revision).
- ✓ Large scale input organics for **different types of biochar test production and characterization.**
- ✓ **Economical industrial scale biochar technology**
- ✓ **Commercial scale biochar business plan** and industrial good practice guide development for 10,000 t/y capacity.
- ✓ **Validation of the recycling technology and biochar products:** food crop plant **growth field tests in 6 counties (Netherlands, Italy, Slovenia, Ireland, Denmark, Hungary).**
- ✓ **Validation of environmental viability and safety.**



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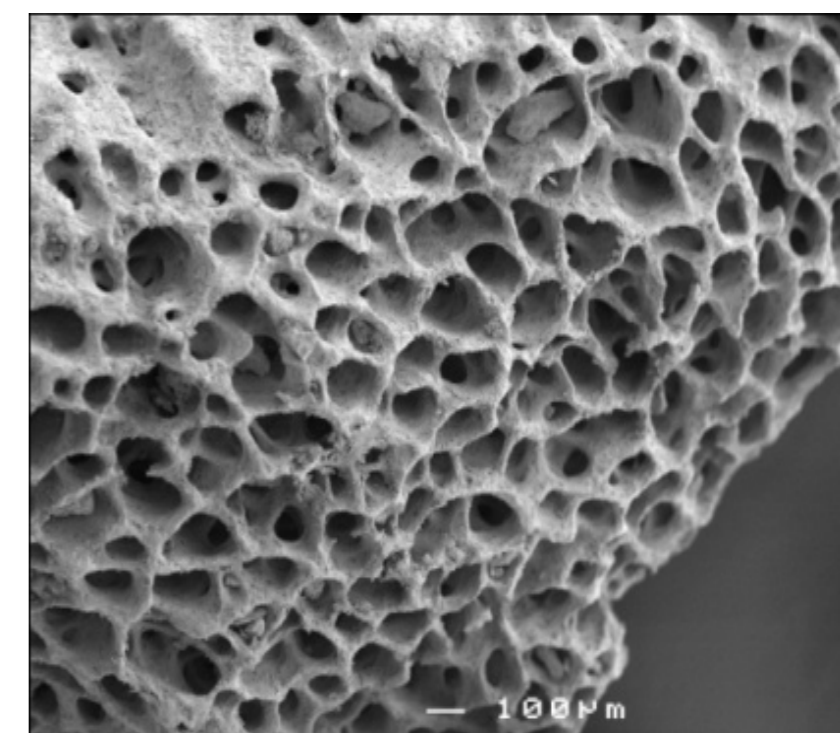
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## WHAT IS BIOCHAR?

**Biochar** is plant and/or animal biomass by-product based stable carboniferous substance with well defined and controlled quality, that is processed under reductive thermal conditions. Plant based biochar is soil improver; ABC Animal Bone bioChar is organic P fertilizer and growing media.



## What is ABC - Animal Bone bioChar?

- ✓ **Made of food grade category 3 bones.**
- ✓ **Having low carbon content and high concentrated (30%) P<sub>2</sub>O<sub>5</sub> nutrient composition** with controlled release fertilization effect.
- ✓ **Highly macroporous, optimized for significant enhancing of soil microbiological life,** having high water holding and macromolecular organic nutrient retention.



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## REFERTIL BIOCHAR POLICY SUPPORT

Proposed mandatory parameters for biochar (mg/kg)



Biochar parameters	ORGANIC P FERTILISER	SOIL IMPROVER
As	10	10
Cd	1.5	1.5
Cr	100	100
Cu	200	200
<b>Pb</b>	<b>120</b>	<b>120</b>
Hg	1	1
Ni	50	50
Zn	600	600
<b>PAH<sub>16</sub></b>	<b>6</b>	<b>6</b>
<b>PCB<sub>7</sub></b>	<b>0.2</b>	<b>0.2</b>
PCDD/F5 (ng/kg)	20	20
Germination Inhibition assay	no inhibition	no inhibition
Phytotoxicity	no Phytotox.	no Phytotox.
Particle size distribution	ABC: 1 mm-5 mm 90%	Plant based: 1-20 mm90%
Bulk density	declaration	declaration
Dry matter content	> 80%	> 60%
<b>pH</b>	<b>6-10</b>	<b>6-10</b>
<b>Total Organic C</b>	declaration	20%
N total	declaration	declaration
<b>Total P (P<sub>2</sub>O<sub>5</sub>)</b>	<b>&gt;25 %</b>	<b>declaration</b>
Total K	declaration	declaration
Ca	declaration	declaration
Mg	declaration	declaration
<b>Agronomic efficiency</b>	<b>Should be proved and declared</b>	<b>Should be proved and declared</b>

### The EU FERTILIZER REGULATION revision efforts:

The Commission intends to revise Regulation (EC) No 2003/2003 to **extend its scope to other fertilisers and fertilising materials and possibly including organic P fertiliser, growing media (ABC biochar) and soil improver (plant based biochar).**



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