Improvement of comprehensive bio-waste transformation and nutrient recovery treatment processes for production of combined natural products „REFERTIL”

COMPOST - BIOCHAR

REFERTIL contract number: 289785
Time: October 2011 – September 2015
Coordinator and key technology designer: Edward Someus / Terra Humana Ltd.
### Generation of animal and vegetal waste (EWC-Stat 09)

2010, Source: Eurostat

<table>
<thead>
<tr>
<th>GEO/NACE_R2</th>
<th>ALL NACE + HH</th>
<th>A</th>
<th>C</th>
<th>C10-12</th>
<th>G467</th>
<th>OTHER NACE</th>
<th>HH</th>
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</thead>
<tbody>
<tr>
<td>EU27</td>
<td>108 680 000</td>
<td>32 760 000</td>
<td>31 030 000</td>
<td>29 690 000</td>
<td>2 880 000</td>
<td>15 940 000</td>
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<td>Total REFERTIL</td>
<td>77 669 811</td>
<td>12 083 588</td>
<td>25 775 833</td>
<td>24 759 462</td>
<td>2 603 841</td>
<td>13 157 693</td>
<td>24 048 856</td>
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<td>% REFERTIL</td>
<td>71,5</td>
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<td>83,4</td>
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<td>7 234</td>
<td>19 037</td>
<td>18 722</td>
<td>19</td>
<td>457 315</td>
<td>253 318</td>
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<td>180 402</td>
<td>2 224 126</td>
<td>1 841 165</td>
<td>0</td>
<td>2 033 710</td>
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<td>13 645</td>
<td>511 534</td>
<td>508 551</td>
<td>1 149 995</td>
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<td>1 902 603</td>
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<td>6 283 870</td>
<td>1 271 614</td>
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<td>555 856</td>
<td>306</td>
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</tbody>
</table>

A: Agriculture, forestry and fishing  
C: Manufacturing  
C10-C12: Manufacture of food products; beverages and tobacco products  
G467: Wholesale of waste and scrap  
HH: Household
Generation of animal and vegetal waste (EWC-Stat 09)

http://www.refertil.info
Generation of animal and vegetal waste (EWC-Stat 09)

- EWC-Stat 09.1 Animal and mixed food waste
- EWC-Stat 09.2 Vegetal waste
- EWC-Stat 09.3 Slurry and manure
Biochar technology improvement

→ ZERO EMISSION

http://www.agrocarbon.com
Recycling of animal bone into concentrated natural phosphate mineral bio-fertilizer
http://www.agrocarbon.com

"3R" ZERO EMISSION CARBONIZATION PROCESSING

BONE MEAL
BONE CHIPS

ADSORBENT
Environmental and industrial applications, water treatment

Bone Char
C=(~12 %), Ca₃(PO₄)₂ = (~ 88%)

Bone Char
BIOCHAR

Process gas
CATALYTIC CONVERSION

BIOJETFUEL - kerosene
RECYCLED NITROGEN

NPK-C

BIOTECH
Solid State Fermentation

FORMULATED NPK-C
BONE CHAR-BIOCHAR

3R AGROCARBON EFFECTS:
- Full value NPK-C fertilizer.
- Enhanced agronomic food crop productivity.
- Nutrient & moisture retention.
- C-sequestration.
- N₂O mitigation.
- Cation Exchange Capacity ↑

DIRECT SOIL APPLICATION

COMPOST ACTIVATOR

DROUGHT TOLERANT HORTICULTURE
LOW INPUT FARMING

http://www.agrocarbon.com
C based wood biochar

NPK-C based bonechar biochar

http://www.refertil.info
Fungal growth on bone char
Biochar, Phosphorous

- Biochar, bonechar
- Biochar, WoodWaste
- Biochar of thuja
- Biochar, wood chips

Phosphorus levels (mg/kg):

- Biochar, bonechar: 140,000 mg/kg
- Biochar, WoodWaste: 0 mg/kg
- Biochar of thuja: 0 mg/kg
- Biochar, wood chips: 0 mg/kg
EU 27 improvement of the composting technologies

http://www.refertil.info
INCREASING AMOUNT OF ANIMAL WASTE: > 20 M t/year (EU)

ORGANIC WASTE > 138 M t/year, 40% landfill (EU)

RELIES ON NON RENEWABLE FERTILIZERS: >90 M t/year fossil fuel

ECONOMICAL VALORIZATION OF ORGANIC WASTE

RECYCLED NATURAL & SAFE FERTILIZERS N-P-K-C +

ZERO LANDFILLING, GHG EMISSION MITIGATION

Recycling economy makes sustainable business
Compost P, Mg, K

Phosphorus
Magnesium
Potassium
Compost versus Bone-char biochar, P

![Graph showing comparison between compost and bone-char biochar in terms of phosphorus (P) content.](image-url)
Field trials:
Italy
Germany
The Netherlands
Danmark
Hungary
Spain
Ireland
Slovenia

RESULTS:
YIELD: +10-30%
FRUIT QUALITY: ↑
FOOD SAFETY: ↑
€ COST: ↓

http://www.agrocarbon.com
THANK YOU!

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