

**European Knowledge Based Bio-Economy**  
**Knowledge for Resource Added-value Conversion**

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**EU FP7 “REFERTIL” 289785**

**EU FP7 project title:**

*Development of comprehensive bio-waste transformation and nutrient recovery treatment process for production of combined compost and bio-char natural fertilizers and soil amendment products.*

**Coordinator** and key technology designer: Edward Someus / Terra Humana Ltd.

**Overall objectives:** improvement of common compost quality standards and development of new biochar quality standards for the EU 27 by 2013 for European Union Commission regulation law harmonization support.

**Participants:** 14 partners from 10 countries.

**Field of works:** coherently integrated works **from** the area of late/matured phase of applied science, “product like” pilot/field demo **towards** industrial scale up, commercial engineering design and full scale industrialization with clear economical and SME market oriented viability (no basic research included).

**Timing:** October 1, 2011 and + 4 years.

**General targeted organizations:** proactive co-operation between RTD, SME and industry relevant public sectors stakeholders and in European policy support for improvement of common compost and biochar quality standards for the EU27 by 2013.

**EU programme:** EU FP7 KBBE.2011.1.2-02 (European Commission C(2010)4900 of 19 July 2010) *Reducing mineral fertilisers and chemicals use in agriculture by recycling treated organic waste as compost and bio-char products.* [http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm)

[http://www.se2009.eu/polopoly\\_fs/1.8460!menu/standard/file/lund\\_declaration\\_final\\_version\\_9\\_july.pdf](http://www.se2009.eu/polopoly_fs/1.8460!menu/standard/file/lund_declaration_final_version_9_july.pdf)

**Abstract:**

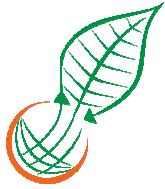
**The main drive of this topic is the contribution to the transformation of urban organic waste and farm organic residues management from a costly disposal process into an income generating activity, and to allow the related industry to produce added value products and organic matter of high quality to be recycled in agriculture.**

There is a strong need for increased sustainability of all production systems, such as agriculture, plant health and crop protection. In this context reducing mineral fertilisers and chemicals use in agriculture are key objectives, which objective driven goals can economically achieved by virtuous cycle recycling and reuse of the treated organic waste as compost and bio-char products.

The overall picture shows significant nutrient losses (depletion) in rural areas and huge nutrient accumulation and loss in urban areas. Human activities have been disturbed the natural nitrogen cycles. In the case of nitrogen, it is estimated that human activity has doubled the amount in circulation; in the case of phosphorus, we have tripled the amount available since the industrial revolution.

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**The objective driven goal of this project is to develop an EU27 standardized advanced and comprehensive bio-waste treatment and nutrient recovery process with zero emission performance,** resulting a

- ✓ virtuous nutrient cycle, and
- ✓ safe,
- ✓ economical,
- ✓ ecological and
- ✓ EU27 standardized compost and bio-char combined natural fertilizers and soil amendment agricultural products.

The targeted high quality output products aiming to reduce mineral fertilisers and intensive chemicals use in agriculture; enhancing the environmental, ecological and economical sustainability of food crop production; reducing the negative footprint of the cities and contributing to climate change mitigation.

In this context the new bio-waste treatment process opens new technical, economical, environmental and social improvement opportunities, while improving the use, effectiveness and safety of the resulting compost and bio-char products in agriculture. The output products developed in a standardized way to meet all industrial, agricultural and environmental norms and standards in European dimension.

Modern industrial agriculture relies on continual inputs of mined non renewable phosphor. Reserves of the phosphate rock PR used to make such fertilizers are finite, and concerns have been raised that they are in danger of exhaustion. It has been argued, for example, that data from the US Geological Survey point to the available low Cadmium/Uranium content PR supplies peaking in as little as 25 years time. Because there is no substitute for phosphate in agriculture, this might present an urgent and substantial problem.

The food industrial system today is primarily linear, with “Take-Make-Waste” processes and costly/polluting long distance transport systems, which linear system is highly inefficient and is not sustainable any-more. The linear system is not only inefficient and costly, but these linear outputs products often contain persistent or toxic materials that negatively impact the environment, and resulting high costs for post life management.

Carbon dioxide and nitrogen cycles are strongly coupled. The anthropogenic Nitrogen is the input of man on nature, that is induced or altered by the presence and activity of man (such as fossil fuel combustion and agricultural fertilizer use activities) which makes anthropogenic interference of the global nitrogen cycle, as global fertilizer.

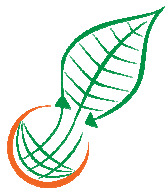
Nitrous oxide is a powerful greenhouse gas, important in climate change, and as well, is a stratospheric ozone depleting substance. The human population has grown at an unprecedented rate this century and this has resulted in many localized environmental impacts. Food production is considered as a source of global nitrous oxide emissions; however, the nitrogen in waste water and solid wastes may be a significant fate of much anthropogenic nitrogen.

The REFERTIL project will make high attention and also developing solutions to human impacts on the global nitrogen cycle, impacts which are quantitatively greater than the impacts on the carbon cycle.

The most important objective of the REFERTIL is the closing the nutrient loop by application added value nutrient recycling (N, P and organic) compost and/or biochar production strategy and technology for creation of virtuous cycle between urban and rural areas. In order to implement this objective soonest improvement and new definition of common compost and biochar quality standards required for the EU27.

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The REFERTIL consortium:

Participants	Participant organization name	Country	Activity Type
1 Coordinator	TERRA Humana Clean Technology Development, Engineering and Manufacturing Ltd. Edward Someus (coordinator/key tech designer)	Sweden	Industry
2	Stichting Dienst Landbouwkundig Onderzoek (Wageningen University Research <a href="http://www.wageningenuniversity.nl">http://www.wageningenuniversity.nl</a> )	Netherlands	RES
3	Aarhus University	Denmark	University
4	Videncentret for Landbrug (Knowledge Center for Agriculture)	Denmark	Advisory Centre
5	Universita Degli Studi Di Torino, University of Torino - Agroinnova	Italy	University
6	Gottfried Wilhelm Leibniz Universitaet Hannover	Germany	University
7	BIOMASA del GUADALQUIVIR, S.A	Spain	Industry
8	TWI Ltd. (The Welding Institute, <a href="http://www.twi.co.uk">www.twi.co.uk</a> )	United Kingdom	Industry
9	WESSLING Laboratory Ltd (part of the Dr. Wessling Group, Germany)	Hungary	Industry
10	Reginalna Wielkopolska Izba Rolno-Przemysłowa	Poland	AGRI Chamber
11	KOTO proizvodno in trgovsko podjetje, d.o.o. (Animal Waste Rendering Industry)	Slovenia	Industry
12	Comune di Grugliasco (Municipality, Torino)	Italy	City Council
13	Renetech Bioresources Ltd.	Ireland	Industry
14	Profikomp Environmental Technology Plc.	Hungary	Industry

**Stakeholders:**

Voluntary free external cooperation organizations from world wide from different sectors for open public consultation and experience exchange in the field of compost and biochar standardization. The improvement of common compost and biochar quality standards legislation harmonization consultation works targeting all the EU 27, which may also serve as international environmental law harmonization model.

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