



3R ENVIRONMENTAL TECHNOLOGIES Ltd.

WEB: <http://www.terrenum.net> E-mail: edward@terrenum.net

General Manager: **Edward Someus**

May 28, 2008

Economical organic farming and natural food crop production 3R Integrated Thermal and Agro Biotechnology Processing for natural N,P,K fertilization

Recycle - Reuse - Reduce for Prevention - Protection - Preservation Converting Trash Into Cash

The innovative 3R “Recycle-Reuse-Reduce” AGROCARBON technology provides recycling of agricultural organic and mineral by-products provides carbon products for soil amendment and restoration of soil natural balance. The input feed stream is refuse grain, food processing and/or other by-products. The innovative technology providing surface modified charcoals and minerals for plant availability. The process is upgrading by-products to high added-value plant growth promotion and natural fertilization products for environmentally friendly vegetable cultivation, with carbon sequestration potential. The 3R is a horizontally arranged and indirectly heated low temperature zero emission carbonization system (operating under vacuum, up to $850\text{ }^{\circ}\text{C}\pm 50^{\circ}\text{C}$ material core temperature) and directly integrated novel agro biotechnological processing units of agroc carbon specific solid state fermentation and formulations. Performance:

1. **Food crop mineral deficiency and disturbance stress mitigation in temperate climatic regions by restoration of soil natural balance.**
2. **The input feed streams** are low value organic and/or inorganic by-products; such as refuse grain, sawdust and/or high Phosphorous content animal bone meal, and/or other (heavy metal and halogen free) by products; which can be valorization transformed and processed by added-value integrated thermal and biotechnological means.
3. **The 3R** biotechnology integrated industrialized biochar production technology is a modern **zero emission solution**, in which process all and any output products are recycled and reused, aiming prevention-protection-preservation approaches.
4. **The output products** are different types of soil biotechnology specific solid carrier composites and adapted microbiological fungus and/or bacteria strain consortiums. Depending on the different soil and climate application scenario conditions, different types of relevant 3R products can be made, as per specific local need.

The output end product provides combined effect, **3 in 1 triple effect**, and used in the **ORGANIC and LOW INPUT FARMING agriculture, with special aim to the vegetable and medicinal herb plant cultivations:**

1. **Biological control** effect against soil borne plant pathogens, for substitution or significantly lower the input of agro chemicals
2. **Plant growth promotion**, for natural substance support to get higher plant yields with better quality and safer food products
3. **Natural N, P, K fertilization: Food crop mineral deficiency and**

3R Environmental Technologies Ltd. (Reg. ID: 98178)

Liaison office: H-1222 Budapest, Szechenyi str. 59. Hungary

E-mails: edward.someus@gmail.com – edward@terrenum.net - WEB: <http://www.terrenum.net>

Tel.: (36-20) 201 7557 Tel./Fax: (36-1) 424 0224

ZERO EMISSION SOLUTIONS

disturbance stress mitigation in temperate climatic regions by restoration of soil natural balance. Substitution of highly energy intensive artificial fertilizers

5. **The application objective** of the products are the natural balance and functionality restorations of degraded continental agro soils with controlled microbiological activity and precision farming nutrient supply for sustainable, improved, economical and ecological food crop production. Carbon sequestration potential is also targeted.
6. **The application targets** are combined effects, such as plant growth promotion, biological control against soil borne plant pathogens and natural fertilization, especially sequenced mobilized Phosphorus supply and improved nutrient use efficiency.
7. **The application sectors** are the organic farming and/or low input farming for environmentally friendly vegetable cultivation and other food crop productions.
8. **SUSTAINABILITY OF AGROCARBON TECHNOLOGY**
 - **ENERGY SUSTAINABILITY** = uses minimum energy for agro product recycling and processing, all energy is recycled and reused
 - **ECONOMICAL SUSTAINABILITY** = high cost efficiency and economical value creation for farmers
 - **MARKET AND CONSUMERS SUSTAINABILITY**= "WIN-WIN" for all stake holders from producers to Consumers, where the enduser is main winner, all in order to receive very high quality and purity nutritious crop food products on the table for less cost.
 - **ENVIRONMENTAL SUSTAINABILITY** = recycles and reuses waste materials to added value products by an **advanced ZERO EMISSION carbonization process solution**. Environmentally compatible agriculture practices with maintaining the nutrient balance of the soil.
 - **TECHNICAL SUSTAINABILITY** = industrialized production system with controlled output quality.
 - **LEGAL SUSTAINABILITY** = The 3R technology operations and product applications are designed to meet the EU, USA, Canadian, Australian and Japanese norms, standards and Authority permit requirements. The patented 3R technology is invented by the Swedish inventor Edward Someus and the intellectual property rights are owned by the 3R Environmental Technologies Ltd.
 - **CLIMATE SUSTAINABILITY** = **carbon negative process** by reversing global warming and sequester carbon to soil for thousands of years, while restoring carbon and mineral balance in cropland that has been lost due to intensive agriculture and human induced degradation.
9. **STATUS:** Innovative Solid Substrate Fermentation and Formulation technology and “product like” pilot plant has been developed for effective formulation of several types of microbiological substances on soil application specific chars and minerals. Scale up optimization and comprehensive industrialized engineering design developed for 30,000 m³/year input feed stream, including biochar specific auxiliary systems for turn key installation as of modern US/EU industrial standards. The EU relevant four years permitting field tests will be completed by the end of 2008.

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