Activated Carbon for clean water

EU Strategy for the Danube Region

Water Quality (PA4) and Environmental Risks (PA5) Priority Areas

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Introduction and invitation for cooperation

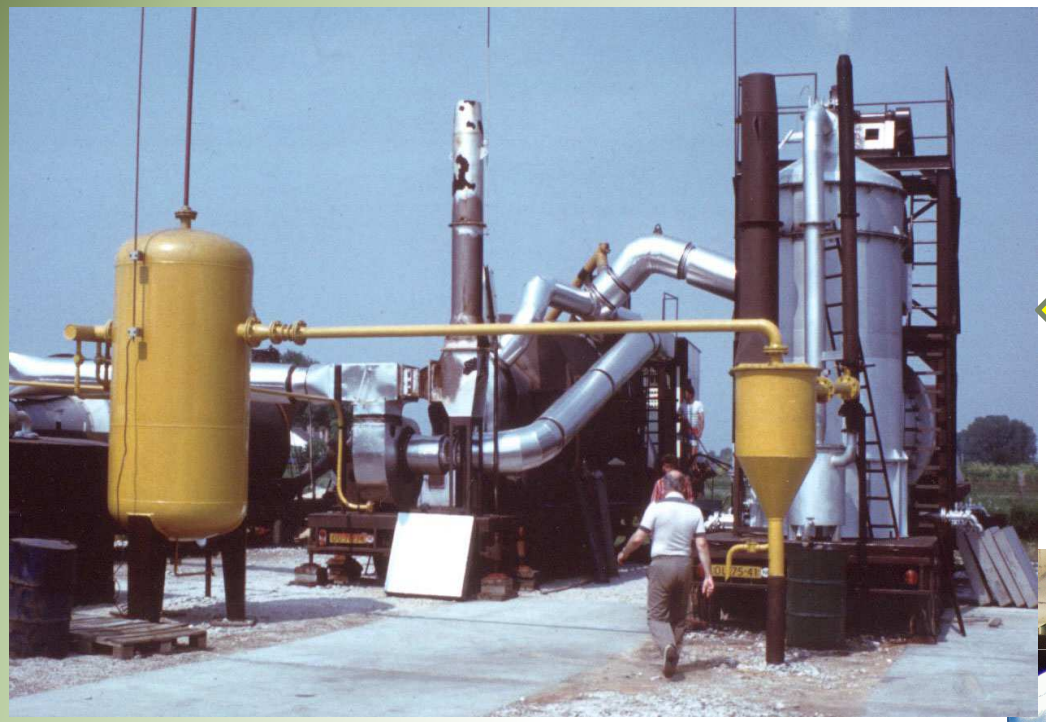
Edward Someus
http://www.refertil.info
http://www.3Ragrocarbon.com
biochar@3Ragrocarbon.com

TERRA ADSORBENTS IN FOCUS

- **DEVELOPING BIOCHAR & CARBON science, proven industrial technology, products and applications** for safe & economical transformation of the organic by-product/waste streams from agri/food industries,
- Recycling of byproducts and bio-wastes into safe biochar and activated carbon.
- Contributing to the **international standardization and legal permitting of carbon** products, and
- **BIOCHAR POLICY SUPPORT to** the European Commission DG GROW + other DG's for **FERTILIZER REGULATION REVISION** and **EU28 law harmonization.**

Background: carbon refinery since 1989.

- ✓ Biochar & cabon bio-refinery specialization since +30 years.
- ✓ Coordinator/key tech designer for large scale EU biochar S&T research projects since 2002.



The 2nd generation 3R biochar pyrolysis pilot for woody material tests.

1990-1995

The 3rd generation 3R biochar pyrolysis field demo plant. Designed for all type of organic materials.

2004-2015

REFERTIL TRL Technology Readiness Level 1-9

EU COMMUNITY RESEARCH PROGRAMES – SYSTEM RTD
Commission Decision C(2013)8631

WHAT IS THE REFEERTIL BIOCHAR S&T STATUS NOW?

BASIC RESEARCH

TRL 1 – basic principles observed

TRL 2 – technology concept formulated

TRL 3 – experimental proof of concept

TRL 4 – technology validated in lab **1980's**

APPLIED S&T RESEARCH pilot plant

TRL 5 – technology validated in industrially relevant enviro **1990-1995**

TRL 6 – technology demonstrated in industrially relevant environment

EU FP5 MULTI FUEL 2002-2005

APPLIED S&T RESEARCH field demo plant

TRL 7 – system prototype demonstration in operational environment

EU FP6 PROTECTOR 2005-2009

TRL 8 – system complete and qualified ← **EU FP7 REFERTIL biochar status 2015**

APPLIED S&T RESEARCH industrialization 2016

TRL 9 – actual system proven in operational environment, competitive manufacturing >5k - 20k t/y throughputs. → **MARKET**

Mandatory biochar permits and commercial certificates in the EU

Manufacturing/ import/ placing on the market and using of all types of biochar products in the EU require mandatory Authority permits and certificates:

1. Member State Authority **permits for biochar production**.
2. Member State Authority **permit for biochar applications.**
   - Valid for issuing MS only.
   - Mutual Recognition (EC 764/2008) procedure needs to be extended to other MS.
   - **Note: EC 2003/2003 Fertilizer Regulation revision** is under progress to include biochar, EC BIOCHAR valid for EU28.
3. **REACH registration** (in 2015 >10 t/y, from 2018 >1 t/y).
4. **Extended Producer Responsibility** certificate.

Voluntarily biochar certifications= no any legal effects and validity!

Extended Producer Responsibility (EPR)

- OECD: EPR is "**an environmental policy approach in which a producer's responsibility for a product is extended to the post consumer stage of a product's life cycle"**.
- Biochar is irrevocably applied to soil. Therefore**, legal and economical integration** of the **environmental costs of biochar use** and **biochar market price** needed vs biochar quality/safety.
- Producers/actors in the distribution chain having EPR.
- **In practice, EPR implies that biochar producers (and/or distributors) having responsibility for the environmental and product safety of the product with "take back" and remediation responsibility of error product.**
- Biochar product safety and application conditions are specified in the mandatory MS / EU Authority permits and sufficiently specified in the product **labeling information towards user**.

EU priorities for prevention, reuse, recycling and resource efficiency

REFERTIL

BIOCHAR APPLICATION
AUTHORITY PERMIT – HUNGARY CASE STUDY

LIMIT VALUES for toxic elements	
As (mg/kg)	10
Cd (mg/kg)	2
Co (mg/kg)	50
Cr (mg/kg)	100
Cu (mg/kg)	100
Pb (mg/kg)	100
Hg (mg/kg)	1
Se (mg/kg)	5
PAH_{19} (mg/kg)	1
QUALITY PARAMETERS	
Particle size distribution	Below 3.2 mm (100%)
Dry matter content	>80%
pH	8
N and K total	declaration
Total P (P2O5)	>29 %
Total Ca	>25
Germination inhibition assay	No inhibition
Phytotoxicity	No phytotoxicity
Agronomic efficiency	Proved

ABC biochar quality and safety parameters in the permit
(FVM decree 36/2006 V.18. HU)

PAH_{19} = key quality indicator for biochar safety and processing technology performance qualification/conditions.
The occurrence of PAHs in biochar derive from obsolete, low grade and inefficient pyrolysis technology design and conditions.

THANK YOU!

CONTACT:

Edward Someus

Coordinator, biochar S&T key tech designer

E-mail: **biochar@3Ragrocarbon.com**

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All progressive biochar and activated carbon cooperation welcome in any carbon S&T, product/application fields.