



 **BIO**P HOSPHATE
100% NATURAL

Terra Preta - Biochar

Edward Someus

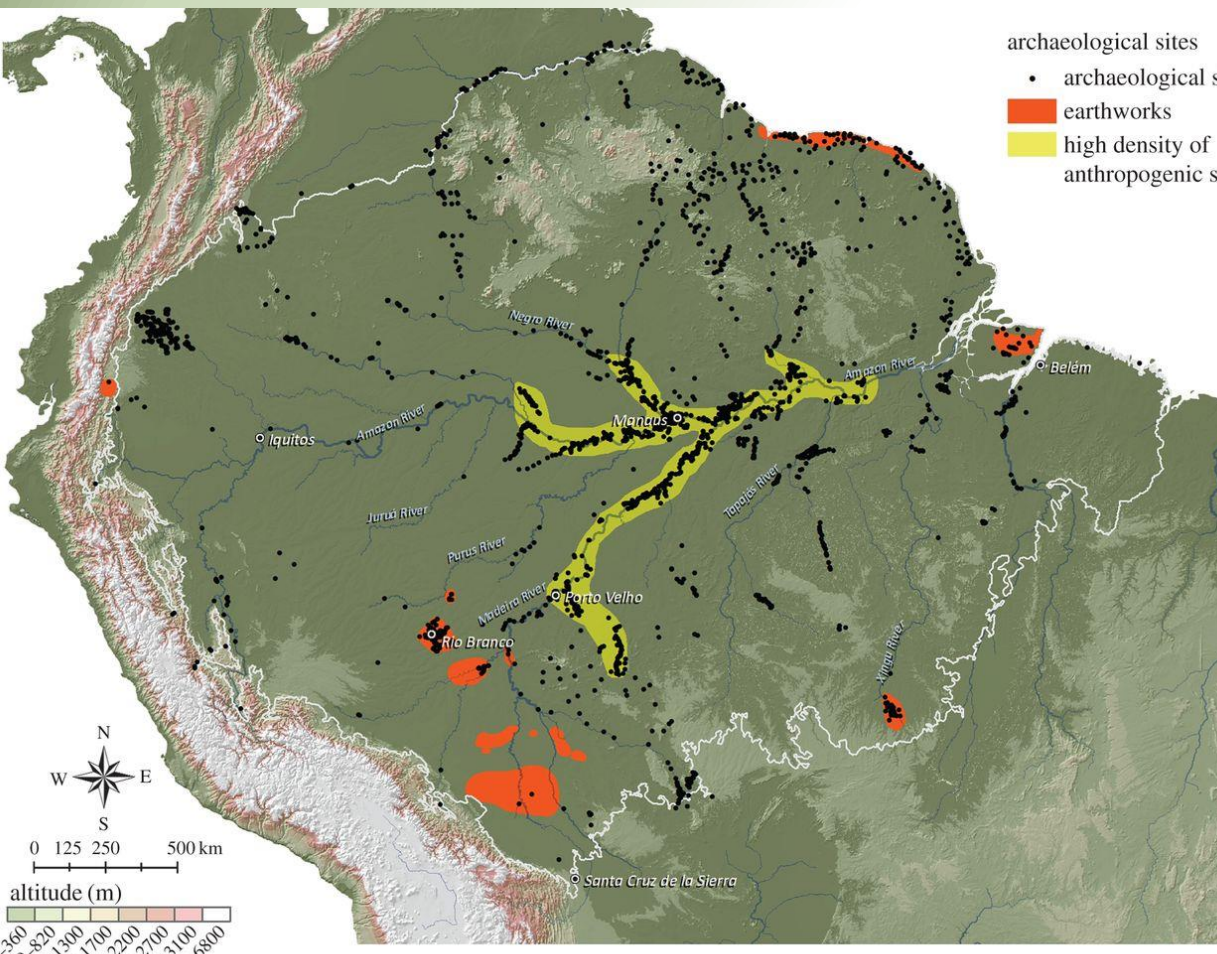
<http://www.BioPhosphate.net>

In a world with finite resources there is no infinite development opportunity with sustainability

What is Terra Preta de Indio – Biochar ?



- Known as “Black Earth” Amazonian dark earth.
- High char content soil, that is created by Amazonian farming communities between 450 BC and 950 AD.



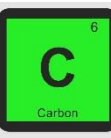
Creating soil: amending
ferralsol with charcoal
for greatly increased
productivity



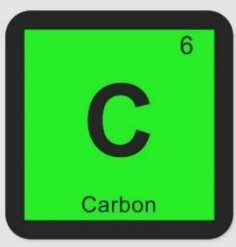
Advanced 3R PYROLYSIS for biochar production

- **Edward Someus has been early pioneer for the ancient Terra Preta-Biochar** and from 1990's recognized the great importance of the Terra Preta-Biochar and possible applications in modern age. High quality and safe biochar specific modern technology developed (3R tech) that go for full industrialisation 2021.
- The European Commission supported and significantly co-financed Edward Someus Terra Preta-Biochar and BioPhosphate developments to create new generation modern technology with biochar products that meet the 21st century industrial, environmental, climatic and economical requirements.
- Since 2011 Edward Someus is EU Commission policy support senior consultant for biochar and phosphorus recovery cases.
- Past decade large number of biochar research publications made on global level, but most of them (if not all) are theoretical and thesis oriented research results and not economical industrial technology, market competitive product, user driven practice and business oriented.

The only source of knowledge is experience (Einstein)



WHAT IS TERRA PRETA BIOCHAR?



BIOCHAR MATERIAL is:

- plant and/or animal bone biomass origin carboniferous material,
- Authority permitted for lawfully marketing in different open ecological soil enhancement use and
- eco-safe carbon negative applications.

BIOCHAR PRODUCT have specific quality requirements and

- a labeled and full value chain safe product,
- with producers product responsibly guarantees,
- meet the EU/US industrial and environmental norms/standards.

INPUT SUSTAINABILITY CRITERIA, the feed material is:

- not from primarily and secondarily land use.
- not competing with human food and animal feed.
- logistic is environmentally, climate protection and economically sustainable at the same time.

WHAT IS NOT TERRA PRETA BIOCHAR? – I.

- Biochar is **NOT** a fine ground charcoal, not activated carbon, and/or
- biochar is **NOT** labile carbon hydrochar material that application is rapidly promoting GHG developments, and/or
- biochar is not carbon material that does **NOT meet quality** to be put into open ecological soil environment, and/or
- made from input feed material, that is originating **from primer and secondary land use products**, and/or the feed material use is competing with human and/or animal food supply and/or food crop plant production nutrient supply, and/or
- made from input **feed material that is not from living, or recently living organisms** and containing any ecotox substances (IMPORTANT: when biochar is used in dose 10 t/ha, than the concentration limits of the possible exotox substances are 10x multiplied VS when dose is 1 t/ha only) and/or
- the **pyrolysis process is not towards zero emission performance**, and/or

Biochar is NOT a fine ground charcoal



WHAT IS **NOT** TERRA PRETA BIOCHAR? – II.

- the pyrolysis process is **not energy self sustaining**, and/or
- the pyrolysis – **biochar production – manufacturing process is not Government Authority permitted and controlled** operation, and/or
- the **application of biochar materials in open ecological soil environment above 1 t/y capacity is not Government Authority permitted** and controlled operation for lawfully marketing, (voluntarily biochar certificates have no any legal value or validity) and/or
- the overall life cycle of the process (input material, process, biochar use) is **having more negative environmental impacts than total benefit**, and/or
- the biochar product having **no labeling and producers responsibility performance**, and/or
- the **output biochar product economical value and free market valorization is not based on common market demands** and commercialization process, e.g. biochar economical valorization may not be based grants, subsidies, and/or unclear carbon trade programmes.

TERRA RPETA Biochar is NOT a HTC labile carbon



Feedstock characteristics and physical/chemical properties to be considered

1. **Particle size distribution**
2. **Bulk density:** low mass density is causing logistical problem (collection, transport and storage).
3. **Moisture content:**
 - critical for storage and pre-treatment strategies
 - Pyrolysis technology is suited to low moisture content (usually below 20 % w/w)
4. **Ash content, pH**
5. **Sustainability of feed material**
6. The Potential Toxic Elements (PTEs) and organic pollutants should be minimized. The majority >85% of the PTEs concentration level will be multiple increased in the char only by factor approx. 4x-6x.

The prime important is the applied pyrolysis technology design qty/performance that allow high material core treatment temperature

Sustainability of feed material for biochar production

- 1. Biochar feed materials does not compete with human food, animal feed and plant nutrition supply.**
Production biochar from low economical value by-product biomass should not create competition for land use for human and animal food production.
- 2. Low feedstock production costs and inputs** needed.
- 3. Feedstock availability:** seasonal and yearly round availability.
- 4. Environmentally sustainable feed material logistics.**
The environmental and human health impact of logistics storage should be minimized.
- 5. Economically sustainable feed material availability:** price and long term supply contract and logistical cost.
- 6. Feedstock quality and safety:** no Potential Toxic Element Content.

Biochar product: Organic fertilizer or soil improver?

BIOCHAR	P ₂ O ₅	N	K ₂ O	CaO	NUTRIENT CONTENT
	% dm				
Animal bone charcoal	30-35%	<0.1	0.4-0.8	30-42	HIGH
Plant Based Biochar	0.01-0.3	0.3-1	0.1-1	0.2-6	NO Not with economical importance

If the nutrient content is low,
the dose/ha is high →
resulting higher load of potential
contaminants to the land per ha

Plant based biomass VS. animal bone feedstocks

	PLANT BASED	ANIMAL BONE BASED
Density	Low: 100 – 300 kg/m ³	High: 650 – 670 kg/m ³
Biochar yields	Low: 15-30%	High: 50-60%
Feedstock cost	Low	High
Transportation cost per ton	High	Low
Alternative feed supply	Multi feed strategy	Multi feed strategy
Material handling	Costly: large volume, bulky and high storage requirement	Medium cost
Fire protection system cost	High	Low

There is no one fit for all solution





THANK YOU!

CONTACT:

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The original source for the 3R tech, biochar and ABC products

E-mail: biochar@3ragrocarbon.com

<http://www.BioPhosphate.net>

The 3R biochar is right product with right price, right in time in right place with right marketing and sales promotion.

**The Stone Age did not end because of World run out of stones.
The Chemical Fertiliser Age will not end because we
run out of chemical fertilisers.**