



Biochar Update

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BIOCHAR AND BIOFUELS

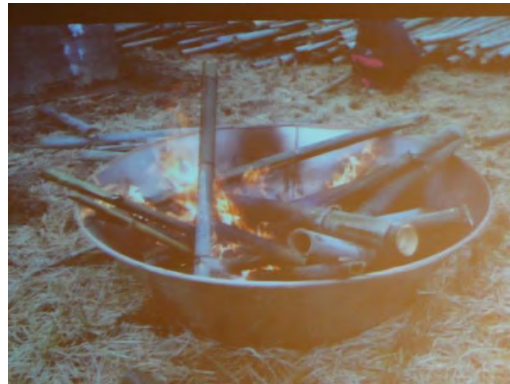
Bioenergy Washington

Future Energy Conference, Seattle, WA

October 18, 2011



- Biochar 2012: US Biochar Initiative
- Asian Pacific Biochar Conference
- Biochar and New Green Agriculture of China” International Biochar Initiative



US Biochar Initiative (USBI)



BIOCHAR 2012 July 29-Aug 1, 2012

Sonoma State University, Sonoma County, CA

www.sonomabiochar.org

www.biochar-us.org

Gloria Flora, Executive director

A not-for-profit organization promoting the sustainable production and use of biochar through research, policy, technology and doing it!

- Staff and Advisory Board
- Regional chapters (PNW, Seachar.org)
- Event coordination and promotion
- Support: Donations, Grants
- Past events: Biochar 2009 (Boulder, CO), Biochar 2010 (Ames, IA)



2nd Asian Pacific Biochar Conference

Kyoto, Sept 15-18, 2011

apbc2011.com



- 1979 Japan investigates relation between microorganisms and charcoal (Dr. Makato Ogawa and Dr. Ginji Sugiura)
- 1984 Japan Min Ag approves charcoal for soil improvement
- 1990 Australia starts biochar research (Dr. Steven Joseph)
- 2005 International Symposium Utilization of Charcoal , Japan (Sumiyaki Assn ICCA)
- 2006 International Agrichar Initiative, Australia
- 2009 1st Asian Pacific Biochar Conference, Australia

Sponsors and Hosts

Japan Biochar Association www.biochar.jp

Japan Association for Human and Environmental Symbiosis www.jahes.jp

Ritsumeikan University, Kyoto www.ritsumei.ac.jp/eng

Australia and New Zealand Biochar Researchers Network www.anzbiochar.org

International Biochar Initiative www.biochar-international.org

International Charcoal Cooperative Assn www.sumiyaki.jp



Participating Countries:

Australia, New Zealand, Cambodia, China, Indonesia, Italy, Korea, Malaysia, Mongolia, New Zealand, Philippines, Taiwan, Thailand, US, Viet Nam



APBC Highlights



- Japan
 - Kuntan (rice husk char) used for root development in rice seedlings, commercial gardens and sale for house insulation.
 - Nonprofit (sumiyaki) and commercial (Binchotan, turf, cosmetic) production of charcoal (bamboo, wood, rice husk) tree restoration
 - “Cool Vege” carbon sequestration project, JBA, Moki kiln
- Australia
 - Advanced lab and field research (esp. NSW), Synthetic Terra Preta
 - Many small producers. 1st 2 tph commercial project (PacPyro).
- Cambodia, Indonesia, Philippines, Viet Nam
 - Exploring biochar for rural development
- Organizations:
 - UN FAO Asia, Asian Development Bank - interested, especially biochar cooking stoves

Kuntan (Rice Husk Char)

Aito Nanohana EcoProject, Higashi-Omi City, Shiga
 Kansai Corp 200 kilns 150 kg/hr, 1.2 MMBtu, 50 kg char/hr



| | | |
|-------------------------|------|----------|
| 主成分 | 炭素分 | 40% |
| | ケイ酸分 | 50% |
| 炭成分中の微量元素 (バイオ炭1kg中) | | |
| カリウム | K | 11,000mg |
| カルシウム | Ca | 5,700mg |
| ナトリウム | Na | 1,700mg |
| マンガン | Mn | 790mg |
| 鉄 | Fe | 190mg |
| 亜鉛 | Zn | 110mg |
| 銅 | Cu | 微量 |



700Y/10 kg
 \$0.41/lb



Artisanal Kilns and Binchotan

Binchotan Wakayama oak
www.tanagokoru.com/english



300 gal 4 ft³
80 lb wood->
24 lb char
4 ft ID
\$21k

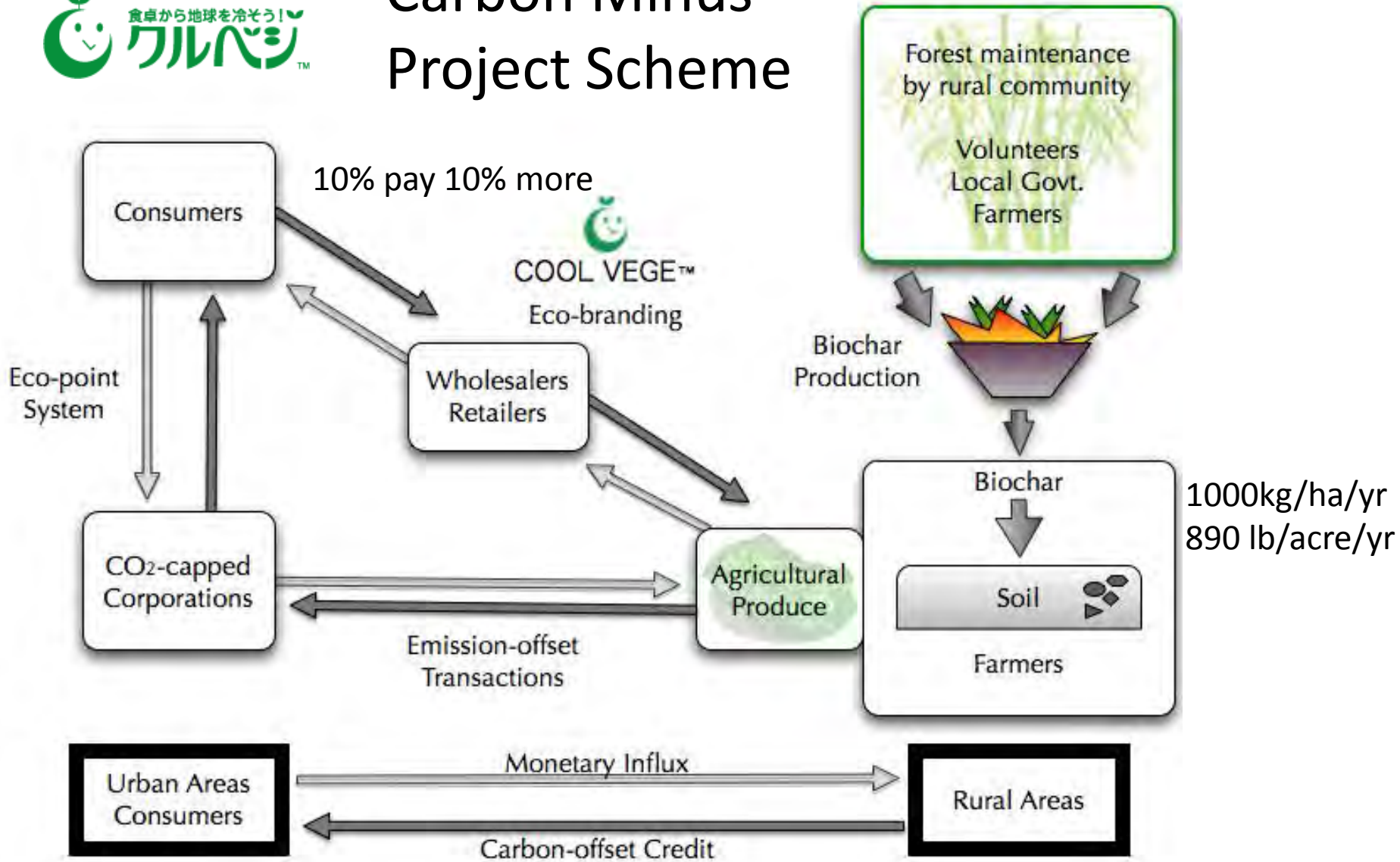


26 gal .6 ft³
2' x 3' x 3.5 '
12 lb wood->
4 lb char
\$8k

Tesaki Mfg www.tesaki.co.jp/sumiyaki



Carbon Minus Project Scheme



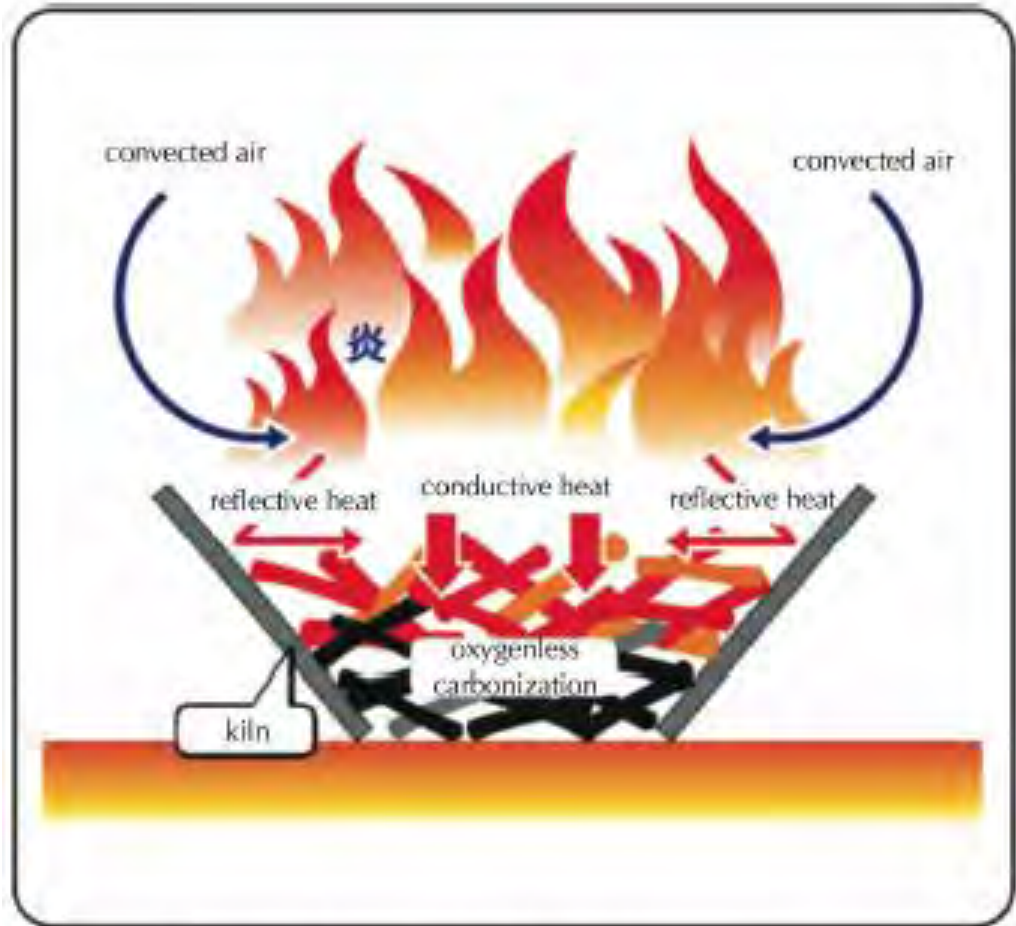
McGreevy and Shibata Kyoto University 2010 <http://hdl.handle.net/2047/d20000347>



Moki Charcoal Kiln

www.moki-ss.co.jp

4-550 gal
4-100 lb wood
1-25 lb char
\$300-\$3500



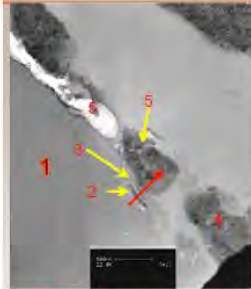
Smokeless Carbonizing Kiln Charring Schematic

<http://hdl.handle.net/2047/d20000347>

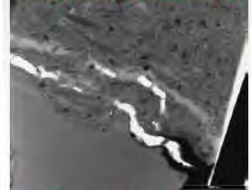
Australian Research

Synthetic Terra Preta, Organomineral complex, Nanostructure, Laboratory and Field trials

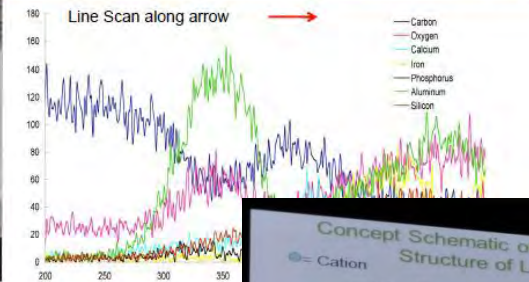
Carbon Stabilisation and Formation of High Absorptive/CEC Organomineral Phases



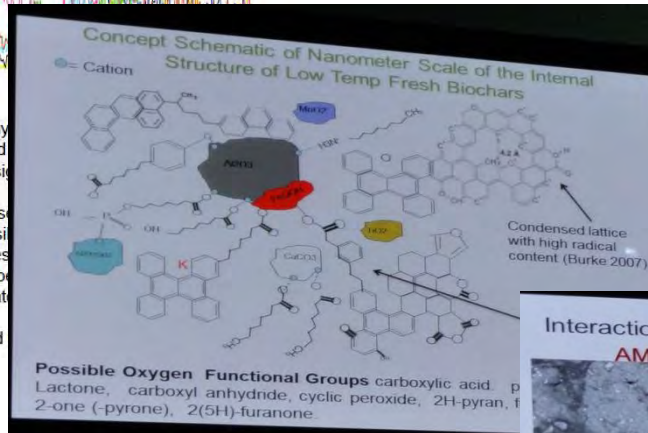
TEM Aged Chicken Litter Bio



TEM; Terra Preta Particle



1. Amorphous Carbon
2. Mixed Aluminium Oxide (hydrated) on carbon surface. This could be a high carbon phase with silicon concentrations
3. A high carbon phase with silicon concentrations
4. Mixed Mineral/Carbon phases (mainly clay and silicates). Fe, O and smaller quantities of calcium phase appear to be together. There is a separate phase of smaller particles.
5. Micropores at interface and



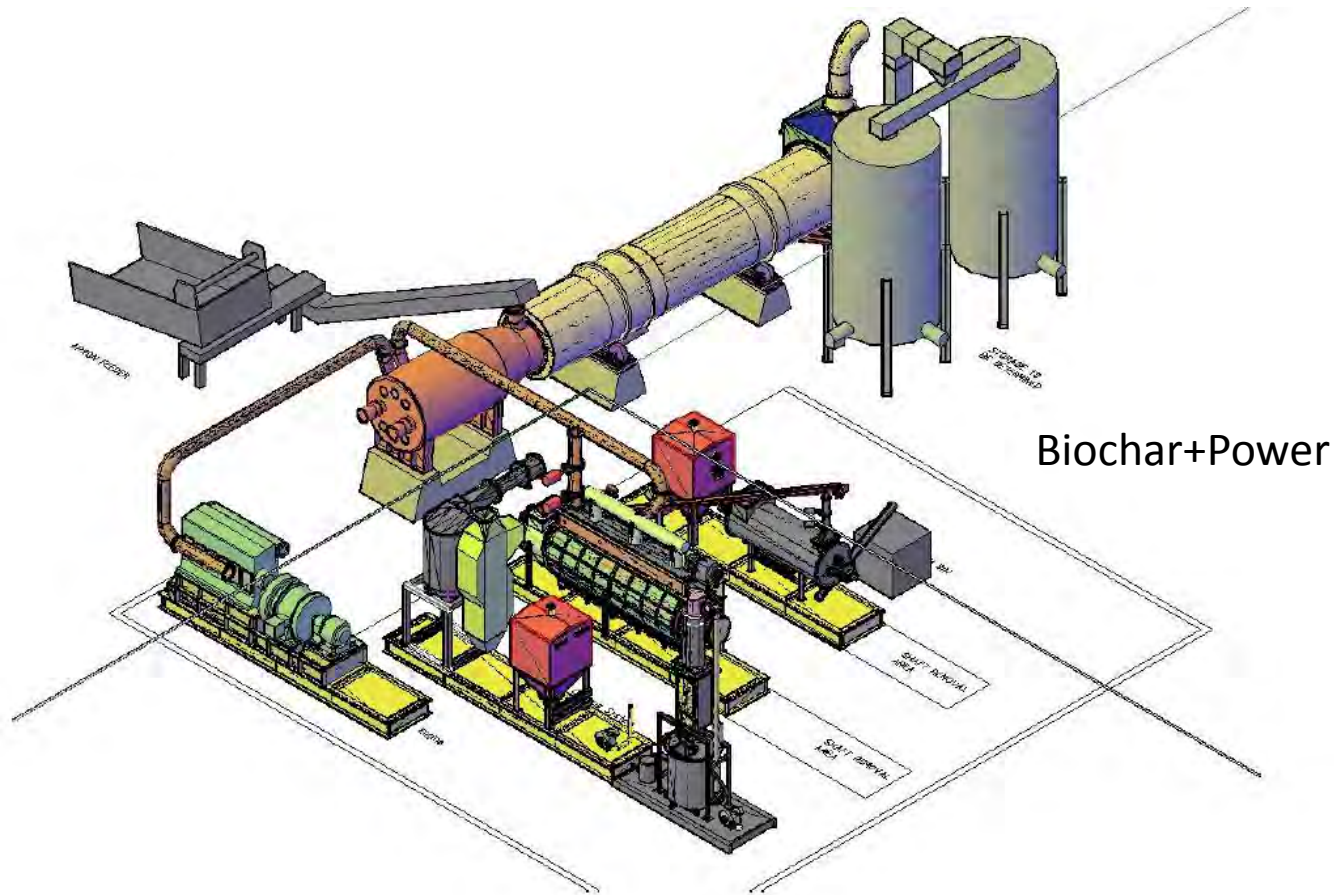
Interaction of Biochars Microbes with Root Hairs
AMF inside root hair inside biochar?

Os Indicate Microbe

High Ca and P around Pore

S. Joseph et. al. 2011

Commercial Greenwaste Project



PacPyro has been offered \$4.5 million dollars by the Victorian State Government to assist in building a project for the conversion of waste organics to renewable energy and biochar.

pacificpyrolysis.com 2011





Biochar and New Green Agriculture of China

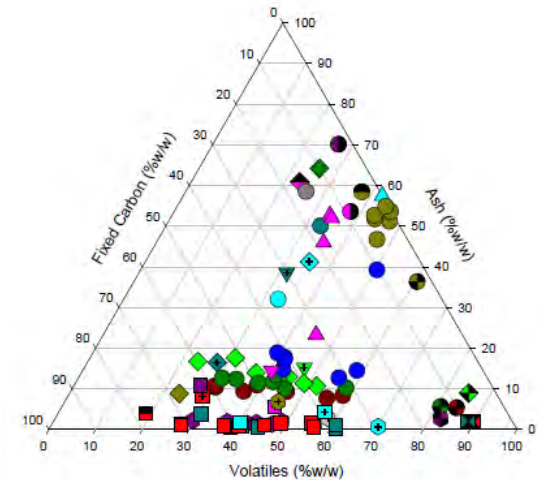
Nanjing, September 20 – 23rd

[www.biochar-international.org/Conference/China Green Agriculture 2011](http://www.biochar-international.org/Conference/China%20Green%20Agriculture%202011)

Biochar Based Fertilizers
Microbial Inoculants
Rice, Soy, Field Trials

International Biochar Initiative (IBI)

Debbie Reed, Executive director
www.biochar-international.org



The mission of the IBI is to promote the development of biochar systems that follow Cradle to Cradle sustainability guidelines.

- Support the generation, review and dissemination of information on all aspects of biochar
- Develop sustainability guidelines and monitor and evaluate biochar projects and systems against these guidelines
- Support: Membership, Grants



www.biochar.bioenergylists.org

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Design and development of energy and environmental processes

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