Charging and Inoculating Biochar

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Living Web Farms Biochar
Remembering the Soil Food Web

- Emphasizes complex relationships of give and take among organisms in soil.
- Diversity among organisms creates resilience, improves soil structure and nutrient exchange.
- Biochar aids diversity by moderating stressful conditions and creating a stable habitat for microbes.
- Adding ‘uncharged’ biochar can be a disruptor by tying up nutrients.
- Better to load biochar with nutrients and entice microbes to move in.

Image courtesy of USDA Natural Resources Conservation Service.
Charging and Inoculating... what does it mean

- Process of charging (adding nutrients) and Inoculating (adding microbes) to biochar
- Remember the adsorptive qualities of biochar will ‘suck in’ nutrients in your soil when applied raw
- Important to understand that nature will take it’s course... if you have the patience to wait (1-2 growing seasons?), then you can skip this step.
- Charging and Inoculation allow you to hit the ground running on crop production, jump-start the soil food web, restore damaged soils.
- Biochar can be a substrate for custom blends of microbes and microbial foods catered towards specific plant needs (“designer chars”)
- When conditioning biochars, think in terms of **Nutrients, Microbes and Substrates**
Mix with finished compost

- Nutrient charging and microbe inoculation in one shot
- Mix char and compost at ratio as high as 1:1 (50/50)
- Maintain moisture after mixing in char - squeeze test
- Compost markets are dominated by inferior compost, quality fungal compost has been very difficult to find.
- Be prepared to wait at least a few weeks - assuming moisture conditions are right and compost is high quality
Liquid Gold

- 10:1:4, plus some trace elements
- Store for a 30 days above 68 degrees for sterilization. **Science is still out on this.**
- Dilute 1:5-10 for direct application to soil. No need to dilute for charging biochar
- Beware salt accumulation.
- Beware pharmaceuticals.
- Great way to provide nutrients to microbes, convince microbes to “move in”
- Wetting and charging in one step, NOT a microbial inoculation
- Probably best done before composting, adding microbes. **Guarantee safety with PFRP**

Source: waldeneffect.org
Actively Aerated Compost Tea

- Microbial extraction... and multiplication
- Ingredients: Good compost, Microbial foods, and AIR
- Custom brews for specific applications:
  - Bacterial tea
  - Fungal tea
  - Foliar application
  - Soil drench
  - Compost enhancer/accelerator
  - Biochar inoculation: important to provide adequate nutrients
- Lots of recipes available
- Simply put:
  - With appropriate air, worst case is your tea isn’t doing anything
  - Without air, possible multiplication of pathogens
- If tea is brewed well, all microbial foods will have been consumed.

Image source: motherearthnews.com
Vermicompost

- Great way to use food waste at home, very scalable
- Start with a container or two of ‘red wigglers’
- 2 lbs of worms - 1 lb/day of food waste
- Opaque container, 8-12” deep
- Moisture management is critical
- Moderate temperatures req’d. 40-80. 55-77 preferred
- Bedding, grit, worms, food, cover
- Multiple ways to harvest castings
Mix AS compost

- Speeds up composting
- Acts as a ‘black’ carbon source, with your ‘browns’ and ‘greens’
- Found to reduce losses of nitrogen (up to 50% - UGA, 42 days w/20%biochar)
- Improves texture, uniformity
- Great way to further process pee-char
- James Joyce C:N Ratios: slow pyrolysis biochar 100:1, too inert to compost without traditional high organic carbon sources.
  - 10 parts grass clippings, (15:1)
  - 5 parts shredded leaves, (55:1)
  - 1 part slow-pyrolysis biochar (100:1)
- Think seasonally for at-home inoculation: alternate between methods if necessary...if you’re like me, you won’t have enough material to compost until harvest, leaf drop
References and Resources

- Why we process and condition biochar for use in the soil: www.dyarrow.org/CarbonSmartFarming/docs/BiocharUseInSoil.pdf