Biochar Market Development and Product Registration

Presented by: Ron Alexander, President
Biochar 2016

August 24, 2016
Subjects

• Current Realities of the Biochar Marketplace  (*my POV*)

• Registration Basics

• Labeling Basics

• Certified Organic ‘Listing’
Perspective

Biochar production and market expansion……..
Learn from history of compost, AD, worm castings, humic acid industries/markets in the USA

Need to follow a similar path……

• Professionalism,
• Science over ‘fluff’,
• Understand economics of process and usage
Industry Advancing through Large-Scale Technology Providers (or ‘Really Small’ Producers)?

Either way, market expansion often lags…AD in Europe and US

Typical with ‘waste management’ technologies
- Interest in soil health, cannabis production, retail packaged soils

(....but don’t get delusions of grandeur !!)
Confusion in the Marketplace

What is Biochar?

- Need to define it ‘as an industry’…
- What is ‘real’ biochar? (BBQ ashes?)
- Which products provide expected/proven benefits?
Labs Standards Established?

Starting, but not there yet....
- Need to establish standardized testing methods *(agreed upon)* ....

*composting industry* *(TMECC and STA program assisted)*
# Important Parameters for Compost

<table>
<thead>
<tr>
<th>Compost Parameters</th>
<th>Reported as</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pH</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Soluble salts</strong></td>
<td>dS/m (mmhos/cm)</td>
</tr>
<tr>
<td><strong>Primary plant nutrients</strong></td>
<td>%, as-is (wet) &amp; dry weight basis</td>
</tr>
<tr>
<td><em>Nitrogen</em></td>
<td>Total N</td>
</tr>
<tr>
<td><em>Phosphorus</em></td>
<td>P$_2$O$_5$</td>
</tr>
<tr>
<td><em>Potassium</em></td>
<td>K$_2$O</td>
</tr>
<tr>
<td><em>Calcium</em></td>
<td>Ca</td>
</tr>
<tr>
<td><em>Magnesium</em></td>
<td>Mg</td>
</tr>
<tr>
<td><strong>Moisture content</strong></td>
<td>%, wet weight basis</td>
</tr>
<tr>
<td><strong>Organic matter content</strong></td>
<td>%, dry weight basis</td>
</tr>
<tr>
<td><strong>Particle size</strong></td>
<td>Screen size passing through</td>
</tr>
<tr>
<td><strong>Stability (respirometry)</strong></td>
<td>mg CO$_2$-C per g TS per day</td>
</tr>
<tr>
<td></td>
<td>mg CO$_2$-C per g per day</td>
</tr>
<tr>
<td><strong>Maturity (Bioassay)</strong></td>
<td>% (average)</td>
</tr>
<tr>
<td><em>Percent emergence</em></td>
<td></td>
</tr>
<tr>
<td><em>Relative seedling vigor</em></td>
<td>% (average)</td>
</tr>
<tr>
<td><strong>Select Pathogens</strong></td>
<td>PASS/FAIL</td>
</tr>
<tr>
<td>(Per US EPA Class A standards, 40 CFR § 503.32(a)</td>
<td></td>
</tr>
<tr>
<td><strong>Trace metals</strong></td>
<td>PASS/FAIL</td>
</tr>
<tr>
<td>(Per US EPA standards, 40 CFR § 503.13, Table 3)</td>
<td></td>
</tr>
</tbody>
</table>

**What do we test for in order to compare products and determine expected results?**
### Actual Comparison of Compost to Other Horticultural/ Agricultural Products

<table>
<thead>
<tr>
<th></th>
<th>Compost ¹</th>
<th>Organic Soil ²</th>
<th>Native peat ³</th>
<th>Canadian peat ⁴</th>
<th>Aged chicken manure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic matter (%)</td>
<td>46.00</td>
<td>12.00</td>
<td>74.00</td>
<td>97.00</td>
<td>43.00</td>
</tr>
<tr>
<td>pH</td>
<td>7.40</td>
<td>7.50</td>
<td>5.20</td>
<td>4.20</td>
<td></td>
</tr>
<tr>
<td>Soluble salts (mmhos/cm)</td>
<td>2.23</td>
<td>0.64</td>
<td>0.31</td>
<td>0.07</td>
<td>15.10</td>
</tr>
<tr>
<td>Bulk density</td>
<td>32.16</td>
<td>70.22</td>
<td>14.26</td>
<td>6.98</td>
<td>39.32</td>
</tr>
<tr>
<td>Moisture holding capacity</td>
<td>227.00</td>
<td>53.00</td>
<td>428.00</td>
<td>1307.00</td>
<td>166.00</td>
</tr>
<tr>
<td>Cation exchange capacity (meg/100g)</td>
<td>17.30</td>
<td>13.60</td>
<td>4.00</td>
<td>3.10</td>
<td></td>
</tr>
</tbody>
</table>


1 = biosoilds/yard trimmings
2 = organic Florida muck soil
3 = Florida reed sedge peat
4 = Canadian sphagnum peat moss

Understand your product vs. competing products

What can the product actually replace?

What are realistic applications / markets (economics)
## Compost Comparative Data

<table>
<thead>
<tr>
<th>Primary Feedstock</th>
<th>Wood Compost</th>
<th>MSW Compost</th>
<th>Yard Trimmings Compost</th>
<th>Cotton Boll Compost</th>
<th>Cattle manure Compost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHYSICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moisture Content  (%)</td>
<td>28.3</td>
<td>36.1</td>
<td>30.7</td>
<td>38.4</td>
<td>29.8</td>
</tr>
<tr>
<td>Total Solids (%)</td>
<td>71.8</td>
<td>64.2</td>
<td>69.4</td>
<td>61.8</td>
<td>70.2</td>
</tr>
<tr>
<td><strong>CHEMICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>5.9</td>
<td>7.4</td>
<td>7.4</td>
<td>8.1</td>
<td>8.9</td>
</tr>
<tr>
<td>EC (dS/m)</td>
<td>0.3</td>
<td>6.4</td>
<td>4.0</td>
<td>4.2</td>
<td>12.1</td>
</tr>
<tr>
<td>PO₄-P (mg/L)</td>
<td>2.0</td>
<td>1.3</td>
<td>1.1</td>
<td>86.3</td>
<td>45.6</td>
</tr>
<tr>
<td>TKN (% w/w)</td>
<td>0.3</td>
<td>2.0</td>
<td>1.0</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>NO₃-N (mg/kg)</td>
<td>5.5</td>
<td>355.3</td>
<td>447.0</td>
<td>78.0</td>
<td>19.8</td>
</tr>
<tr>
<td>NH₄-N (mg/kg)</td>
<td>1.2</td>
<td>14.0</td>
<td>9.5</td>
<td>61.7</td>
<td>1835.5</td>
</tr>
<tr>
<td>NH₄-N / NO₃-N (Ratio)</td>
<td>2.0</td>
<td>5.0</td>
<td>0.0</td>
<td>0.0</td>
<td>36.0</td>
</tr>
<tr>
<td>Fe (mg/kg)</td>
<td>4,734</td>
<td>8,896</td>
<td>11,300</td>
<td>3,645</td>
<td>5,285</td>
</tr>
<tr>
<td>C:N (Ratio)</td>
<td>161.0</td>
<td>10.9</td>
<td>12.0</td>
<td>15.0</td>
<td>12.2</td>
</tr>
<tr>
<td>CCE (% w/w)</td>
<td>2.8</td>
<td>16.4</td>
<td>-</td>
<td>5.0</td>
<td>9.1</td>
</tr>
<tr>
<td><strong>BIOLOGICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seedling Emergence (%)</td>
<td>99.0</td>
<td>95</td>
<td>100.0</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>Seedling Vigor (%)</td>
<td>5.5</td>
<td>71.0</td>
<td>97.6</td>
<td>90.0</td>
<td>1.0</td>
</tr>
<tr>
<td>CO₂ Evolution (mg/gTS/d)</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
<td>0.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Salmonella (MPN/g dw basis)</td>
<td>0.0</td>
<td>0.0</td>
<td>5.8</td>
<td>3.1</td>
<td>1.5</td>
</tr>
<tr>
<td>T. Coliform Bacteria (MPN/g dw basis)</td>
<td>1,400</td>
<td>10.8</td>
<td>4.0</td>
<td>5.4</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Compost is not compost, varies based on feedstock, processing, etc.
# Biochar Comparative Data

<table>
<thead>
<tr>
<th></th>
<th>% Moisture of Biomass</th>
<th>% Biochar + Ash Left</th>
<th>Butane Activity</th>
<th>% OM in Biochar</th>
<th>% Ash in Biochar</th>
<th>% Carbon in Biochar</th>
<th>Neutralizing Value as % CaCO₃</th>
<th>Carbonate Value as % CaCO₃</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biosolids</strong></td>
<td>7.1</td>
<td>67.1</td>
<td>1.8</td>
<td>14.2</td>
<td>85.8</td>
<td>12.8</td>
<td>13.8</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Foodwaste</strong></td>
<td>84.9</td>
<td>32.2</td>
<td>4.4</td>
<td>49.3</td>
<td>50.7</td>
<td>44.4</td>
<td>25.8</td>
<td>21.9</td>
</tr>
<tr>
<td><strong>Greenwaste</strong></td>
<td>10.9</td>
<td>46.2</td>
<td>4.3</td>
<td>49</td>
<td>51</td>
<td>44.1</td>
<td>24.1</td>
<td>17.9</td>
</tr>
<tr>
<td><strong>Ground Pallets</strong></td>
<td>14.4</td>
<td>26.2</td>
<td>14.6</td>
<td>29.1</td>
<td>70.9</td>
<td>26.2</td>
<td>27</td>
<td>21.6</td>
</tr>
<tr>
<td><strong>Redwood Fines</strong></td>
<td>12.4</td>
<td>46.4</td>
<td>4.7</td>
<td>26.2</td>
<td>73.8</td>
<td>23.6</td>
<td>9.3</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Redwood (new)</strong></td>
<td>17</td>
<td>33.5</td>
<td>11</td>
<td>76.2</td>
<td>23.8</td>
<td>68.6</td>
<td>17</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>Rice Waste</strong></td>
<td>39.5</td>
<td>52.8</td>
<td>3.6</td>
<td>23.3</td>
<td>76.7</td>
<td>21</td>
<td>16.5</td>
<td>9.9</td>
</tr>
<tr>
<td><strong>Wood chips</strong></td>
<td>6.9</td>
<td>28.7</td>
<td>10.5</td>
<td>70.3</td>
<td>29.7</td>
<td>63.3</td>
<td>20.6</td>
<td>15.6</td>
</tr>
<tr>
<td><strong>Wood shavings</strong></td>
<td>17.9</td>
<td>24.4</td>
<td>13</td>
<td>72.4</td>
<td>27.6</td>
<td>65.1</td>
<td>16.7</td>
<td>13.3</td>
</tr>
</tbody>
</table>

F. Shields, Gabilan Laboratory - 550°F min, 1 hour

**BIOCHAR IS NOT BIOCHAR** - Variability based on feedstock, production technique, temperature, etc. Products are not the same, need to be able to test using standard methods to better understand
Improve Sales & Marketability

Helps when products possess the appropriate characteristics:

‘fit for purpose’ and/or of general good quality

Must define...
Compost Specs for Landscaping

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Reported as (units of measure)</th>
<th>Turf Establishment, Planting Bed Establishment, Backfill Mix</th>
<th>Mulch</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>pH units</td>
<td>6.0 - 8.5</td>
<td>5.5-9.0</td>
</tr>
<tr>
<td>Soluble Salt Concentration²</td>
<td>dS/m (mmhos/cm)</td>
<td>Maximum 10</td>
<td>Maximum 10</td>
</tr>
<tr>
<td>(electrical conductivity)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moisture Content</td>
<td>%, wet weight basis</td>
<td>30 – 60</td>
<td>25-60</td>
</tr>
<tr>
<td>Organic Matter Content</td>
<td>%, dry weight basis</td>
<td>30 – 65</td>
<td>&gt;30</td>
</tr>
<tr>
<td>Particle Size</td>
<td>% passing a selected mesh size, dry weight basis</td>
<td>98% pass through 3/4” screen or smaller</td>
<td>99% pass through 3” screen, &gt;25% passing 3/8” screen</td>
</tr>
<tr>
<td>Stability³</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Dioxide Evolution Rate</td>
<td>mg CO₂-C per g OM per day</td>
<td>&lt; 8</td>
<td>N/A</td>
</tr>
<tr>
<td>Maturity³ (Bioassay)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed Emergence and Seedling Vigor</td>
<td>%, relative to positive control</td>
<td>Minimum 80%</td>
<td>Minimum 80%</td>
</tr>
<tr>
<td>Physical Contaminants (inerts)</td>
<td>%, dry weight basis</td>
<td>&lt; 1</td>
<td>&lt;.1</td>
</tr>
</tbody>
</table>

Leads to easier specification (for usage), especially on larger public projects...
## Compost Specs for Erosion Control

Leads to ease of purchase (help buyers), and identify best products for specific applications.

<table>
<thead>
<tr>
<th>Parameters$^{1,6}$</th>
<th>Reported as (units of measure)</th>
<th>Filter Berm to be Vegetated</th>
<th>Filter Berm to be left Unvegetated</th>
<th>Surface Mulch to be Vegetated</th>
<th>Surface Mulch to be left Unvegetated</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH$^2$</td>
<td>pH units</td>
<td>5.0 - 8.5</td>
<td>N/A</td>
<td>5.0 - 8.5</td>
<td>N/A</td>
</tr>
<tr>
<td>Soluble Salt Concentration$^2$ (electrical conductivity)</td>
<td>dS/m (mmhos/cm)</td>
<td>Maximum 5</td>
<td>N/A</td>
<td>Maximum 5</td>
<td>Maximum 5</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>%, wet weight basis</td>
<td>30 – 60</td>
<td>30 – 60</td>
<td>30 – 60</td>
<td>30 – 60</td>
</tr>
<tr>
<td>Organic Matter Content</td>
<td>%, dry weight basis</td>
<td>25 – 65</td>
<td>25-100</td>
<td>25 – 65</td>
<td>25-100</td>
</tr>
<tr>
<td>Particle Size</td>
<td>% passing a selected mesh size, dry weight basis</td>
<td>Minimum:  100% passing 3” (75 mm), 90% passing 1” (25mm), 70% passing 3/4” (19mm), Between: 30-75% passing 1/4” (6.4mm), Maximum: particle size length of 6” (152mm) (no more than 60% passing 1/4” (6.4 mm) in high rainfall/flow rate situations)</td>
<td>Minimum: 100% passing 3” (75 mm), 90% passing 1” (25mm), 70% passing 3/4” (19mm), Between: 30-75% passing 1/4” (6.4mm), Maximum: particle size length of 6” (152mm) (no more than 50% passing 1/4” (6.4 mm) in high rainfall/flow rate situations)</td>
<td>Minimum: 100% passing 3” (75 mm), 90% passing 1” (25mm), 65% passing 3/4” (19mm), Maximum: 75% passing 1/4” (6.4 mm) particle size length of 6” (152mm)</td>
<td>Minimum: 100% passing 3” (75 mm), 90% passing 1” (25mm), 65% passing 3/4” (19mm), Maximum: 75% passing 1/4” (6.4 mm) particle size length of 6” (152mm)</td>
</tr>
<tr>
<td>Stability$^3$</td>
<td>Carbon Dioxide Evolution Rate</td>
<td>mg CO$_2$-C per g OM per day</td>
<td>&lt; 8</td>
<td>N/A</td>
<td>&lt; 8</td>
</tr>
<tr>
<td>Physical Contaminants (man-made inerts)</td>
<td>%, dry weight basis</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>
Varying products based on application (market/use)

Blacklite
This biochar material is created purely from softwood forestry residues. It is sustainably produced in CA with capacity to consistently deliver large volumes. It is highly porous, adsorptive, and has great water holding capacity. The gradation is ¼” minus, the bulk density dry is 1.5 pounds per gallon and it is delivered with 50% moisture content for safety and ease of handling. *Ingredients: Biochar*

BlackLite Mix #6
Beyond plain biochar, our Mix #6 cultured blend is fantastic for use as a component of potting blends. The unique biological activation process that we have developed results in a biochar material that is charged, matured, and instantly ready to help your soil produce vigorous plants. *Ingredients: Biochar, Worm Castings, Rice Bran.* (About 90% biochar by volume)

Dense Mix
Moist biochar rolled in microfine basalt rock powder, blended with rice bran and worm castings then given time to mature. The biochar acts as a catalyst for microbial activity and housing for beneficial fungi, allowing minerals to become available faster. This material is particularly good for re-invigorating tired or abused soils. *Ingredients: Biochar, Microfine Basalt Rock Powder, Rice Bran, Worm Castings.* (About 70% biochar by volume)

Custom Blended Orders Available Upon Request.
Free Consulting Available for Application Optimization.

www.pacificbiochar.com | sales@pacificbiochar.com | 808.936.3484
Confusion in the Marketplace

It’s not a magical product! (SCIENCE-BASED)

Focus on realistic claims / proven benefits?
Verified Vermicompost Benefits

1. Improves soil structure and porosity
2. Increases moisture infiltration and permeability, and reduces bulk density of heavy soils
3. Improves the moisture holding capacity of light soils
4. Improves the cation exchange capacity (CEC) of soils
5. Supplies organic matter
6. Aids the proliferation of soil microbes
7. Supplies beneficial microorganisms to soils and growing media
8. Encourages vigorous root growth
9. Allows plants to more effectively utilize nutrients
10. Enables soils to retain nutrients longer
11. Contains humus
12. Buffers soil pH
13. Source of macro and micro nutrients
   (for fertilizer registered products, not soil amendment registered products)

Must identify provable benefits!

Allowable label claims based on state, application rates, etc.

National organization should establish list with AAPFCO
Biochar - Advantages

- Enhanced plant growth
- Suppressed methane emission
- Reduced nitrous oxide emission (estimate 50%)
- Reduced fertilizer requirement (estimate 10%)
- Reduced leaching of nutrients
- Stored carbon in a long term stable sink
- Reduces soil acidity: raises soil pH
- Reduces aluminum toxicity
- Increased soil aggregation due to increased fungal hyphae
- Improved soil water handling characteristics
- Increased soil levels of available Ca, Mg, P, and K
- Increased soil microbial respiration
- Increased soil microbial biomass
- Stimulated symbiotic nitrogen fixation in legumes
- Increased arbuscular mycorrhizal fungi
- Increased cation exchange capacity

From scientific text...how many of these claims can we REALLY make? (Is there enough scientific back-up, legal claims, relevant to buyers?)
Biochar Claims from Existing Labels

- Improve soil tilth and aeration
- Boost soil biodiversity
- Increase nutrient and water retention
- Stimulate and promote beneficial microbes and fungi
- Reduce off gassing of CH$_4$ and NO$_2$
- Increase pH and reduce liming needs
- Accelerate composting process

- From actual label……which claims provable, which relevant to ‘buyer’? WHICH ONES WILL BE DEEMED ALLOWABLE?

- AAPFCO – all written (and spoken) word = a labelling claim
Biochar Claims from Existing Labels

• Healthier soil = Better yields
  - Vegetables and flowers are bigger and more abundant. Encourages micro-organisms to thrive in your soil. Increases nitrogen and other important nutrients.

• Drought resistance
  - Retains water better than compost and peat moss

• Long-lasting love for your soil
  - Biochar benefits the soil for 100’s of years

• Reduces Global Warming...Seriously!
  - Biochar returns carbon back to the soil that would’ve been released as CO₂ into the atmosphere. Also called carbon sequestration, this “carbon negative” process helps stop global warming.

From actual label....(problem claims)
Labels and sales data should not be an academic exercise, must lead to sales, not cause a ‘stop sale’
Valuing Products

• Must work to monetize product benefits
  – Depends on product characteristics
  – Real and perceived value
  – Other….  

Just because university research proves benefits, doesn’t mean the industry will readily accept them! (commercialization)

Not always straightforward…
Various markets are being established, but are 'early days' (need more people knocking on doors)
Key Elements in Market Research and Development

- Production/facility
- Product development research
- Market research
- Promotion
- Education
- Sales / distribution

*Industry needs to take market development seriously... expand usage, raise value...
Organization of State DOAs

• Work together on issues affecting State DOAs regarding the distribution of feed, lime, fertilizers, and soil amendments
  - Involve industry in discussions
  - Goal: uniformity from state to state

• Create model legislation & regulation, labeling law

State regulations affect how we ‘legally’ approach the market
Regulatory Background

• 48 states have fertilizer laws (not HI or AK), 38 have soil amendment laws
  – Biochar currently considered a soil amendment

• Individual State DOA’s decide what you can and cannot state on the label
  – Regulation will be based on the State in which your facility is located and the states in which you distribute product
  – Biochar producers / marketers have to register product in all states that product is distributed, and meet their labeling and distribution regulations
Related Regulation

- Typically, State DOAs (*Control Officials*) regulate the distribution of products, not their production

  - Can regulate product quality (e.g., heavy metals, pathogens, etc.) *‘Adulteration’*

  - Regulate labeling text (during the registration process) *‘Also adulterated if it doesn’t meet claims’*

- Claims (benefits), terms, units of measure, other

- Providing any nutrient data, technically, makes your product a fertilizer

*Some States have gotten very conservative about labeling claims, especially with soil amendments / conditioners*
Current Registration Options

• Register as soil amendment
  - No nutrient claims (unless dual registration), volume vs. weight, must negotiate label claims

• Register as fertilizer
  - Sell by weight, moisture content vs. nutrient claims, etc.

• Dual registration – few states (e.g., PA, IL)

• Don’t register? (OK, until you get caught)
Related Definitions

Soil Amendment – (commonly referred to a Soil Additive or Soil Conditioners), means any substance or a mixture of substances which is intended to improve the physical, chemical, biochemical, biological or other characteristic of the soil, except fertilizer, agricultural liming materials, unmanipulated animal manures, unmanipulated vegetables manures, pesticides and other materials exempt by regulation.

MANY STATES WILL REQUIRE UNIVERSITY RESEARCH TO PROVE CLAIMS

CLAIMS MUST BE TRUTHFUL, BASED ON SUGGESTED APPLICATION RATES
Related Definitions

**Fertilizer** – any substance containing one or more recognized plant nutrient(s) which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth, except unmanipulated animal and vegetable manures, marl, lime, limestone, wood ashes and other products exempted by the regulation by the __________.

**Specialty Fertilizer** – a fertilizer distributed for non-farm use.

**MAY HAVE TO PROVE NUTRIENT RELEASE / PLANT AVAILABILITY**
Related Definitions

**T-101 Biochar** - is a solid material obtained from thermochemical conversion of biomass in an oxygen-limited environment (pyrolysis) containing at least 60% carbon. Feedstocks may be composed of crop residue, wood or other forest waste, and animal manures. Materials transported in salt water, painted, or treated with preservatives are not permitted. When listing biochar in an ingredient statement, the feedstock shall be designated by prefixing the term biochar with the feedstock from which it was produced; i.e. poultry litter biochar, green waste biochar, papermill biochar, etc. When more than one feedstock is involved, all feedstocks greater than 10% of the total volume are to be listed by decreasing volume. Their uses include soil amendments.

AAPFCO - 2016
Registration Costs

- Fees associated with registering both soil amendments and fertilizers vary from state to state.
- There may be a registration fee per product or company and/or a tonnage fee (known as an inspection fee).
- Often you pay both a registration fee (*typically* ranging from $0 to $250/product) and a tonnage fee (*typically* ranging from $0 to $0.90/ton).
Biochar Labels

What needs to be on the label?

What cannot be on the label?

Bagged product = Bag is label
Bulk product = Literature, B/L is label
Biochar Distributed as a Soil Amendment

- Uniform Soil Amendment Bill
  - Brand name
  - Net weight (or volume)
  - Guaranteed analysis – ingredient statement
  - Purpose of product (benefits/claims)
  - Directions for application
  - Name and address of applicant

Other text allowable, claims, etc. ‘The more states, the more hassles’
Product are on the market, which are ‘registered’?
Biochar
Distributed as a Fertilizer

- Uniform State Fertilizer Bill
  - Brand (product name)
  - Grade (e.g., 0-0.5-0.5)
  - Guaranteed analysis – chemical breakdown (e.g., WIN, WSN)
  - Directions for use for fertilizer distributed to the end user
  - Name and address of registrant/licensee
  - Derivative statement – source of nutrients
  - Net weight (IMPERIAL AND METRIC UNITS)
Biochar
Distributed as a Fertilizer

- Other stuff
  - Heavy metal statement and testing – west coast states primarily
  - *Apply only as directed*…..statement
  - Allowable claims and terms on labels are based on historical product research, product type being registered (fertilizer vs. soil amendment), whim of individual State/Control Official
  - No pesticidal or unproven claims!
    
    *(University research)* Careful microbial claims
Certified and Exempt Organic Farms

**TOP 10 STATES**

1. California - 2,714
2. Wisconsin - 1,222
3. Washington - 887
4. New York - 827
5. Oregon - 657
6. Pennsylvania - 586
7. Minnesota - 550
8. Ohio - 547
9. Iowa - 518
10. Vermont - 467

EXPANDING! (Gardeners also want)……so

2008 Organic Production Survey
OMRI Listing

OMRI Standards Manual

STANDARDS FOR THE REVIEW OF PRODUCTS INTENDED FOR USE IN CERTIFIED ORGANIC PRODUCTION OR PROCESSING
Includes the OMRI Generic Materials List

published 2007

Allows for easier usage on certified organic farms
Ashes

Status: Allowed

Class: Crop Fertilizers and Soil Amendments

1. Description: **Wood ash** must be produced exclusively from untreated and unpainted wood. Wood stove ashes must not be generated from burning of colored paper, plastic, or other prohibited materials. Excessive applications of ash can cause pH and nutrient imbalances. See ASH – PLANT OR ANIMAL.

2. Description: **Ash from plant and animal sources only**. Ashes from burning minerals, manure, or prohibited materials are prohibited. See also MANURE ASH.

*Is no ‘biochar’ term…. Listed as ‘ash’*
Ashes

Status: Prohibited

Class: Crop Fertilizers and Soil Amendments

Specifically ash from burning manure. See Glossary for definition of "manure."

Products will be allowed (as an ash) primarily based on its feedstock (ingredients)

REMEMBER - OMRI has no labeling authority (so just because they approve it, doesn’t mean it’s a legal label
Crop Fertilizers and Soil Amendments Contaminant Requirements

- **Heavy Metals**
  - As / 10ppm, Cd / 20 ppm, Pb / 90 ppm

- **Pathogens**
  - 1,000 MPN Fecal Coliform
  - 3 MPN Salmonella / 4 grams
Conclusions

• Industry needs more product development and market research (cost to produce vs. market value, applications)

• Understand market – don’t ASS-U-ME overall marketability or product value…. Be realistic with expected values

• Do a proper ‘due diligence’ – do the RESEARCH! – market and product development, study and invest, product placement

• Market/Sell using scientific proof

• Match product with application

• Properly register for sale (consider certifying, Listing)

• Industry must start to standardize to allow growth
  – Learn from history of related products / industries
Questions?

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