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CLEAN AIR

BIOCHAR

A new Citizens for Clean Air project for the Grand Valley

GOOD FOR THE SOIL

GOOD FOR THE PLANET

GOOD FOR THE AIR

What is Biochar

- Biochar is a charcoal-like material made by heating plant matter in the absence of oxygen to 800 deg F or higher (pyrolysis).
- This drives out the volatile stuff but leaves behind a carbon-rich, porous scaffold with any mineral content of the plant material.
- One gram of well-made biochar has an internal surface area of 2,000 square feet, or more.
- This surface area is composed of microscopic pores.
- These pores make ideal habitat for beneficial bacteria and fungus, and a great pantry for nutrients like K, Mg, Ca, PO_4, and NH_4.
- Like any good house, biochar protects the microbes and nutrients from leaching.

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Biochar History

- Biochar has been used for millennia.
- The example often cited is Terra Preta in Amazonia.
- The indigenous people there created these peculiar soils between 500-2500 years ago by continuously adding charcoal derived from cooking along with charcoal and/or fresh biomass from agricultural waste and forest clearings.
- This continuous addition of charred biomass turned these soils very dark in color, extremely high in organic matter, and very fertile in comparison to the adjacent highly weathered soils

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Terra Preta

- Terra Preta soil in the Amazon Basin and adjacent soil showing contrasting color and crop production potential

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Images of Biochar

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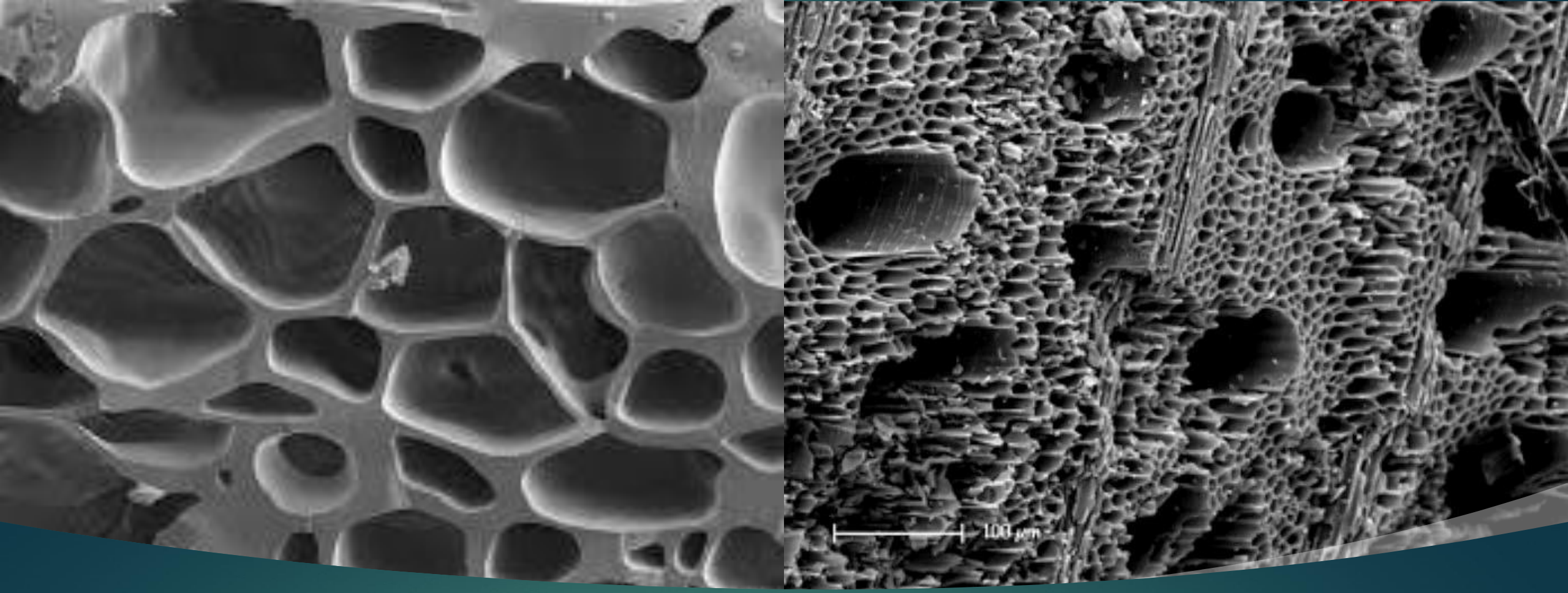

Scanning Electron Microscope View of Biochar

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How Biochar Benefits the Soil

Biochar can act as a phenomenal agricultural catalyst, working synergistically with microorganisms and nutrients to improve soil health - *for the long term*.

Researchers have reported an enhanced plant growth of as much as 300%.

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Biochar Issues

- When to apply
  - According to one study, biochar right out of the kiln will reduce crop yields by 40%.
  - This is because raw biochar is 'hungry' for chemicals and microbes to fill its pore space and will pull them out of the soil until it is full.
- How to prepare
  - If biochar is fully preloaded with microbes and nutrients, yields could increase by up to 300%
  - Pre-loaded biochar is ready from day one to deliver bacteria, fungus and nutrients to the fine root hairs of plants.
  - We will co-compost biochar with plant material and manure in hopes of filling up all the pore vacancies before it is applied to the soil.
- What not to use
  - Sorption of pesticides and herbicides by the biochar can reduce their efficacy and also disrupt the soil microbiome.
  - Biochar made from high salts and toxic mineral content biomass

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Why is Citizens for Clean Air (CCA) Researching Biochar

- If field stubble, tree trimmings, and yard waste can be turned into biochar in a properly operated kiln, instead of burned in big, smoky piles, smoke pollution in the Valley will be reduced.
- Sequestering carbon in soils reduces carbon in the atmosphere

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Why is Biochar not being used in the Grand Valley?

- Biochar does not have the same benefits in all soils.
  - Our soil is alkali (high pH). So is some biochar.
- Biochar is
  - Expensive to purchase.
  - Depending on source it is expensive to make.
  - Safe volume production requires expensive equipment.
- Lack of solid research on the topics above and local information to farmers/other plant growers about potential benefits (to them!) means lack of demand.

4 qt jug, $25.95 on Amazon

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CCA Biochar project

- Small grant from Western Colorado Community Foundation/Dave and Mary Wood Fund
- Initial activity to research supply …
  - Where can we get biochar?
  - What does it cost?
  - What are some of the challenges to utilizing local plant byproducts
- And demand
  - Who might be interested in utilizing compost with biochar?
  - How much biochar is best to add to regular compost?
  - What are some potential benefits in the Grand Valley? To whom?

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Initial process

- Purchase small amounts of composts/biochar mix (10 and 20% biochar) from Olathe company
- Test chemical composition
  - At start of process
  - At end of process
- Apply to multiple small plots of vegetable gardens around the Valley (size to be determined)
  - 4 subplots, all with same mix of plants – no compost, compost only, compost with 10 % biochar, compost with 20% biochar
  - Record various statistics – planting dates, water applied, soil moisture, yields, etc.

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Volunteers needed!

- Volunteers who would be willing to manage a plot
- CCA provides
  - Compost mixes
  - Some measuring equipment
  - Initial soil test
- Volunteers provide
  - Water
  - Field labor
  - Recording of data in a standardized form
- Produce remains with volunteers or is donated to charity

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How to volunteer

- Contact Karen Sjoberg at

  citizensforcleanairgj@gmail.com

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- CSU research and extension staff
- Mesa County Organic Materials Composting Facility

For technical advice and biochar reference material.

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