

A close-up photograph of a pair of hands holding a small, vibrant green seedling with four leaves, growing out of a mound of dark, rich soil. The hands are positioned to cradle the soil and plant, with the fingers visible on the left and right sides. The background is a blurred, dark surface, likely more soil.

Biochar: A Brief Introduction

Katie Arledge

Photo courtesy of: <http://egenindustries.com/genesis-biochar-is-superior/>

What is Biochar?

-Biochar is the carbon-rich product of the thermal decomposition of biomass in anaerobic or nearly anaerobic conditions, i.e. pyrolysis.

-In pyrolysis, biomass is converted into a more stable, recalcitrant form referred to as biochar.

-A range of types of biomass can be used to create biochar, including forestry residues (e.g. woodchips, sawdust, and tree bark), dedicated bioenergy crops (e.g. grasses or willow coppicing), municipal wastes (e.g. yard and food waste), and agricultural wastes and residues (e.g. rice hulls and straw).

-The type of biomass and the specifics of the pyrolysis process (e.g. duration of pyrolysis, temperature) influence several properties of the resulting biochar, including organic content and physical structure.



Biochar Applications

Biochar can serve as:

- A fuel source, acting as a substitute for coal
- A soil amendment, acting as a carbon sink and potentially improving soil fertility (Glaser et al. 2002).

Application	Carbon Storage
Fuel Source	All of the carbon in biochar is immediately released; replaces fossil fuel use.
Soil Amendment	Carbon in biochar has a residency time of 100s to 1000s of years; carbon is removed from the global carbon cycle for duration.

Studies of biochar indicate variable residency times for biochar applied to soil, from 293 years (Hammes et al. 2008) to 9259 years (Lehmann et al. 2008). Part of this variability is likely due to the wide geographical distribution of study sites.

Because biochar removes carbon from the carbon cycle it could serve as a net-negative carbon sink.