

Biochar: A Bioenergy Product For Soils

DUANE FRIEND



SPRINGFIELD, ILL.

A byproduct of bio oil and syngas production may provide a huge benefit to poorer soils, especially for the sandy and timber soils in Illinois. This substance, called biochar, has improved some of the most nutrient-poor soils in the world.

Biochar is a high-carbon material created through low oxygen, low temperature combustion. This process is called pyrolysis. The production of bio oil or syngas from Miscanthus or other types of biomass creates this charcoal-type substance.

Using biochar as a soil amendment is not new. In fact, the practice has possibly been around for more than a thousand years. Locations in the Amazon have shown that ancient people made biochar and added it to the nutrient-poor soils, which helped them create a stable agricultural society. Called Terra preta, these amended soils are still highly productive hundreds of years after the material was applied.

Research has shown that when used as a soil

amendment, biochar increases cation exchange capacity, raises pH, attracts beneficial soil microbes and retains moisture. Because of its surface structure, biochar is also capable of adsorbing excess ammonium and phosphates, reducing the potential of these compounds getting into surface or groundwater supplies.

Biochar can also adsorb atrazine and simazine to a much greater extent than soil by itself. It appears that biochar contains a very stable form of carbon, created during pyrolysis. While organic matter quickly loses carbon during regular decomposition, biochar retains up to half of the original carbon content for decades or even centuries. This means that biochar can potentially store carbon in the soil for long periods of time, decreasing the amount of carbon dioxide going into the atmosphere.

More research is needed before producers look to use biochar as a soil amendment. Researchers still need to look at characteristics of biochar made from different types of biomass, what amounts are needed to make significant improvements in our soils, and how to manufacture biochar on a large scale. Δ

DUANE FRIEND: Extension Educator, Natural Resources Management, University of Illinois



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