



This research has allowed us to study the biodegradation of biochar and to initiate the development of a low-cost and user-friendly biochar producing system for farmers and the general public.

Biochar Technology and Its Potential for Sustainable Agriculture and Carbon Sequestration

Who cares and why?

Developing an agricultural system that is productive and sustainable is a major challenge today. Mitigating the anthropogenic increased atmospheric CO₂ and environmental pollution are also major concerns of our society. Finding an economic and ecological feasible solution to those major problems is certainly not an easy task. However, the development of biochar technology may provide a promising means that contribute to the solutions of those global problems. Biochar technology turns portion of the plant materials produced every year into a “charcoal” form and a soil amendment.

Biochar enhances soil water and nutrient holding capacity, reduces fertilizer use and its pollution to the environment. Moreover, biochar is much more resistant to microbial degradation than the original plant materials in a soil, which prevents the sequestered carbon from returning to the atmosphere (carbon sequestration). Biochar probably is the only viable technology so far that can significantly sequestered atmospheric carbon and mitigates the anthropogenic effect on climate change.

What has the project done so far?

- Developed a thermochemical method for biochar research, production and application.
- Developing a low-cost and user-friendly biochar producing system for farmers and the general public.
- Study biodegradation of biochar in soil using stable carbon isotopic tracer.
- Gained research experience in air quality that can be applied to the air quality issues of biochar production.



Impact Statement

Our study showed that biochar as a soil amendment can increase soil productivity and sequester carbon to various degrees depending on the properties of the biochar and the soil receiving the treatment.

Additional research is needed to fully realize the optimal use of the technology in various field conditions. We also initiated a design of a low-cost biochar production system that can facilitate the wide spread usage of the technology.

Our research, education and outreach efforts begin to show the benefits of biochar technology in enhancing agricultural productivity without increasing fertilizer use and in the meantime sequestering carbon from the atmosphere.

What research is needed?

We need to develop sensitive and practical analytical technology that is applicable to the biochar research, production and application. We

need to optimize the low-cost biochar production system that is efficient, versatile and user friendly.

Want to know more?

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Strategic Priority:
Agricultural Systems; Natural Resources and Environment

Additional Links:
<http://www.umes.edu/ard/Default.aspx?id=46285>

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