BRC Science Highlight
June 2018

The impacts of four potential bioenergy crops on soil carbon dynamics as shown by biomarker analyses and DRIFT spectroscopy

Background/objective

To elucidate the mechanisms of soil organic matter transformation and stabilization under four bioenergy crops with differing management strategies.




Approach

- Biomarkers and DRIFT spectroscopy were used to determine microbial contributions to soil carbon, degradation ability, and soil organic matter stability under four potential bioenergy crops: miscanthus (*M* x *giganteus)*, switchgrass (*Panicum virgatum* L.), corn-corn-soy rotation (*Zea mays* L., *Glycine max* (L.) Merr.) and mixed prairie.

Results

- Soil organic carbon concentrations increased by 10.6% in prairie over 6 years, and soil organic carbon storage increased by 17.0% in switchgrass and 15.6% in mixed prairie.
- Soil organic carbon stability was maintained under perennials and bacterial contributions to SOC were increased in miscanthus (20.0%) and switchgrass (15.0%).

Significance

- Microbial communities under miscanthus and switchgrass increased SOC quality, while SOC quantity increased under switchgrass and prairie, and all perennials maintained SOC stability.
- These findings increase the understanding of microbial control over soil carbon quality and quantity under agricultural land use change.

Zhu, X. et al., 2018. "The impacts of four potential bioenergy crops on soil carbon dynamics as shown by biomarker analyses and DRIFT spectroscopy." Global Change Biology Bioenergy, 10, 489-500, DOI: 10.1111.gcbb.12520.

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