

The contentious nature of soil organic matter

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The exchange of nutrients, energy and carbon between soil organic matter, the soil environment, aquatic systems and the atmosphere is important for agricultural productivity, water quality and climate. Long-standing theory suggests that soil organic matter is composed of inherently stable and chemically unique compounds. Here we argue that the available evidence does not support the formation of large-molecular-size and persistent 'humic substances' in soils. Instead, soil organic matter is a continuum of progressively decomposing organic compounds. We discuss implications of this view of the nature of soil organic matter for aquatic health, soil carbon-climate interactions and land management.

www.css.cornell.edu/faculty/lehmann/publications/index.html

Soil organic matter is a *continuum* of progressively decomposing organic compounds.

–Johannes Lehmann

** Biochar isn't a finished product.
It's a raw material that will be transformed in soil.*

Soil fertility goals

- Our primary goal for soil fertility is to create as many functional groups as possible ...
- Which implies we need to leave as much oxygen and hydrogen in the char as we can.
- Focusing on char stability during production may be misplaced. Soil environmental factors may be more effective to ensure long-term stability, such as the clay found in terra preta soils.
- A focus on the “supply side” of the carbon cycle, ensuring optimal drawdown of CO₂ using affordable means to add carbon to soil and retain it there that results in a very widespread change in agricultural land use practice may be *much* more effective.

Rotary kilns

- Heat is distributed to the feedstock particles by turning them in a large cylinder, like a cement mixer.
- Most rotary kilns are indirectly heated.



Edward Someus 3R Agro Carbon