Glomalin is a major and unrepresented pool of soil organic carbon. (S05-nichols162630-Oral)

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Abstract:

Humic acid (HA), fulvic acid (FA), humin and particulate organic matter (POM) traditionally comprise the majority of soil C. With long turnover times and high C concentrations, humic substances are important to long-term C sequestration, and with POM appear to contribute to the formation and stability of soil aggregates. A recently identified glycoprotein produced on hyphae of arbuscular mycorrhizal fungi, glomalin, is abundant in soils (typically from 4480 to 31360 kg per ha) and on the surface of water stable aggregates throughout the world. POM, HA, FA, and glomalin were extracted from undisturbed soils in the U.S. and from agricultural soils under different management conditions. Carbon within each extract and the unextractable humin were compared. Glomalin represented 27% of the C in the undisturbed soil (48% was co-extracted with HA, 44% in humin and 8% in the POM fraction). In agricultural soils, glomalin was 9% of the C compared to 6% in HA, 1% in FA, and 3% in POM. Glomalin has a decadal turnover and represents a large C sink, especially in undisturbed soils. Glomalin strongly correlates with aggregate stability, which amplifies its contribution to C sequestration.

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