Carbon Composition of Soil Humic, Fulvic and Humin Fractions. (S03-martens125240-Oral)

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Abstract:

Fractionation of soil C into operational pools such as humic (HA) and fulvic (FA) acids and insoluble humin (Hu) has been a research tool for more than 200 yrs. Yet, we have not identified the soil C composition or the C in HA and FA fractions. HA and FA were extracted from a native prairie soil and two cropped soils on the same Webster map unit with 0.2 M NaOH (twice) and the purified fractions were dialyzed and freeze-dried. The remaining soil (Hu) was washed free of alkalinity. The fractions were subjected to total C and N, stable isotope content, pyrolysis-GCMS, 14C dating and extraction with ion and gas chromatography techniques. Analyzes found that 85% of the C and 74% of the N remained in the Hu fraction with an average FA, HA and Hu recovery of 104% C and 102% N compared with the whole soil C and N. Up to 67% of the HA-N and 64% of the FA-N were recovered as amino acids (AAs) with traditional extraction and ion chromatography. Nearly 40% of the FA-C was identified as carbohydrate- and AA-C and 20% of the HA-C was identified in these fractions. Few fatty acids (FAME) were removed by the NaOH extraction and the FAs remained in the Hu fraction. The HA contained the soil phenolic acid (PAs) fraction and few FAME. The high recovery of FA- and HA-N as AAs, the occurrence of PAs of plant origin in the HA and the failure to extract soil FAME suggests that the HA and FAs are mixtures of microbial and plant compounds and may merely reflect the solubility of soil organic C fractions, not a discrete polymeric C entity.

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