Formation and Extraction of Fumigant Residues in Soil. (S11-guo185533-Oral)

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Abstract:

Fumigants are commonly thought short-lived in soil due to their high volatility, weak sorptivity and easy degradability. However, residues were found in field soils years following application, implicating ground water pollution risks. In this study, formation and extraction of soil fumigant residues were investigated. Fumigants 1,3-chloropropene , chloropicrin and methyl isothiocyanate were spiked into Arlington (coarse-loamy Durixeralfs), Glenelg (fine-loamy Hapludults), and Hagerstown (fine Hapludalfs) soils and incubated under different conditions. The incubated soils were evaporated for 20 hr prior to extraction. Extraction with acetonitrile in sealed vials at 80C for 24 hr was most efficient for soil fumigant residues. Soil moisture and temperature influenced residue formation. The residual amount increased with application rate, correlated with soil silt content, decreased dramatically as indigenous organic matter (OM) was removed, and changed little with external OM addition. Adsorption to clay surfaces was not important. The results suggest that fumigant residues are retained in soil intra-aggregate micropores resulting from binding clay flocs and silt particles by humus.

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