Minimizing Soil Fumigant Off Gassing by Using a Soil Surface Water Seal. (3504)

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Abstract:

Metam sodium (MS; Sodium N-methyl dithiocarbamate) has been identified as a promising alternative chemical to replace methyl bromide (MeBr) in soil pre-plant fumigation. One of the degradation products of metam sodium in soil is the volatile gas methyl isothiocyanate (MITC) that controls soil-borne pests. Inconsistent efficacy of MS indicates a need to determine cultural practices that promote more efficient use of MS and increase pest-control efficacy. Sealing the soil surface with water after MS application may be a sound method to reduce rapid off-gassing loss of MITC from the soil and increase the time necessary for MITC to control pests. The objective of this research was to determine a soil surface water application amount that would best limit off-gassing rate of MITC. Orelia fine sandy loam (fine-loamy, mixed, hyperthermic Typic Ochraqualfs) was packed into steel soil columns and MS was applied at 15 cm depth and additional water (0.0, 1.3, 2.5, and 3.8 cm) was applied to the soil surface immediately following MS application to simulate irrigation and create a water seal at the soil surface. Activated charcoal was used to collect chemical off-gassing from the top of the sealed soil columns. Off-gassing rate was consistently reduced with increasing water seal application. The application of a 2.5-3.8 cm water seal provided significantly lower (275-376% decrease) total fumigant loss compared to no water seal.

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