

Reducing Toxin Exposure for Workers in Western Agriculture: Development of Sustainable Alternatives to Soil Fumigation

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Problem: Many conventional soil fumigants used to protect crops in Western agriculture have been identified as being toxic and/or carcinogenic.

Project Overview: Biosolarization is a potential alternative to toxic soil fumigation and is less damaging to health and the environment. Instead of toxic conventional pesticides, biosolarization uses solar heating and microbial activity to create soil conditions that are lethal to many pests but safe for humans. This project tests whether biosolarization is an effective fumigation substitute in the context of western agriculture, which entails controlling major western agricultural soil pests in western specialty crops.

Progress to date: Experiments were conducted to examine biosolarization in the context of the California almond industry, which accounts for nearly all of the nation's almond production. When almond processing residues, such as hulls and shells, were amended into the soil to trigger microbial activity, various organic acids accumulated in the biosolarized orchard soils, which were shown to inactivate plant parasitic nematodes. These acids are generally far less toxic than conventional fumigants, which benefits orchard workers, neighboring communities, and the environment.

Anticipated Project Outputs: Project results will provide growers with information on the efficacy, safety, and health benefits of biosolarization and how to adopt biosolarization as an alternative to conventional soil fumigation.

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