

## **Weed Seed Inactivation Using Biosolarization with Mature Greenwaste**

**Compost and Tomato Pomace Amendments.** Y. Achmon\*<sup>1,2</sup>, J. Fernández-Bayo<sup>1,2</sup>, K. Hernandez<sup>3,4</sup>, D. McCurry<sup>3</sup>, D. Harrold<sup>2</sup>, J. Su<sup>1</sup>, R. Dahlquist-Willard<sup>3</sup>, J. Stapleton<sup>5</sup>, J. VanderGheynst<sup>2</sup>, C. Simmons<sup>1</sup>. <sup>1</sup>Food Science and Technology and Biological and Agricultural Engineering Departments, University of California, Davis, CA, USA, <sup>3</sup>University of California Cooperative Extension, Fresno County, CA, USA, <sup>4</sup>School of Natural Sciences, Fresno Pacific University, Fresno, CA, USA, <sup>5</sup>Statewide Integrated Pest Management Program, University of California, Kearney Agricultural Research and Extension Center, Parlier, CA, USA.

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Biosolarization is a fumigation alternative that combines passive solar heating with amendment-driven soil microbial activity to temporarily create antagonistic soil conditions, such as elevated temperature and acidity, that can inactivate weed seeds and other pest propagules. A potential advantage of biosolarization over soil solarization without amendments is increased biocidal activity, which can shorten treatment time and allow usage in marginal climatic areas or during less favorable weather conditions. The aim of this study was to employ a mesocosm-based field trial to assess and compare soil heating, pH, volatile fatty acid amendment, or soil amendment without solarization. Biosolarization for 8 days using 2% mature greenwaste compost and 2 or 5% tomato pomace (processing residues) in the soil resulted in accumulation of volatile fatty acids in the soil, particularly acetic acid, and >95% inactivation of black mustard (*Brassica nigra*) and black nightshade (*Solanum nigrum*) seeds. Inactivation kinetics data showed that near complete weed seed inactivation in soil was achieved within the first 5 days of biosolarization. This was significantly greater than the inactivation achieved in control soils that were solarized without amendment, or were amended but not solarized. The composition and concentration of the organic amendments in soil significantly affected volatile fatty acid accumulation at various soil depths during biosolarization. Combining soil solarization with the selected organic matter amendments resulted in accelerated weed seed inactivation, compared with either treatment alone. The exploitation of agri-food wastes can be useful in sustainable soil pest management treatments, and in waste management cost reduction efforts. REFERENCE: Achmon, Y. et al., 2016. Pest Management Science, 10 AUG 2016, DOI: 10.1002/ps.4354. Online: <http://onlinelibrary.wiley.com/doi/10.1002/ps.4354/full>