# The Intersection of Nutrient Availability and Produce Safety on Timing Organic Amendments

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**Objectives:**

- Establish a non-bearing orchard research site
- Measure changes of soil nutrient content from different sources of organic matter (OM) amendments
- Determine decomposition rates of OM amendments
- Test the effect of mulching different sources of OM on soil moisture
- Monitor OM amendments for human pathogens

## PROJECT SUMMARY

Use of conventional fertilizers for nitrogen (N), phosphorus (P), and potassium (K) nutrition results in improves agronomic performance but, also comes with important economic and environmental costs. Food safe integrated nutrient management of organic matter amendments offers an option to supplement conventional fertilizers. We examined the effects of composted manure and green waste on nutrient availability, soil moisture, and *human* pathogen persistence under root exclusion in a non-bearing orchard in the San Joaquin Valley. OM amendments contain readily available P and K nutrients that may be able to act as a substitute for conventional fertilizers and savings for growers.

## Background and Discussion:

During 2015, we established a research trial in a non-bearing almond orchard outside of Escalon, CA in San Joaquin County. We designed a randomized complete block trial to compare composted manure from a local dairy farmer and green waste compost from Recology applied as mulch in early April. Chemical characterization of OM amendments was conducted prior to application. A total of 48 soil core-IER units were deployed on March 26th 2015 and will remain in the field until October 2015.

Changes in mass loss from organic matter amendments were not significantly difference. After four months, 45% of the initial mass of the green waste compost remained compared to 53% of the composted manure. Significant differences in soil moisture were detected during late April and early May between green waste compost and the control. As the OM amendments decomposed during the growing season any differences in soil moisture were no longer significant.

Throughout the growing season total inorganic N adsorbed to the surfaces of resin membranes in the top soil (0 – 10 cm) were not significantly different. The higher inputs of $PO_4^{3-}$ and $K^+$ from the composted manure and green waste compost resulted in significantly greater adsorption to resin membranes compared to the control for most sampling dates.

Samples of composted manure and green waste sent to USDA-ARS in Albany, CA tested negative for human pathogens including *Salmonella enterica*, *Escherichia coli* O157:H7, and *Listeria monocytogenes*.

**Project Cooperators and Personnel:** Asmeret A. Berhe, Teamrat A. Ghezzehei, Stephen C. Hart, UC Merced; Jeffery A. McGarvey, USDA; Ruyang Han, David R. Smart, UC Davis

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- Poster location 57 Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at Almonds.com/ResearchDatabase
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