Compost Amendment for Co-Management

O'AHU RESOURCE CONSERVATION & DEVELOPMENT COUNCIL

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COOPERATIVE EXTENSION
UNIVERSITY OF HAWAI'I AT MANOA

Co-management:
Refers to managing farms and their surrounding environments such that multiple goals are achieved: natural resource conservation *and* food safety.

Co-management practices:
Refers to those *best management practices* (BMPs) which meet objectives in both natural resource conservation and food safety.

Compost Amendment: Application of decayed organic carbon-rich material with many microbiological, structural, and fertility benefits for soil.

Soil from an organic farm in Waianae, Oahu

How does compost help?

Compost amendments improve soil health and soil biodiversity, helping to encourage microbial diversity and competition that suppress pathogens. Compost can improve soil structure, leading to increased infiltration of water and reduce the risk of potentially contaminated runoff or irrigated water to come in contact with produce.

Functions

- ➔ Increased microbial biodiversity
- ➔ Improved soil structure
- ➔ Increased water holding capacity
- ➔ Increased available nutrients

Best use: *Good for farms that need to improve soil health and function.*

Benefits

...to food safety

- Balancing/suppressing populations of human pathogens

....to conservation

- Building soil carbon and health
- Improved drought resistance
- Improved nutrient availability

Practicality

the pros

- Reduced need for fertilizer
- Compost tea is convenient to add into drip irrigation
- Long term benefits, requiring infrequent application in subsequent years

the cons

- May be too expensive/labor intensive for large scale operations
- Using an unfinished compost or improper application can pose food safety risk

Literature Summary

- *E. coli* O157:H7 growth in compost was negatively correlated with higher indigenous microorganism populations (Kim et al. 2011).
- Pathogens did not survive in stabilized compost with high indigenous microorganism populations, compared with sterilized compost (Paniel et al. 2010).
- Higher soil organic matter and moisture content, soil microbial diversity, and lower soil pH suppress *E. coli* abundance in the soil (Williams et al. 2015; Xing et al. 2019).

References

Kim, J., C. Miller, M. Shephard, X. Liu, and X. Jiang. 2011. Impact of indigenous microorganisms on *Escherichia coli* O157:H7 growth in cured compost. Bioresource Technology 102: 9619–25.

Paniel, N., Rousseaux, S., Gourland, P., Poitrenaud, M., and J. Guzzo. 2010. Assessment of survival of *Listeria monocytogenes*, *Salmonella Infantis* and *Enterococcus faecalis* artificially inoculated into experimental waste or compost. Journal of applied microbiology, 108(5), 1797-1809.

Williams, M., LeJeune, J. T., and B.M. Gardener. 2015. Soil conditions that can alter natural suppression of *Escherichia coli* O157:H7 in Ohio Specialty Crop Soils. Applied and environmental microbiology, 81(14), 4634-4641.

Xing, J., Wang, H., Brookes, P. C., Salles, J. F., and J. Xu. 2019. Soil pH and microbial diversity constrain the survival of *E. coli* in soil. Soil Biology and Biochemistry, 128, 139-149.

Resources

1. Learn more about co-management: Wild Farm Alliance: Food safety and Conservation Resources
2. Learn more about food safety: Roots FSMA Guide & Produce Safety Alliance
3. Learn more about conservation practices and on-farm assistance opportunities: Oahu RC&D & CTAHR Extension

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