

Potential of compost tea for suppressing plant diseases

Chaney C.G. St. Martin*

Address: Department of Life Sciences, The University of the West Indies, St. Augustine, Republic of Trinidad and Tobago

***Correspondence:** Chaney C.G. St. Martin. Email: cstmartin@hotmail.com

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Abstract

Numerous studies have demonstrated that water-based compost preparations, referred to as compost tea and compost-water extract, can suppress phytopathogens and plant diseases. Despite its potential, compost tea has generally been considered as inadequate for use as a biocontrol agent in conventional cropping systems but important to organic producers who have limited disease control options. The major impediments to the use of compost tea have been the less-than-desirable and inconsistent levels of plant disease suppression as influenced by compost tea production and application factors including compost source and maturity, brewing time and aeration, dilution and application rate and application frequency. Although the mechanisms involved in disease suppression are not fully understood, sterilization of compost tea has generally resulted in a loss in disease suppressiveness. This indicates that the mechanisms of suppression are often, or predominantly, biological, although physico-chemical factors have also been implicated. Increasing the use of molecular approaches, such as metagenomics, metaproteomics, metatranscriptomics and metaproteogenomics should prove useful in better understanding the relationships between microbial abundance, diversity, functions and disease suppressive efficacy of compost tea. Such investigations are crucial in developing protocols for optimizing the compost tea production process so as to maximize disease suppressive effect without exposing the manufacturer or user to the risk of human pathogens. To this end, it is recommended that compost tea be used as part of an integrated disease management system.

Keywords: Compost, Biocontrol agent, Pathogens, Molecular tools, Metagenomics