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Urban desert soil bioinformatic survey and biomarker validation

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One teaspoon of healthy soil contains 100 million to 1 billion bacteria, fungi, nematodes and other microorganisms. These microorganisms sequester nutrients and carbon for plants and soils with thriving complex, dynamic community structures that occur at the root zone and throughout the soil. When compost is added to a soil, it provides a burst of beneficial microorganism, nutrients and organic matter than can augment a poor or non-arable urban soil. Traditionally, we have measured soil and compost quality with chemical and physical parameters, while only recently applying biological and molecular methods to look at microbial communities and their relationship in building soil health. Recent studies have developed compost and soil biological indices of soil health using 16S rDNA pyrosequencing and principal component statistical analyses to look at compost and forest soils studies of other ecoregions, like deserts and grasslands are needed to validate these biological indices of soil microbial health. The City of Phoenix is currently studying the impact compost to desert soils and turf grasses at eight City parks with an objective of measuring beneficial microbial, nutrient and organic matter growth in soils and turf with compost application over two-years. Compost made from city yard waste and food scraps is applied with varied frequency (spring and fall) and application rates (1/2" or 1") to parks with diverse soils, grass and water sources. In collaboration with the Global Sustainability Solutions Services, a program of the Walton Sustainability Solutions Initiatives at Arizona State University and the ASU Biodesign Institute, bioinformatic indices developed previously in Northeastern forest soils will be applied and modified accordingly for desert soil and environmental conditions. Initial findings will be presented for microbial community dynamics measured in the first year and compared with indices in composts and soils made from non-desert regions.

Biography

Emily Viau has completed her PhD in Environmental Engineering at Yale University and Postdoctoral studies from Stanford University. She is the Founder and Director of Fresh Recycling Inc., a premier biotechnology R&D service firm dedicated to streamlining city development of organic recycling and bioenergy production systems. She has completed BSE and MS in Civil Engineering from Arizona State University, USA. She has published 13 papers in peer-review journals and currently serves as a Professor of Microbiology and Earth and Space Science at Grand Canyon University.

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