

Public Abstract

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Title:Effects of a Consortia Probiotic Inoculant on Soil Microorganisms and Impacts on Autoinducers Employed in Quorum Sensing

Disease control in plant agriculture is largely achieved through application of various antimicrobials. Manipulation of indigenous soil microbial communities received attention as it promises improved pathogen control and enhanced plant outputs. Another promising tool in disease control is disrupting quorum sensing (QS)-controlled pathogenicity expression. In this work, efficacies of a consortia probiotic soil amendment (CP) were evaluated: (1) impact on soil microbial diversity; (2) capacity to degrade autoinducers involved in QS in soil-borne pathogens. The first efficacy was assayed in Central Missouri during growing season of 2012. Soils under two management situations were studied: cultivated soil and restored grassland. Samples from cultivated soils were also studied under environmentally controlled conditions. Analysis of soil microbial community diversity was carried out with 16s rDNA PCR DGGE. To evaluate the second efficacy, two autoinducers were incubated in a controlled, triplicated study. Pre- and post-incubation autoinducer concentrations were verified using GC-MS. Under field conditions, CP was found to produce no impact (beneficial or adverse) on soil microbial community diversity. Under controlled conditions, depending on particular treatment, CP had no impact on soil microbial diversity or enhanced it. The CP studied was capable of degrading one of two autoinducers, however the capacity varied and it apparently depended on CP batch or storage conditions. Results suggest that CP studied has benign profile against soil microbial communities and under certain circumstances may enhance community diversity. Furthermore, by disrupting QS autoinducers, CP revealed the potential to control pathogenicity. Future studies are required to fully evaluate CP impacts on agricultural produce.