Microbiome and Transcriptome Analysis of Probiotic Bacteria against Plant Pathogens

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Plants are exposed to various biotic and abiotic stresses due to climatic changing conditions. These stressful conditions induce changes in microbiome and transcriptome, resulting in changes in the plant-associated microbial community. The introduction of probiotic bacteria represents a promising solution to recover the microbiome that exhibits beneficial traits directly related to enhancing plant growth and productivity. The probiotic strains are associated with rhizosphere microbiome, nutrient mineralization, hormone co-regulation, and pathogen suppression. These beneficial bacteria could increase in abundance to compete for resources and space using bio-arms such as antimicrobial compounds and quorum-sensing quenching molecules, which inhibit pathogen growth and virulence. The mechanisms for phytopathogen regulation are still unknown, and therefore more research is required to understand the virulence and pathogenicity. This research is an effort to understand the basic molecular mechanism by which probiotics can resist plant pathogenic bacteria in the development of diseases. The study also amalgamates an emerging approach of transcriptomics to further understand host-pathogen immune interactions, quantify gene expression changes, and track disease progression. Together, we provide a novel approach to elucidate the possible mechanism and functional implications of genes in disease resistance.

Keywords: bacterial genomics; mechanism of action; probiotic bacteria; pathogenic bacteria; quorum sensing; transcriptomics.

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