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BIOCHEMICAL ANALYSIS OF *BACILLUS THURINGIENSIS* ISOLATE IMC 8 IN PLANT DISEASE PROTECTION AND GROWTH PROMOTION IN TOMATO.

Abstract

Bacillus thuringiensis isolate IMC 8 is an endophytic bacteria that grows inside plants without causing harm or any external symptoms on colonized plants. Previous studies have shown that this endophyte protect plant from diseases and significantly suppress plant infection from *Phytophthora capsici*. Plant growth-promoting rhizobacteria constitute an important component of biological control agents (BCA) for plant disease management to reduce synthetic pesticide inputs in crop production systems. The objective of this study was to (i) evaluate the effects of bacterial endophyte IMC8 on tomato growth in growth chamber, (ii)) analyze volatile compounds produced by the IMC 8 bacteria alone and in the presence of the *P. capsici* pathogen and, (iii) Evaluate the effect of IMC8 on plant growth in greenhouse environment. Volatile compounds produced by the IMC 8 bacteria significantly increased plant growth when container-grown plants were nested above bacterial cultures, and roots were exposed to the volatiles without direct contact between bacterial cells and the plant roots. Observations of this study indicated that volatiles were involved in promoting plant growth in height, root length, weight and chlorophyll content. Electronic Nose (E-Nose) that uses Gas Chromatography technology was used for the collection and analysis of microbe-emitted volatiles to detect chemical compounds produced by the endophyte IMC 8 bacteria alone and in the presence of the *P. capsici* pathogen. This study analyzed volatile chemical compounds emitted by IMC8 bacterial endophyte and by *P. capsici* pathogen. The chemical profiles of volatile compounds showed that some compounds detected from the pathogen were no longer detected in the presence of the IMC8 bacteria, and some new compounds were emitted by the combination of IMC8 and the pathogen. Although the function of the detected compounds have not been analyzed, the observations on eliminated compounds from the pathogen and new compounds from IMC8 and the pathogen interactions suggested that volatile chemical compounds in the IMC8 endophyte and *P. capsici* pathogen interactions may be involved in *P. capsici* pathogenesis and plant defense triggered by the IMC8 endophyte. Continuation of the study is needed on the role of the biochemical compounds in promoting plant growth and in boosting plant defense and protection against

P. capsici pathogen.