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Molecular Implication of Interaction of Human Enteric Pathogens with Phylloplane of Tomato

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Abstract : Cultivation and consumption of organically grown fruits and vegetables have increased by several folds. However, the presence of Human Enteric Pathogens on the surface of organically grown vegetables causing Gastro-intestinal diseases, are most likely due to contaminated water and fecal matter of farm animals. Human Enteric Pathogens are adapted to colonize the human gut, and also colonize plant surface. Microbes on plant surface communicate with each other to establish quorum sensing. The cross talk study is important because the enteric pathogens on phylloplane have been reported to mask the beneficial resident bacteria of plant. In the present study, HEPs and bacterial colonizers were identified using 16s rRNA sequencing. Microbial colonization patterns after interaction between Human Enteric Pathogens and natural bacterial residents on tomato phylloplane was studied. Tomato plants raised under aseptic conditions were inoculated with a mixture of Serratia fonticola and Klebsiella pneumoniae. The molecules involved in cross-talk between Human Enteric Pathogens and regular bacterial colonizers were isolated and identified using molecular techniques and HPLC. The colonization pattern was studied by leaf imprint method after 48 hours of incubation. The associated protein-protein interaction in the host cytoplasm was studied by use of crosslinkers. From treated leaves the crosstalk molecules and interaction proteins were separated on 1D SDS-PAGE and analyzed by MALDI-TOF-TOF analysis. The study is critical in understanding the molecular aspects of HEP's adaption to phylloplane. The study revealed human enteric pathogens aggressively interact among themselves and resident bacteria. HEPs induced establishment of a signaling cascade through protein-protein interaction in the host cytoplasm. The study revealed that the adaptation of Human Enteric Pathogens on phylloplane of Solanum lycopersicum involves the establishment of complex molecular interaction between the microbe and the host including microbe-microbe interaction leading to an establishment of quorum sensing. The outcome will help in minimizing the HEP load on fresh farm produce, thereby curtailing incidences of food-borne diseases.

Keywords : crosslinkers, human enteric pathogens (HEPs), phylloplane, quorum sensing
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