World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:11, No:06, 2017

Proteomics Associated with Colonization of Human Enteric Pathogen on Solanum lycopersicum

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Abstract : The aerial surface of plants colonized by Human Enteric Pathogens ()has been implicated in outbreaks of enteric diseases in humans. Practice of organic farming primarily using animal dung as manure and sewage water for irrigation are the most significant source of enteric pathogens on the surface of leaves, fruits and vegetables. The present work aims to have an insight into the molecular mechanism of interaction of Human Enteric Pathogens or their metabolites with cell wall receptors in plants. Tomato plants grown under aseptic conditions at 12 hours L/D photoperiod, 25±1°C and 75% RH were inoculated individually with S. fonticola and K. pneumonia. The leaves from treated plants were sampled after 24 and 48 hours of incubation. The cell wall and cytoplasmic proteins were extracted and isocratically separated on 1D SDS-PAGE. The sampled leaves were also subjected to formaldehyde treatment prior to isolation of cytoplasmic proteins to study protein-protein interactions induced by Human Enteric Pathogens. Protein bands extracted from the gel were subjected to MALDI-TOF-TOF MS analysis. The foremost interaction of Human Enteric Pathogens on the plant surface was found to be cell wall bound receptors which possibly set ups a wave a critical protein-protein interaction in cytoplasm. The study revealed the expression and suppression of specific cytoplasmic and cell wall-bound proteins, some of them being important components of signaling pathways. The results also demonstrated HEP induced rearrangement of signaling pathways which possibly are crucial for adaptation of these pathogens to plant surface. At the end of the study, it can be concluded that controlling the over-expression or suppression of these specific proteins rearrange the signaling pathway thus reduces the outbreaks of food-borne illness.

Keywords : cytoplasmic protein, cell wall-bound protein, Human Enteric Pathogen (HEP), protein-protein interaction
Conference Title : ICPB 2017 : International Conference on Plant Biology
Conference Location : Vienna, Austria
Conference Dates : June 21-22, 2017