

EFFECT OF INFECTION BY MILD VARIANT OF POTATO SPINDLE TUBER VIROID ON METABOLIC PROFILES OF TOMATO CULTIVAR 'RUGERS'^{*}

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Abstract

Viroids, the smallest known pathogens, consist of small circular single-stranded RNA with non-coding genome but having autonomous replication in their plant hosts. Despite many studies, the mechanism of viroid pathogenesis has still remained unclear. Recently, studying the effects of viroid infection on host gene expression utilizing cDNA microarrays have yielded only a low-resolution snapshot of viroid-host interaction. In the present study, the metabolic profile of susceptible tomato cultivar 'Rutgers' infected by mild variant of PSTVd was compared with those of mock inoculated plants. Three terminal leaflets of the third true leaf of tomato were mechanically inoculated with PSTVd cDNAs and samples were taken from eighth leaf, 19 days post inoculation. Metabolites were extracted, identified and quantified with GC/MS and subjected to statistical analyses. Results showed that 40 unique metabolites showed significant difference over their controls at $P \leq 0.05$, which was brought about by changes in 14 metabolic pathways. The affected pathways in PSTVd infected leaves of tomato included five cutin and wax biosynthesis pathways, four pathways that produce defense related compounds, three hormone biosynthesis pathways, an energy generator pathway, and a chlorophyll degradation pathway. As host plant responses to viroid infection are complicated, employing metabolomics approach, viroid-host interaction was studied and changes in biochemical pathways of plant discussed.

Keywords: Potato spindle tuber viroid, Gas chromatography/mass spectrometry, Metabolomic profiling, Plant-pathogen interaction

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