Tropentag, September 14-16, 2010, Zurich

"World Food System —
A Contribution from Europe"

Induction of Defense Related Enzymes and Gene Expression after Resistance Induction by Rhizobacteria and Silicon against *Ralstonia solanacearum* in Tomato (*Solanum lycopersicum*)

Kerstin Wydra[1], Henok Kurabachew[2]

[1] *Centre for Tropical and Subtropical Agriculture and Forestry (CeTSAF) - Tropenzentrum, Georg-August Universität Göttingen, Germany*

[2] *Leibniz Universität Hannover, Institute of Plant Disease and Plant Protection, Germany*

Abstract

Bacterial wilt caused by *Ralstonia solanacearum* is one of the most destructive diseases in tomato production. Silicon and rhizobacteria were tested in single and simultaneous application to elicit active defense responses in tomato against this pathogen. Individual application of silicon and rhizobacteria significantly reduced bacterial wilt incidence by 50.7 and 26.8 % in KK2 (moderately resistant) and in L390 (susceptible) genotypes with silicon amendment, and by 31.1, and 22.2 %, respectively, after rhizobacteria application, compared to the pathogen inoculated control. The elicitors also reduced bacterial populations in the mid-stem of tomato but the dual application of the two elicitors did not. In addition application of the individual elicitor increased the shoot dry weight in non-pathogen inoculated treatment in both genotypes. Up on inoculation the pathogen shoot dry weight was significantly reduced but showed a slight increment when each elicitor was amended in pathogen inoculated tomato plants (elicitor + pathogen). Silicon amendment significantly increased the silicon content in the root of both genotypes but not in the stem, which is typical for silicon non-accumulator plant. Non-significant increases of peroxidase (POD) and phenylalanine ammonia lyase (PAL) activity were observed in the individual treatments of silicon and rhizobacteria upon inoculation with *R. solanacearum*, while the activity of lipoxygenase (LOX) was significantly decreased in the pathogen inoculated silicon amended, but increased in the rhizobacteria treatment. In simultaneous application of silicon-rhizobacteria, the activity of the three enzymes significantly dropped. To elucidate the molecular mechanisms underlying silicon-rhizobacteria mediated induced resistance, first results of transcriptome analysis of up and down regulated genes will be presented.

Keywords: Lipoxygenase, peroxidase, phenylalanine ammonia lyase, rhizobacteria, transcriptome, tomato

Contact Address: Henok Kurabachew, Leibniz Universität Hannover, Institute of Plant Disease and Plant Protection, Dorotheen Straße 5a Zimmer Nummer 416, D-30419 Hannover, Germany, e-mail: kurabachew@ipp.uni-hannover.de