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Vitamin B mediated priming of disease resistance and defense responses to tobacco mosaic virus in *Capsicum annuum* L. plants

Zenab Aly Torky Ain Shams University, Egypt

Thiamin (B1) and riboflavin (B2) can act as activators and priming factors of defense mechanisms for Tobacco Mosaic Virus (TMV) infection in *Capsicum annuum* plants. Effect of exogenous application of each vitamin on *C. annuum* leaves was demonstrated to induce defense responses and systemic resistance against TMV in the untreated parts of the plant. A concentration ranging from 0.25 to 15 mM was used of both vitamins and caused 70% of inhibition of TMV for thiamin at concentration 4 mM and 64.1% of inhibition of TMV for riboflavin at concentration 2 mM, when applied just before virus inoculation. The induction of disease resistance and reduction of virus infectivity in *C. annuum* leaves as indicated by virus concentration was determined by indirect ELISA and local lesion host plant assay. There is a difference in effective concentration of both vitamins which showed different percentage of inhibition with the different concentrations used. When mixing the two vitamins each at its own effective concentration, it was found that there is a synergetic effect on TMV disease reduction. To investigate the defensive enzymes responsible for the induction of resistance, the levels of Phenylalanine ammonia-lyase (PAL), Polyphenol Oxidase (PPO) and Peroxidase (POD) were examined by specific enzyme assay for each one and the accumulation of the enzymes was detected 0 to 20 days after treating with the vitamins. Also, the up-regulation and expression of the defense genes POD, PPO, PAL and some of the pathogenesis related proteins, PR4, PR9 and PR10 were studied by reverse transcriptase polymerase chain reaction (RT-PCR). Application of vitamins B1 and B2 significantly increased the activities of some of the pathogenesis related enzymes and genes. The possible correlation between timing of application of elicitors and expression of defensive genes were also studied.

Biography

Zenab Aly Torky is an Assistant Professor of Microbiology in the Department of Microbiology, Faculty of Science, Ain Shams University in Egypt. She has also worked as a Visiting Scientist in the Department of Biological Sciences, University of Louisville, USA. She has reviewed and edited many papers for the *Food Safety Journal*.

zenabaly72@yahoo.com

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