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Influence of viral suppressor expression on the activity of molybdoenzymes

Ilyasova B.*, Akbassova A., Zhangazin S., Tleukulova Zh., Iksat N., Dildabek A., Stamgaliyeva Z., Masalimov Zh., Omarov R.
L.N. Gumilyov Eurasian National University, Nur-Sultan, Kazakhstan
** e-mail: bayansulu.ilyasova@gmail.com*

The study of molecular interactions between plants and pathogens of paramount importance in creating methodological approaches to increase crop productivity. Currently, there are a large number of viruses that infect most plants. The TBSV virus is an effective and convenient model in studying the molecular interactions of plants and viruses. The P19 suppressor protein, encoded by the TBSV genome, protects the viral genomic RNA by binding small interfering RNA duplexes, thereby blocking RNA interference at the initial stage of infection. Systemic infection and the development of symptoms is inextricably linked to the level of P19 accumulation in the plant. The aim of our research is to study the effect of a suppressor protein expression on the activity of molybdoenzymes. These enzymes play an important function in plant metabolism and involved in resistance mechanisms to biotic and abiotic factors. Xanthin dehydrogenase plays a significant role in the metabolism of N-heterocyclic compounds. Plant aldehyde oxidase is a key enzyme in the synthesis of abscisic acid. Recent studies indicate the important role of this enzyme in the activation of an oxidative explosion in response to a viral pathogen. In the experiments were used the wild type TBSV virus and its suppressor-defective mutant ΔP19 TBSV. Plants inoculated with ΔP19 TBSV RNA mutant transcripts succumb to systemic necrosis and show moderate signs of viral infection. This phenomenon is explained by the inability of ΔP19 TBSV to express a viral protein, a suppressor of RNA interference P19. P19 is able to isolate both siRNAs and miRNAs, causing morphological disturbances in plant growth. Using the suppressor-defective mutant of the TBSV virus, we have shown the key role of the P19 protein in the activation of aldehyde oxidase isoforms. The multifunctional role of the viral suppressor in the activation of plant defense systems is discussed.