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Effect of Anthelmintics on Antioxidant Enzymes in Arabidopsis Thaliana

Radka Podlipná¹, Eliška Syslová^{1,2}, Markéta Hanulíková², Lucie Raisová Stuchlíková², Barbora Szotáková², Lenka Skálová²

¹Laboratory of Plant Biotechnologies, Institute of Experimental Botany, Czech Academy of Sciences Rozvojová 263, Praha 6, Czech Republic

²Department of Biochemical Sciences, Faculty of Pharmacy in Hradec Králové, Charles University in Prague Heyrovského 1203, Hradec Králové, Czech Republic podlipna@ueb.cas.cz; lenka.skalova@faf.cuni.cz

Extended Abstract

Veterinary drugs have potential to enter the environment and cause adverse ecological or human health effects. Although the health-risk assessment of these pharmaceutical compounds regarding their toxicity has been studied for a long time, little is known about the ecotoxicological effects on non-target organisms. Since veterinary drugs, as biologically active compounds, are designed to interact with a target molecule in the animal, in the environment they may affect other organisms having the same target or they can exert toxicity via other mechanisms [1].

In our project we focused on the changes in plant antioxidant system after contact with veterinary anthelmintics. We used *in vitro* suspension cultures of thale cress (*Arabidopsis thaliana*) as model system. Cell suspensions were incubated with anthelmintics monepantel (MOP), albendazole (ABZ), fenbendazole (FBZ), flubendazole (FLU) and ivermectin (IVM) for various times (from 8 hours to 3 days). After incubation, the cell suspensions were collected and the activity and expression of the main antioxidant enzymes were measured as the changes in the activities/expression of the antioxidant enzymes represent a widespread response observed in plants under various stresses.

The results showed the significant increase of peroxidase activity (POX) after ABZ, FLU, FEN and IVM treatment of *Arabidopsis thaliana* suspension cultures while catalase activity increased only in cells treated by ABZ and MOP. The activity of ascorbate peroxidase (APX) and glutathione S-transferases was not affected by any tested anthelmintics with exception of IVM, which significantly increased the activities of APX. In addition, IVM also markedly increased POX activities (by 20-fold) after 8 and 24 hour -treatment. Certain changes in the expression of antioxidant enzymes were observed too.

In conclusion, veterinary anthelmintics can induce stress in plants and might affect their antioxidant systems.

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Reference

[1] H. Bártíková, L. Skálová, "Veterinary drugs in the environment and their toxicity to plants," *Chemosphere*, vol. 144, pp. 2290-2301, 2016.