ABSTRACT

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Title of diploma thesis: Effect of anthelmintics on expression of selected plants enzymes

Fenbendazole (FEN) is a broad-spectrum benzimidazole anthelmintic that is widely used to prevent and treat helminthoses in farm animals. The use of anthelmintics is associated with the risk of their transfer to the environment, where they can potentially affect non-target organisms, including plants. They come into contact with anthelmintics and their metabolites mainly due to the fertilization of farmland with manure and/or come directly into contact with the excrements of treated animals on pastures. There have not been many studies focused on the cell physiology and cell metabolism of plants affected by anthelmintics, which lead to our participation in a study which dealt, in part, with the influence of FEN on the transcriptome and gene expression in model plant *Arabidopsis thaliana*. *A. thaliana* is a monocotyledonous plant, which is a very common model organism of higher plants. Its genome was also published in 2000, allowing extensive research into gene expression.

The aim of this work was to monitor expression of selected A. thaliana genes in leaves and roots after exposure to 5 μM of FEN after 24 and 72 hours and to verify RNA-microarray analysis by quantitative PCR. RNA isolation was performed from both plant tissues, which was transcribed back into cDNA by reverse transcription. This was further modified according to the protocol and analysed using quantitative real-time PCR. Expression of the selected genes was compared to the control group that was not affected by FEN. It was found that only roots provide significant changes in the expression of selected genes. Therefore, RNA-microarray verification was only performed on root samples. A good match was found between the results of the two methods.