Abstract

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Title of diploma thesis: The effect of selected herbicides on UGTs expression and activity of antioxidant enzymes in *Arabidopsis thaliana*

Herbicides are widely used to control weeds in agriculture. Although their use is essential to ensure crop production, their effect occurs to be reduced due to the development of herbicide resistence. Therefore it is important to clarify the mechanism of herbicide resistence, so that herbicides can be used effectively and new substances can be developed if necessary. At the same time, herbicides acts as an abiotic stress factor on the plant, thus affecting the antioxidant apparatus of plant cells. The aim of this work was to investigate the effect of selected herbicides – tribenuron-methyl (TBM), pinoxaden (PNX) and sulcotrione (SLC), on the expression of selected UGTs that could play a role in herbicide resistence. Secondary, we want to find out the effect of TBM on the activity of selected antioxidant enzymes – ascorbate peroxidase (APX), catalase (CAT) and superooxide dismutase (SOD). *Arabidopsis thaliana* was used as a model plant and the experiment was performed on cell suspensions and hydroponic cultures. In samples exposed to PNX, qPCR showed a significant increase in expression in multiple selected UGTs (UGT74E2, UGT73C6 and UGT84A2). Expression changes were not significant for TBM and SLC. The enzymatic activity of antioxidant enzymes was measured spectrophotometrically and the results showed that some concentrations of TBM cause an increase in activity in CAT and SOD, and a decrease in activity in APX. However, no relationship was observed between herbicide concentration and the level of enzyme activity.