Abstract

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Benzimidazole anthelmintics, the drugs against parasitic worms, are widely used in human as well as in veterinary medicine. Following excretion, these substances may persist in the environment and impact non-target organisms. Phytoremediation might be a suitable method for elimination of anthelmintics from the environment. In order to test detoxification abilities of plants, biotransformation pathways of albendazole (ABZ) and flubendazole (FLU) were studied in reed (*Phragmites australis) in vitro*. It was found that reed cells were able to uptake and biotransform both anthelmintics. These drugs did not significantly affect viability of the reed cells. Using HPLC/MS 10 ABZ metabolites and 5 FLU metabolites were found. Some atypical biotransformation metabolites (glucosylglucosides, acetylglucosides and xylosylglucosides), which have not been previously reported were identified. Based on the obtained results, the schemes of metabolic pathways of ABZ and FLU in reed were proposed. The amount of main metabolites (reduced FLU, ABZ-sulfoxide, ABZ-sulfone) in reed cells and cultivation media were quantified using HPLC. The majority of ABZ and FLU metabolites can be considered as less effective anthelmintic agents compared to patented drugs. Thus, reed could be used for the removal and detoxification of these anthelmintics in pastures and water sources.

The effects of FLU on the proteome of *Arabidopsis thaliana* was evaluated using two-dimentional electrophoresis. The „stain free“ gels revealed an elevated amount of 1 protein and a reduced amount of 3 other proteins in the presence of FLU. Staining of the gels with Commassie Brilliant blue G 250 showed the presence of 5 proteins with altered quantities due to the presence of FLU. Identification of these proteins will be a focus of further study.