

ABSTRACT

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Title of rigorous thesis: Phytoremediation of nitro compounds: a toxicity of dinitrotoluene and a change in proteom of plants.

Nitro compounds present in the soil, the water and the air have been a considerable environmental burden for many years. For example 2,4-dinitrotoluene (2,4-DNT), used mainly as an explosive, belongs to hazardous chemicals and common environmental contaminants. Therefore, there is a need to develop new and effective methods of a removal of 2,4-DNT from the environment. A suitable method could be a phytoremediation which uses plants for removing pollutants directly from contaminated areas. It also minimizes the introduction of other chemicals into a decontaminating process.

The aim of this work is to study the potential of plants to remove 2,4-DNT from contaminated water. Firstly, we focused on the ability of plants to metabolize 2,4-DNT. The degradation products: 2-aminonitrotoluen (2-ANT) and 4-aminonitrotoluen (4-ANT) were found both in media and plant extracts of suspension culture of *Saponaria officinalis* L. and *Phragmites australis* (Cav.) Steud. In plant extracts of *Arabidopsis thaliana* L there were found, in addition to above mentioned metabolites, a small amounts of 2,4-diaminotoluene (2,4-DAT). We also confirmed the change in the proteome of this plant after the expression of 2,4-DNT using 2D electrophoresis. Furthermore, we focused on a toxicity of 2,4-DNT metabolites and we found that the toxicity of both mononitrotoluenes used in low concentration (0-25mg/l) was significantly higher than the toxicity of the parent compound. The toxicity of 2,4-DAT was much lower in all concentration (0-200mg/l) than the toxicity of 2,4-DNT.