Abstract

Aluminium toxicity is the main limiting factor in crop production on acid soils. The main symptom of aluminium toxicity is a rapid inhibition of root growth, but the mechanism of root growth cessation remains unclear.

In this diploma thesis we deal with the question of whether phospholipases PLDα1 and PLDδ may play a role in the mechanism of aluminium toxicity. We compared the responses of plants lacking PLDα and PLDδ with WT plants. Growth analysis of roots was performed in hydroponic conditions.

The most sensitive part of roots was transient zone in which cells were dying earlier. It was further found that *pldα1* plants were less sensitive on aluminium toxicity because their roots showed less growth inhibition than WT. *Pldδ* plants did not differ from WT plants in their response to aluminum. During further analysis of the *pldα1* reactions, it was found that the root cells were capable of cell expansion during aluminum toxicity, and the cellular malformations were formed on the roots. This phenomenon was associated with faster reorientation and even depolymerization of cortical microtubules in response to toxic aluminium in *pldα* plants compared to WT plants.

The results indicated that PLDα1 molecule affects the stability of cortical microtubules. Microtubules were less stable and they depolymerized faster in response to the aluminum in plants lacking PLDα1. This phenomenon was associated with higher resistance of plants *pldα1* on toxic effects of aluminum.

Key words: aluminium toxicity, phospholipid D, PLDα, PLDδ, microtubule, root tip