EuroSciCon

5th Edition of International Conference on

Plant Genomics

June 13-14, 2019
Berlin, Germany

Ildiko Matusikova, AJPSKY 2019, Volume 09

Nutrition effects on synthesis of plant defense proteins and tolerance to metals

Ildiko Matusikova

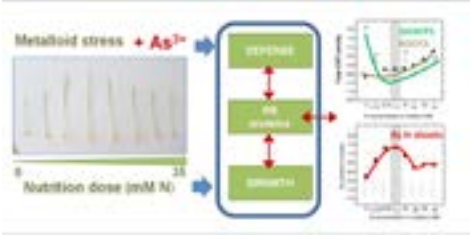
University of St. Cyril and Methodius, Slovak Republic

Under stress including metal toxicity plants synthetize defense components, including enzymes like ß-1, 3-glucanases and chitinase. Since defense is costly the synthesis of these enzymes depends on nutrients availability. The situation is more complicated if nutrient dose itself represents stress several enzyme isoforms with peculiar response to either starvation or nitrogen excess have been identified. A comprehensive study on the impact of nutrition on defense enzymes under stress is missing. Therefore, responses of plants exposed to arsenic, combined with conditions of low, optimal as well as excessive N concentrations, were studied in more detail.

Methodology and Theoretical Orientation: Hydroponic wheat plants were grown in standard Hoagland media with different amounts of ammonium nitrate at the final nitrogen concentrations of 0, 0.75 and 5.25 mm N (suboptimal doses), 7.5 mm (optimum), and 15, 25, 30 and 35 mm N. After a week, As3+ at sub lethal dose was applied. The profile and activity of individual defense enzymes (ß-1,3-glucanases and chitinases) as well as some morpho-physiological parameters were studied.

Findings: Nutrition conditions affect the responses of wheat plants to arsenic toxicity: Enzyme isoforms responsive to nitrogen concentration, metalloid, and to both were identified. Although (supra) optimal nitrogen concentrations positively activate the defense, the optimal dose appears not always the same for the individual parameters. Furthermore, at high doses of nitrogen the plants accumulated less arsenic in the shoots; probably due to better ability to prevent the transport of toxic element to the aerial parts.

Conclusion and Significance: Nutrition availability affects accumulation and/or activity of defense-related compounds, and impacts uptake of arsenic by the wheat plants. Some chitinase and glucanase isoforms are candidates for screening of plants health in the context of fertilizer management and / or presence of toxic metals.



Biography

Ildiko Matusikova studies the physiology and biochemistry of, and gene expression changes in, stressed plants. She focuses of enzymes of chitinases and ß-1, 3-glucanases in context of different scientific questions. Recently she extended her interests in studying the uptake, transport and accumulation of (toxic) metals in plants using radioanalytical approaches. She also does research on the molecular biology of Drosera and studies the role of hydrolytic enzymes in prey digestion by carnivorous plants.

ildiko.matusikova@ucm.sk