

Study programme: **General Crop Science**

Department of: **Agroenvironmental Chemistry and Plant Nutrition**

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## **Topic: Innovation of Diagnostic Methods for Evaluating of Sulfur Status of Different Crops**

### **Hypotheses:**

It is possible to assume, that sulfur became more and more limiting nutrient for plants in Czech Republic as well as in whole Europe. Because of this is necessary to focus more on cycling of this element in soil and environment.

### **Summary:**

The content of bioavailable sulfur forms in soil strongly decreased in last three decades. It is caused mainly due to the decreasing input of sulfur to soil with atmospheric depositions, growing of crops with higher S demand and lower S inputs by sulfur containing fertilizers (superphosphates). Because of that sulfur became limiting nutrient in crop production, especially in the crops with higher S demand (oilseed crops).

Actually used methods for estimating of bioavailable sulfur in soil have significant disadvantages, such as low correlations with sulfur content and S uptake by plants. Furthermore, for example, the determination of a significant proportion of other forms of sulfur than those for which the methods are proposed. Methods for plant analysis are then inconsistent and often do not correspond to the yields and qualitative parameters of harvested products. Therefore, the integration and innovation of diagnostic methods for the determination of plant available sulfur is needed, including the modification and extension of existing criteria for the evaluation of S content both in soil and in the plant.

The aim of the dissertation is to compare the methods for determination of sulfur, the activity of the enzyme arylsulphatase in soil with S content in the plant and its uptake in a wide range of soils. Another objective will be the evaluation of S content in soils and in different parts of plants in relation to final product yield and quality.

As a part of the trials is planned the collection of a wide range of soils in the Czech Republic together with plant samples. Subsequently, soil analysis by various methods for determining the S-accessibility and enzymes involved in the S mobilization and the analysis of the various parts of the plants (above-ground biomass, the youngest leaves) in the crucial vegetation phases will be realized. Based on the statistical evaluation will be proposed the new criteria and recommendation for the sulfur fertilizing.

Source of: Czech Ministry of Agriculture - TAČR TJ01000454: Innovation of diagnostic methods for phosphorus and sulfur fertilizing.

In Prague, date 25. 3. 2018

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