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Determination of oilshale fly ash impact to soils chemical properties and plant nutrient mobility

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The use of mineral ferilizers and natural processes leads to the acidication of agriculturally used soils. The soils acidification leads to decrease of plant available nutrient content and increase of toxic elements in soil solution and creates with this an environment what is unsuitable for plants growth. To overcome the decrease of yield caused by acidification and to restore suitable environment for agricultural production typically the liming is used. Mainly the carbonaceous natural materials are in use for liming of soils. Widely are used for liming powdered limestone. Nowadays industry enterprises are generating large amounts and several types of ashes as residues. According to EU Circular economy packages we have a duty to decrease the amount of residues and find a possibility to re-use the residues. Depending the chemical composition some of ashes can be used as liming material for acid soils.
Approximately 70% of electricity in Estonia is produced in powerplants by the burning of oilshale. In 2017 for producing of electricity 13 500 tons of oil shale with average content of mineral matter 45% was used. This means the production of large quantity of ash as waste. From the 1960-s the oilshale fly ash was used for liming of acid soils in Estonia. During the last 50 years the burning technology is made a several changes. Depending from the type of used burning technology (temperature, time, granulometric composition of fuel, etc.) the ashes have diferent chemical and physical properties. Also the legislation according to fertilizers and management with residues has passed several improvements. Therefore ashes which are used as liming fertilizers and the requirements for material used as fertilizers have changed.
Therefore we have need to investigate the impact of diferent type of ashes to the diferent type of soils. The main aim of our research was not to observe the content of toxic compouns and elements in ash but observe the changes in plant available nutrients contents, speed of changes in soil reactivity and some other soil chemical parameters. The five acid soils and five ashes was choosen for experiment. For investigation of changes in soil a 150 days laboratory experiment was conducted and the changes of parameters are periodically monitored. The aim of our presentation is to present the laboratory method for complex investigation of impact of liming fertilizers to the soils.