Agriculture in mining-impacted regions- Investigations on the influence of soil amendments on As mobility

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800 years of mining in Saxony, Germany, left behind a thousand km² of agricultural soils contaminated with metalloids, whereby 288 km² exceed the German trigger value for Arsenic (As) of 50 mg/kg. Local hotspots can reach As concentrations up to 5000 mg/kg. Little is known about the fate of As in agriculture. However, safe production of food and fodder requires an appropriate treatment of sites, taking into account the influence of agricultural practices on As transfer and uptake into plants. Hence, the Saxon region is used in the European project AgriAs as a study site for the investigation of interactions between soil, water and plants in mining-impacted agricultural areas and the demonstration of suitable technologies for water and soil protection. Therefore microcosm studies were conducted with amendments used at the side (lime plus ammonium nitrate; organic fertilizer). As concentration in the leachate water for blank and treated soil was 0.13 mg/l and 0.10 mg/l respectively. Results did not show a significant effect of amendments, but a tendency for As retention. As a treatment technology for water and soil on agricultural sites a novel schwertmannite-based adsorbent is being tested, which is produced microbially from acidic mining water using a patented process developed by the company G.E.O.S.. The successful removal of As from water was demonstrated in previous studies, while the use as a soil improver is beeing investigated. Preliminary batch tests with contaminated soil (130 mg As/kg) and deionized water indicated that an adsorbent concentration of 0.5 % w/w is sufficient to reduce As concentrations in the eluate from 0.13 mg/l to below 0.05 mg/l. Pot trials with soil, summer rye and adsorbent are part of ongoing test work to investigate the influence of different adsorbent concentrations on As transfer and development of plants by measuring the content of As in soil and plants, microbial activity in soil and oxidative stress of plants.