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ABSTRACT FOR BCD 2013 (250 words)

Session 3: Sustainable uses, applications and environmental impact of biochars, composts and digestates

TITLE - Impacts of biochar on the phytostabilization of contaminated soils with ryegrass

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Biochar has been regarded as a promising carbon sequestration and fertilizing agent in soils. Its ability to sorb pollutants also offers new possibilities to remediate contaminated sites. However, very few studies have investigated the actual effect of biochar on the transfer of heavy metal to plants.

In order to evaluate the potential of biochar in this context, we examined the effect of a wood-derived biochar at different amendment rates on the growth of ryegrass in one acid and one basic soil, both similarly contaminated by Zn, Pb and Cd from smelter industry. After 12 weeks of growth in one-liter pots, both roots and shoots were harvested, weighted and analyzed for their total trace element content. In addition, we also sampled the pore solution during the first weeks and analyzed soil samples after harvest to monitor changes in pH and in metal or nutrient availability.

The increasing addition of biochar lead to an increase of pH on both soils and a continuous decrease of Zn, Pb and Cd concentration in the soil solution, which resulted in a reduced transfer of metals to the plants. Positive effects of biochar on the plant growth were observed on both soils, but the increasing addition of biochar after 0.5 % on the basic soil resulted in a decrease of shoot biomass, which we attributed to a decrease of nutrient absorption. The ability of biochar to reduce the phytotoxicity of heavy metal contaminated soils may therefore be counterbalanced by the limitation of nutrient availability to plants.