STRUCTURAL AND CHEMICAL DEVELOPMENTS OF BIOCHAR USED IN HORTICULTURAL TRIALS FOR VARIOUS PERIODS OF TIME

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There is a growing interest in peat alternatives for the preparation of horticultural potting soils. Pot trials have shown that Biochar can play an important role in decreasing the peat fraction and the associated GHG emissions. Biochar is very stable (no decay) and completely free of diseases. Despite some first successes up to 35% Biochar in the mixture, further application will require more knowledge to increase the share of biochar as well as the yield in horticultural production.

Pot trials in greenhouses provide a unique opportunity to follow the structural and chemical development of biochar over time, as the ingredients of the potting mix are known and all nutrient and water streams are recorded. Biochar grains can be retrieved from the pots at intervals during the trials. Precise pore size distributions at the start (t=0) were made (Hg-porosimetry and N2 adsorption) and followed over time using Scanning electron microscopy (SEM). Also the chemical composition and adsorption of compound on the biochar were measured over time for a number of pot trails. It was concluded that for the greenhouse application, clay-free mixtures might be better in order to avoid blocking of the internal pore structure of biochar and thereby maintaining the water holding capacity. For soil applications this may provide information on the formation of micro-aggregates.

A first attempt was made to include bacillus and Trichoderma in different pot trails on the biochar. Crop results on biochar as carrier for resilience enhancing Bacillus subtilis were not improved, although the bacillus could be found in samples after the trial under the SEM. The use of Trichoderma in biochar/peat pot trails is currently in progress. A number of sampling moment from the pots allows for a structural development screening of the biochar under well-known conditions in the greenhouse. The results will be presented. Tracing bacillus and Trichoderma in samples with the SEM is very difficult as very few previous examples are available. This presentation aims to add also to the knowledge base on following “life” under the low-pressure electron microscope.