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Biochar as a possible solution to shortcomings of traditional forest biomass utilization in Finland

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The removal of biomass is reducing C stocks in forests and implies a large removal of nitrogen. Current studies show more than 10% decreases in tree growth and biomass removal seems to be the reason. If some of harvested nutrients could be returned to the ecosystem, the observed reductions in growth might be avoided. The use of biochar has been proposed as a solution to shortcomings of forest biomass use. If the biochar is buried into the soil it will stay there for thousands of years, keeping the C out of the atmosphere, and nourishing the soil. Preferably the origin of the biochar used in forest ecosystems should be also the forest. However, for forest ecosystems studies are rare and it is not clear if biochar applications to the boreal forest would lead to larger biomass production or C neutrality. Furthermore it is not clear how much the source of biochar influences the nutrient content of the final product.

We have tried to access and categorize the nutrient contents of biochar from different stocks with an emphasis on wood. We received samples of wood and produced biochar from biochar producers of Finland and one producer from Switzerland. Wooden feed stocks under analysis were birch, willow and spruce. Gained samples of biochar and feed stock have been analyzed for their nutrient contents. Nutrient differences in feed stocks and biochar have been accessed using production data collected from the producers and based on this the ratios between the mass of feed stock and the mass of biochar has been calculated. Data analysis are still in process, but our preliminary results showed that the temperature and time of pyrolysis were positively correlated with the contents of studied nutrients. Overall nutrient contents of biochar produced from spruce were much higher than ones observed in hardwoods.