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Life Cycle Assessment of Biochar - EuroChar Project

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One of the most significant challenges faced by modern-day society is that of global warming. An exclusive focus on reducing the greenhouse gas (GHG) emissions will not suffice and therefore technologies capable of removing CO_2 directly from the atmosphere at low or minimal cost are gaining increased attention. The production and use of biochar is an example of such an emerging mitigation strategy. However, as with any novel product, process and technology it is vital to conduct an assessment of the entire life cycle in order to determine the environmental impacts of the new concept in addition to analysing the other sustainability criteria.

Life Cycle Assessment (LCA), standardized by ISO (2006a), is an example of a tool used to calculate the environmental impacts of a product or process. Imperial College London will follow the guidelines and recommendations of the ISO 14040 series (ISO 2002, ISO 2006a-b) and the International Life Cycle Data System (ILCD) Handbook (EC JRC IES, 2010a-e), and will use the SimaPro software to conduct a LCA of the biochar supply chains for the EuroChar project. EuroChar ('biochar for Carbon sequestration and large-scale removal of GHG from the atmosphere') is a project funded by the European Commission under its Seventh Framework Programme (FP7). EuroChar aims to investigate and reduce uncertainties around the impacts of, and opportunities for, biochar and, in particular, explore a possible introduction into modern agricultural systems in Europe, thereby moving closer to the determination of the true potential of biochar. EuroChar will use various feedstocks, ranging from wheat straw to olive residues and poplar, as feedstocks for biochar production and will focus on two conversion technologies, Hydrothermal Carbonization (HTC) and Thermochemical Carbonization (TC), followed by the application of the biochar in crop-growth field trials in England, France and Italy.

In April 2012, the EuroChar project will be at its halfway mark and will therefore not have any final results available. However, preliminary results concerning the feedstocks and the two production processes could potentially be available. An early hypothesis is that HTC will have reduced environmental impacts compared to TC, as the feedstocks do not require the energy-intensive drying process. A comparison between the different feedstocks will also be made once the data is available. An evaluation framework will be presented, which will be used to derive the final conclusions and recommendations for the EuroChar project. The poster outlines the biochar supply chains being evaluated using SimaPro LCA software and further details concerning the LCA, including the Goal & Scope, the Functional Unit and the System Boundaries.

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