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Reducing environmental impacts of lignin recovery for biochar production

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Biochar is an organic material produced from different feed stocks like forest residues, agricultural wastes and digested municipal solid waste. It is rich in carbon content and can be used in a number of applications including soil fertilization and water filtration. Biochar is currently getting attention of the scientists and policy makers due to its circular bio-economic nature. In spite of the ongoing research studies related to biochar production, applications and conversion technologies, few studies considered the environmental impacts of biochar production systems. In this presentation, we report the results of a life cycle assessment (LCA) study conducted to identify the environmental impacts of lignin recovery for biochar production from forest materials. This was done in order to suggest improvement methods for potential reduction of the environmental impacts. LCA technique was employed following the international standard ISO14044: 2006, using ecoinvent database and industrial scale data for the process modeling. Results revealed that human health was the top impacted category followed by natural resources and ecosystem quality, respectively. Air and solid emissions from biomass residues and natural gas was used as a fuel source for boilers and are the main contributors to these impacts. Reduction of these impacts can be achieved by ensuring the usage of biomass residues with low moisture (30 – 60 % range) and reduce NOx emissions by decreasing access air to boilers.

Biography

Dalia is currently a Post doctor researcher at the Department of Chemistry, Umea University, Sweden. She is part of the system analysis and bioeconomy platform of the Bio4energy program. She obtained her PhD from Alexandria University, Egypt specializing in energy systems and life cycle assessment. She employs life cycle assessment methodology for system analysis thinking in areas related to energy and renewable energy at local and regional levels. She is working on projects related to renewable bioenergy materials and its applications. The current study is part of an ongoing research related to biochar production from forest wood.

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