

Conversion of selected lignocellulosic feedstocks to bio-products: an environmental LCA study

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Abstract

The reliance on fossil fuels and feedstocks has led to a range of environmental concerns, not the least the climate change impacts. To address some of these issues, renewable materials have emerged as possibly more sustainable alternatives to fossil fuels and feedstocks. In particular, biomass used in an integrated bio-refinery to produce platform chemicals and energy is being hailed as a potential solution to the current overreliance on fossil-based feedstocks.

The environmental implications of the integrated bio-refinery have been evaluated using life cycle assessment. The case study considered uses a combination of wheat straw and poplar. The system boundary is defined from 'cradle to gate' and the functional unit in both cases is '1 litre of ethanol co-produced with lactic acid, acetic acid and electricity'. The results from the environmental analysis show that for the case study the hot spot in the supply chain is cultivation of arable crops. This is mainly caused by the application of fertilisers.

