The resource footprint of a switch from fossil to biobased products

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Our society is consuming fossil resources at a high rate and considers the delivered services as evident. This easy source of welfare however, will not last forever. One option to replace the fossils is the use of biomass, which has a large variety of molecules and offers a lot of possibilities with the additional advantage that it is potentially carbon neutral. However, it suffers from the limitation that it comes in competition with the food chain and that it requires an intensive cultivation step. This presentation focuses on a company that produces specialty sugars, starch, gluten and animal feed, which now additionally incorporates a biofuel into its production to cope with the growing demand for alternative resources. It is shown that incorporating bioethanol in a biorefinery concept is thermodynamically efficient (81.1%) and that the biofuel indeed saves fossil resources over its life cycle (27%). However, the cultivation step of biomass is a serious limitation, especially when considering the remaining demand for food and feed. In the case study executed, every percentage fossil fuel saved, costs 3.4% additional mineral, water and land resources from the natural environment, showing the high value of fossils.

Reading material

De Meester, S., Callewaert, C., De Mol, E., Van Langenhove, H., & Dewulf, J. (2011). The resource footprint of biobased products: a key issue in the sustainable development of biorefineries. *Biofuels, Bioproducts & Biorefining, 5*, 570-580.