

The Role of Biotechnology in Replacing Fossil Oil

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The value of the products and chemicals made from the 10% of fossil oil that is used as feed stock in the chemical industry is the same as the value of all fuel made from the remaining 90%. Using plant oil instead of fossil oil as feed stock for the materials and chemicals could capture much of this added value, if the plant molecules are optimized *in-planta* for the end use and thereby minimizing the downstream processing costs. I have a vision that within 20 years time replace 40% of the fossil oil used in the chemical industry with renewable plant oils, whilst ensuring that growing demand for food oils is also met. This will require a trebling of global plant oil production from current levels of 140 MT to about 400 MT annually. Realisation of this potential will rely on application of plant biotechnology to (a) tailor plant oils to have high purity (preferably > 90%) of single desirable fatty acids, (b) introduce unusual fatty acids that have speciality end-use functionalities, (c) increase plant oil production capacity by increased oil content in current oil crops, and conversion of other high biomass crops into oil accumulating crops. Using plant oils in the chemical industry will not only enable replacement of fossil oil but will, at least equally importantly, enable substantial overall energy savings and generate added-value for agricultural products that cannot be captured by using them for energy production. I will in this presentation outline research strategies for the replacement of a significant portion of the fossil oil used in the chemical industry with plant oils by extrapolating on the present state of the art of science in the biotechnology area.