Techno-economic analysis and evaluation of microalgae process design

By

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Abstract

Our society will need to move away from the strong dependence upon fossil fuels and to reduce the emissions of greenhouse gases at the same time. Biodiesel is produced by transesterification reaction of lipid and alcohol. Lipid suitable for producing biodiesel mainly comes from oil plant, oily yeast, and swill-cooked dirty oil. Compared to higher oil plants, microalgae have several advantages (e.g. on average relatively higher yield, higher oil content, meanwhile much less land use) which makes it important to model and optimize the process of microalgae production.

Yield of microalgae is mainly influenced by solar radiation, medium temperature, CO2 concentration, O2 concentration and nutrients. Temperature is very likely to be the main factor that affects the growth rate of microalgae, and also a major factor determining the productivity of an open system.

We have built models for open pond and PBR for predicting the mass yield of microalgae, also models for population growth and the composition of population analysis to optimize the cultivating process and design harvesting strategy.

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Examination Committee:
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