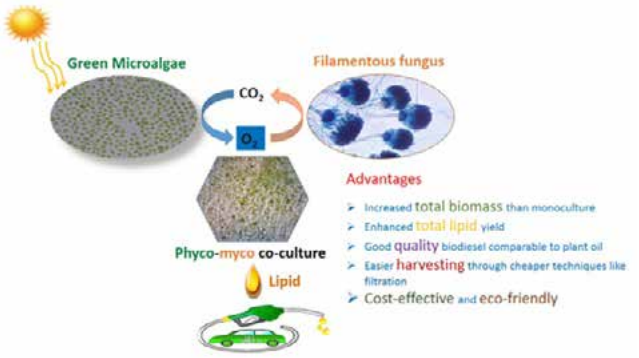
Archana Dash et al., J Fundam Renewable Energy Appl 2017, 7:4(Suppl)
DOI: 10.4172/2090-4541-C1-030

Improved biodiesel production from *Chlorella minutissima* and *Aspergillus awamori* through phyco-myco co-cultivation

Archana Dash and **Rintu Banerjee**
Indian Institute of Technology Kharagpur, India

Microbial sources have been explored for biodiesel production for years owing to their oleaginous nature. In spite of the extensive research biofuel scientists failed to come up with potential economic solutions to several challenges algae biodiesel industry is facing at the current time. Lipid enhancement at the cost of biomass accumulation and harvesting difficulties are some of the major bottlenecks to be named in this context. It suggests the need for the search of other unconventional biodiesel feedstocks, which can oppress these challenges with improved biomass and lipid yields with cost-effective harvesting. One such concept is the use of co-culture strategy for biomass and intracellular lipid generation. Certain microalgae and fungi are known to be symbiotically associated and can grow as a single entity benefitting each other in nature. This concept has been recapitulated to construct the algae-fungi association for constructive biomass and lipid generation taking the aim for subsequent drop-in fuel manufacture. In this study, *Aspergillus awamori*, an oleaginous filamentous fungus was co-cultured with Chlorophycean green alga: *Chlorella minutissima*. The growth and lipid accumulation behaviour were examined in the presence of diverse carbon and nitrogen sources along with various altered cultural attributes. The effects on the biomass and lipid agglomeration abilities of the co-cultures were evaluated against the unialgal and unifungal cultures. Biomass production and lipid accumulation were observed to be significantly enhanced in the co-cultures in comparison to the monocultures. Glycerol was found to be the most effective carbon source, which resulted in a 3.4 to 5.1-time upturn of the total lipid yields as compared to the axenic monocultures. Similarly, potassium nitrate was observed to be the best biomass and lipid accumulator among the nitrogen sources. The co-culture oil was found to be rich in palmitic acid, methyl ester and oleic acid, methyl ester, which suggests its suitability for biodiesel production. Thus, this work suggests that the co-culture of specific oleaginous microalgae and fungi could be an efficient and potential strategy for biodiesel production.



Biography

Archana Dash is currently pursuing her PhD under the guidance of Prof. Rintu Banerjee from Indian Institute of Technology Kharagpur, India. She is working in the area of Biodiesel Production from Microalgae.

rb@iitkgp.ac.in

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