MANUAL PRESSING OF NANNOCHLOROPSIS OCULATA DRIED BIOMASS FOR ENHANCED LIPID EXTRACTION

Author(s): Mehmood Ali, Ian Watson

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Abstract:
Microalgae offer significant potential to produce high value products and biofuels, whilst simultaneously being used to bio-remediate water or capture carbon dioxide (CO₂). Microalgal cell disruption processes are often necessary to increase lipid extraction from microalgae before conventional solvent extraction processes are used to isolate lipids. The extracted lipids can be processed to produce biofuels. The combinations of hydraulic pressing with liquid nitrogen (LN₂) treatment were applied to samples of dried Nannochloropsis oculata in the presented study to enhance the cellular destruction and lipid yields. The results indicated higher lipid extraction with LN₂ treatment (0.159 g/g dry algae) compared to the LN₂ untreated samples (0.070 g/g dry algae). The corresponding cell disruptions were found to be seventy-eight and fifty percent, respectively, at the same 10 bar (145 psi) pressure level. The control sample (without any treatment) lipid yield was 0.006 g/g dry algae, while the lipid yield varied between 0.192-0.213 g/g dry algae with LN₂ treated biomass with pressure loadings of 70-100 bar (1015-1450 psi) and with a corresponding cell disruption of 93-98 percent. The presence of palmitate, oleate and linoleate found in the fatty acid methyl ester composition of the extracted lipids, shows a favourable profile to produce biodiesel.

For full paper, contact:
Prof Muhammad Masood Rafi
Editor-in-Chief, NED University Journal of Research
Ph: +92 (21) 99261261-8 Ext: 2413; Fax: +92 (21) 99261255
Email: NED-Journal@neduet.edu.pk
Website: http://www.neduet.edu.pk/NED-Journal

1 Associate Professor, Department of Environmental Engineering, NED University of Engineering and Technology, Pakistan, Ph. +92-(0)21-99261261x2366, Fax: +92(0)21-99261255, Email: mehmood@neduet.edu.pk.
2 Reader, System, Power and Energy Research Division, School of Engineering, University of Glasgow, UK, Ph. +44-(0) 141-3305258, Fax: +44(0) 141-3302359, Email: ian.watson@glasgow.ac.uk.