

ABSTRACT

With the ongoing scenarios regarding fossil fuel consumption and associated environmental hazards, sustainable substitute fuel source is the need of time. For this purpose, microalgae based fuels has been gaining attention worldwide. But the cost of production is quite questionable as now. In this regard, current study is focused on the production microalgal fuels using agro-industrial waste (molasses and bagasse) as growth substrates. A pre-isolated and characterized microalgal strain (*Chlorella vulgaris*) was cultivated mixotrophically on molasses and bagasse which served as experimental group. The autotrophic cultivation served as control group utilizing atmospheric CO₂ as sole carbon source. After 20 days of cultivations, mixotrophically grown algae shown greater biomass production (78 ± 10 mg/L/d) in comparison to phototrophic cultivation (69.75 ± 2.75 mg/L/d). The cell count and microalgal growth analysis also depicts greater numbers in mixotrophic cultivation conditions. The lipid content and fatty acid profiles shows greater number in mixotrophic than photoautotrophic cultivations. These results showed the potential of microalgae to produce microalgae-based biofuels with concomitant removal of waste materials. The bioremedial potential of microalgae should be utilized more often on different kinds of wastes to produce cost-effective biofuels.