Rapid biodiesel production using wet microalgae via microwave irradiation

Abstract

The major challenges for industrial commercialized biodiesel production from microalgae are the high cost of downstream processing such as dewatering and drying, utilization of large volumes of solvent and laborious extraction processes. In order to address these issues the microwave irradiation method was used to produce biodiesel directly from wet microalgae biomass. This alternative method of biodiesel production from wet microalgae biomass is compared with the conventional water bath-assisted solvent extraction. The microwave irradiation extracted more lipids and high biodiesel conversion was obtained compared to the water bath-assisted extraction method due to the high cell disruption achieved and rapid transesterification. The total content of lipid extracted from microwave irradiation and water bath-assisted extraction were 38.31% and 23.01% respectively. The biodiesel produced using microwave irradiation was higher (86.41%) compared to the conventional method. Thus microwave irradiation is an attractive and promising technology to be used in the extraction and transesterification process for efficient biodiesel production.