

Gasification Characteristics and Kinetics of Lipid-Extracted *Nannochloropsis gaditana*

ABSTRACT

A thermal behavior study of lipid-extracted *Nannochloropsis gaditana* (LEA) was performed in a thermogravimetric analyzer. The study was performed by heating the sample under different heating rates (5, 10, and 15 °C/min) from room temperature to 1000 °C using N₂ gas as the medium. This is crucial for thermal stability studies in a kinetic control regime. The following three stages of chemical decompositions were found: (1) moisture removal (2) devolatilization (3) fixed carbon decomposition; maximum decomposition was observed at the second stage. Activation energies of the LEA were studied using the Flynn–Wall–Ozawa model and Kissinger–Akahira–Sunose model. Main sample decomposition was observed from 100–700 °C during volatile matter evaporation. The thermal behavior study findings were used for the gasification of the sample with air to study the effect of varying reaction parameters on the compositions of the synthesis gas yield. Maximum H₂ yield was found at 700 °C and 0.7 g, which were 51.2 mol% and 50.6 mol%, respectively. From the study, it was found that LEA is suitable to be used as feedstock in gasification for synthesis gas production.