

BIOSURFACTANT PRODUCTION BY INDIGENEOUS PSEUDOMONAS AND BACILLUS SPECIES ISOLATED FROM AUTO-MECHANIC SOIL ENVIRONMENT TOWARDS MICROBIAL ENHANCED OIL RECOVERY**S. E. Agarry^{*}, K. K. Salam, A. Arinkoola & M. O. Aremu**

Biochemical and Petroleum Engineering Laboratories, Department of Chemical Engineering, Ladoko Akintola University of Technology, P. M. B. 4000, Ogbomoso, NIGERIA
Corresponding author: E-mail: sam_agarry@yahoo.com

ABSTRACT

The objective of this work was to study the biosurfactant production of two indigenous organisms isolated from auto-mechanic polluted soil environment and to evaluate their oil recovery efficiency. In this study, six bacteria were isolated from auto-mechanic polluted soil environment. Isolated strains were identified by morphological, biochemical, and physiological characterization. Among these, two isolates (*Bacillus* sp. and *Pseudomonas* sp.) were further selected and used for the production of biosurfactant. *Bacillus* and *Pseudomonas* species were grown in mineral salt medium (MSM) with addition of 3% (w/v) glucose. In the growth kinetic study, the maximum biosurfactant production occurred at 120 h of incubation (2.2 g/l) and maximum biomass was observed at 120 h (3.2 g/l) for *Bacillus* isolate. While for *Pseudomonas* isolate, the maximum biosurfactant production occurred at 96 h of incubation (2 g/l) and maximum biomass at 72 h (2.6 g/l). Different nitrogen sources as well as the effect of salinity and temperature were evaluated for their effect on biosurfactant production. Yeast extract and sodium nitrate was the best nitrogen source for the production of biosurfactant by *Bacillus* and *Pseudomonas* isolates, respectively. The environmental factors such as temperature 30 °C and salinity (0.2% w/v) were found to be optimum for the biosurfactant production. The stability of the biosurfactant was investigated at different salinities and temperature. The biosurfactant was effective at very low concentrations over a wide range of temperature and salt concentration. The results obtained showed that the biosurfactants have a good oil recovery efficiency thus being more attractive to be applied in microbial enhanced oil recovery.

Keywords: Biosurfactant; *Bacillus* species; Emulsification index; *Pseudomonas* species; Surface tension; Microbial enhanced oil recovery.