
The Mechanism of Hydrocarbon Uptake by *Pseudomonas fluorescens* in Lubricating Oil Biodegradation

Ni'matuzahroh Affandi*^{†1}, Nur Hidayatul Alami, Iswanti Iswanti, Mochammad Affandi², and Tini Surtiningsih³

¹Microbiology Laboratory, Biology Department, Science and Technology Faculty, Airlangga University, Indonesia – Science and Technology Faculty, Airlangga University, Surabaya, Indonesia, Indonesia

²Ecology Laboratory, Biology Department, Science and Technology Faculty, Airlangga University, Indonesia – Science and Technology Faculty, Airlangga University, Surabaya, Indonesia, Indonesia

³Microbiology Laboratory, Biology Department, Science and Technology Faculty, Airlangga University, Indonesia – Science and Technology Faculty, Airlangga University, Surabaya, Indonesia, Indonesia

Abstract

The prospect of *Pseudomonas fluorescens* utilization in environmental bioremediation caused by hydrocarbon pollution need the understandings of interaction mechanism between *Pseudomonas fluorescens* with hydrocarbon compounds. So, the purpose of this research is to explore the mechanism that developed by *Pseudomonas fluorescens* isolated from oil contaminated soil, Indonesia, in lubricating oil biodegradation. Bacteria was cultivated in hydrocarbon selective medium which contains of mineral salts added with lubricating oil as hydrocarbon substrate. Bacterial growth was evaluated by enumerating of bacterial cell numbers. Meanwhile, the mechanism of hydrocarbon uptake was investigated by observing the cell-substrate adherence activity and detecting biosurfactant production. Adherence activity was expressed in the ability of this bacteria to adhere to liquid hydrocarbon which was quantified using Rosenberg methods and was visualized using light microscopy. Biosurfactant production was indicated by surface tension reduction and emulsification activity of cell free supernatant. Surface tension was measured using du-Nouy tensiometer and hydrocarbon emulsification activity using Roy et al, method. The formation of oil droplet in bacterial culture which was caused by biosurfactant production was also observed microscopically. The result of this research showed that *Pseudomonas fluorescens* developed an adherence activity and biosurfactant production in hydrocarbon uptake on lubricating oil biodegradation.

Keywords: mechanism, hydrocarbon uptake, *Pseudomonas fluorescens*, lubricating oil, biodegradation

*Speaker

[†]Corresponding author: nimatuzahroh@yahoo.com