CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME I

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SLUDGE PALM OIL AS A POTENTIAL SOURCE FOR EMULSIFIER PRODUCING STRAIN

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ABSTRACT

There is a recent increase of interest in the production of biosurfactants using microorganisms due to their biodegradability, reduced toxicity compared to synthetic surfactants, and their stability under wide range of temperature and Ph. In this study, organic waste, sludge palm oil was used as a novel source for isolation of potential biosurfactant producer. Complex mixture of hydrocarbons of sludge palm oil can trigger certain strains to produce large amount of biosurfactant in order to survive under such harsh environment. Parafilm test and emulsification index were used as a basis for determination of the best strain. After screening, strain S104 was found to have the potential in producing highest yield of biosurfactant.

Keywords: biosurfactant, sludge palm oil, isolation, parafilm test, emulsification index

INTRODUCTION

Surfactants are amphiphilic compounds that reduce the free energy of the system by replacing the bulk molecules of higher energy at an interface (Mulligan, 2005). They contain a hydrophobic moiety with little affinity for the bulk medium and a hydrophilic portion that is attracted to the bulk medium. Surfactants have been used industrially as adhesives, de-emulsifiers, flocculating, wetting and forming agents, lubricants and penetrants (Mulligan & Gibbs, 1993). Because of their amphiphilic nature, surfactants tend to accumulate at interfaces (air-water and oil-water) and surfaces. As a result, surfactants reduce the forces of repulsion between unlike phases at interfaces or surfaces and allow the two phases to mix more easily (Bodour & Miller-Maier, 2002). Due to the presence of surfactant, less work is required to bring a molecule to the surface and the surface tension is reduced.

Biosurfactant is a structurally diverse group of surface-active molecule synthesized by microorganisms. Their capability of reducing surface and interfacial tension with low toxicity and high specificity and biodegradability, lead to an increasing interest on these microbial products as alternatives to chemical surfactants (Banat et al., 2000). However, up to now, biosurfactants is still unable to compete with the chemically synthesized surfactants in the surfactant market. This could be due to their high production costs in relation to inefficient