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CHARACTERIZATION OF BIOSURFACTANT RHAMNO NR22 PRODUCED BY *PSEUDOMONAS AERUGINOSA* NR22 (PS.NR.22)

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ABSTRACT

CHARACTERIZATION OF BIOSURFACTANT RHAMNO NR22 PRODUCED BY *PSEUDOMONAS AERUGINOSA* NR22 (PS.NR.22)

Pseudomonas aeruginosa (Ps.NR.22) is an opportunistic pathogen that have ability to produce glycolipids. Rhamno NR22 is essentially class of glycolipid that consist of one or mostly two 3-hydroxy fatty acids with a different chain of lengths that have a connection with one or two rhamno molecules. Rhamno NR22 was successfully produced by using Phosphate-limited proteose peptone-glucose-ammonium salt (PPGAS) medium. The extraction of Rhamno NR22 was run by centrifuge at 10000 rpm and 4^{o}C for 15 minutes before it went through freeze dryer to powderized the Rhamno NR22. Thermogravimetric analysis (TGA) and nuclear magnetic resonance (NMR) analysis are applicable as a tools to understand the characteristics of Rhamno NR22. TGA reveal the mass lose in a Rhamno NR22 sample as a function of temperature and time. At 900°C, the Rhamno NR22 still remains at 5 mg in 90 minutes. It remarks the endurance of Rhamno NR22. ^{1}H-NMR spectrum was recorded due to the purity of Rhamno NR22. The obtained of multiplicity represent the assignment (-CH_3-) and (-CH-OH-) on rhamnose moiety while several assignment such as (-CH(O)-CH_2COO) and (-(CH_2)-CH(O)-CH_2COO-) on β-hydroxyfatty acids. The fuctional group, chemical bond and chemical structure study from NMR produced dirhamnolipid which classified as hydrophobic. Hence, the result indicate the physical characterization of rhamno NR22.

CHAPTER 1

INTRODUCTION

1.1 Research Background

Biosurfactants are one of the fundamental substances of chemical products that have a wide array of applications across various sectors such as agriculture, industry, households and health. Biosurfactants are the most effective replacement since biosurfactants exhibit biodegradability, non-toxicity and cost-effective characteristics compare to chemical surfactant (Sharma et al., 2018). Moreover, both hydrophobic and hydrophilic molecules appear in amphiphilic compounds which are known as biosurfactants for the purpose to help to reduce surface strains and interfacial tensions between individual molecules respectively. Thus, these properties help biosurfactants to form micro-emulsion; where hydrocarbons are soluble in water or water are soluble in hydrocarbons (Varjani et al., 2017).

In recent years, an increasing interest in biosurfactants due to the several vital reasons focusing on microbial surfactants particularly. Hence, the focus has been fixated on the substitution green process for the production of biosurfactants derived from microorganisms. Unique physical features that found in biosurfactants are not impaired by an environmental factor such as pH and temperature (Md, 2012). Biosurfactants are considered to be more potent and highly effective compared to chemical surfactants due to the difference in term of Critical Micelle Concentration (CMC) (Sabturani et al., 2016). Furthermore, biosurfactants can act as emulsifiers or de-emulsifiers. Kind of emulsions exist are oil suspended in water (o/w) or water suspended in oil emulsions (w/o) (Clark, 2013). O/w emulsions are encompassing of oil droplets that defer in an aqueous phase, while w/o emulsions are comprised of water droplets are suspended in a continuous oil phase. Added substances such as