

ABSTRACT

Sylvia Fathin Maliihah. Screening of Biosurfactant-Producing Yeast on Palm Oil Mill Effluent (POME) Substrate. Thesis. Department of Biology, Faculty of Science and Mathematics, Diponegoro University. 2024. Supervised by Wijanarka and I Made Sudiana.

Yeast biosurfactants (surface active agent) are amphiphilic compounds from yeast characterized by two different features, consisting of a hydrophilic head and a hydrophobic tail. Palm Oil Mill Effluent (POME) is an agro-industrial waste that contains many nutrients such as carbohydrates and lipids. The research was conducted with the aim of obtaining potential biosurfactant-producing yeast strains and determining the optimal conditions for biosurfactant production based on the concentration of POME as carbon substrate and pH. Screening 192 yeast strains by drop-collapse method and emulsification test. The selected strains based on variation of POME substrate concentration as carbon source and media pH were optimized using self-directing optimization with a Completely Randomized Design (CRD). The optimization data were analyzed using ANOVA and further tested with Duncan's test. The optimization results showed that the concentration of POME as carbon source and pH had a significant effect on increasing the emulsification index (IE24) ($p < 0.05$). The optimum biosurfactant production was achieved at the concentration of POME 20% as carbon source and pH 7 (IE24: *P. pini* Y125 = 51.22%; *C. quercitrusa* Y359 = 43.68%). The components of biosurfactants of the yeasts *P. pini* Y125 and *C. quercitrusa* Y359 based on GC-MS include tetraethylene glycol diethyl ether; sulfuric acid, dimethyl ester; hexadecanoic acid, methyl ester; methyl stearate; dan hexasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11-dodecamethyl. Based on the emulsification ability and characterization, *Pichia pini* Y125 and *Candida quercitrusa* Y359 have the potential to be developed as a sophorolipid biosurfactant.

Keywords: Biosurfactant; yeast; POME; optimization; sophorolipid