

ABSTRACT

Matthew Arriel Christiano Loedji. 24020220130061. ***Optimization Of Lipase Production From Lipolytic Yeast With Variation Of Substrate Concentration And pH Using Responses Surface Methodology (RSM).*** (Under the guidance of Arina Tri Lunggani and I Made Sudiana).

The enzyme industry is growing rapidly with a global market value of 6 billion USD in 2017, including applications in biodiesel and environmentally friendly biofuels. Lipase enzymes, which play an important role in the lipid degradation process, are used in various industrial sectors such as food, pharmaceuticals, and bioenergy. The utilization of Palm Oil Mill Effluent (POME) as a substrate for lipase production offers an economical and sustainable solution. POME is rich in organic components such as carbohydrates, lipids, and proteins, making it a potential substrate for lipase-producing microorganisms. Lipolytic yeasts such as Pichia sp. and Trichosporon coremiiforme were selected for this study due to their ability to degrade hydrophobic and hydrophilic substrates. To optimize lipase production, Response Surface Methodology (RSM) was applied, which aims to determine the best fermentation conditions based on variations in substrate concentration and pH. This study compared two types of lipase production media, namely pure POME and POME supplemented with nutrients such as peptone, yeast extract, tween 80, and olive oil. Titration tests were conducted to measure lipase activity, while carbohydrate concentration tests were conducted to assess carbohydrate content during fermentation. Optimization results using RSM showed that substrate concentration and pH had a significant effect on lipase production. The 2FI model was selected for Pichia sp., while the quadratic model was selected for T. coremiiforme. The optimal condition for Pichia sp. was at 80% POME concentration and pH 5 with a lipase activity of 27.96 U/mL, while for T. coremiiforme, the optimal condition was at 53.19% POME concentration and pH 7.69 with a lipase activity of 19.41 U/mL. This study shows that POME can be utilized as a potential substrate for lipase production, with efficiency depending on the optimization conditions and the type of yeast used.

Keywords: Lipase, Palm Oil Mill Effluent (POME), Pichia sp., Response Surface Methodology (RSM), Trichosporon coremiiforme.