**ABSTRACT**

Molecular docking is an emerging field that can aid in tackling rising environmental issues such as microplastic (MP) pollution. MP poses a threat to both the environment and human health, which makes its degradation crucial. Biodegradation is the most efficient eco- friendly method that uses the ability of microbes to secrete enzymes that can break down polymers. However, the in vitro culturing of microorganisms and screening of efficient enzymes in biodegradation is laborious and time-consuming. The application of molecular docking to identify the enzymes that bind to target polymers is a promising approach. Therefore, this study aims to identify the enzymes that bind the target MP through molecular docking and simulations. In this study, 14 enzymes were docked against plastic compounds using Auto Dock Vina software version 4.2. Results show that enzymes such as Copper-dependent laccase (-5.65 kcal/mol), Lignin peroxidase (- 5.21 kcal/mol), and Lipase (-3.11 kcal/mol) had the highest binding affinity to plastic compounds such as Polystyrene, Polyurethane, and Polyvinyl carbon respectively. Additionally, the amino acids involved in binding were discussed of the three highest binding affinity of each polymer along with the interactions such as Van der Waals, hydrogen bonding, and pi-pi interactions.