

ABSTRACT

Farida Alvitarsari. 24020121130088. Potential of Keratinase Enzym from Freshwater Sponge Symbiont Bacteria Isolates *Oncosclera asiatica* for the Unhairing Stage of Leather Tanning Process. Under the guidance of Wijanarka and Arifa Rizqi Nafisa.

*The leather industry grew by 84.49% in July 2022. This increase also led to an increase in hazardous waste such as COD and BOD. Keratinase enzymes are enzymes with keratinolytic activity that can degrade keratin such as hair and fur. Keratinase enzymes have the potential to be an environmentally friendly alternative in the leather tanning industry, especially in the unhairing stage. This study aims to determine the potential of keratinase enzymes from freshwater sponge symbiont bacteria isolates *O. asiatica*, the optimal conditions for enzyme activity, and the effects of their application in the unhairing process. The research methods included primary and secondary screening of keratinase enzymes, macroscopic and microscopic characterization, enzyme extraction, optimization tests with variations in pH and temperature, determination of enzyme concentration and molecular weight, and enzyme application tests on leather. Primary screening results showed that OA-7 had the highest average hydrolysis index of 3,167. Secondary screening indicated that OA-7 positively produced keratinase with an average weight loss of 74.54% on goat skin, 45% on chicken feather powder, and 25% on whole chicken feathers after 7 days of incubation. The macroscopic characteristics of OA-7 are round in shape, with smooth edges, convex elevation, moist texture, and a white-yellowish color, while the microscopic characteristics are Gram-negative with short bacilli. The optimal enzyme activity of OA-7 was at 30°C and pH 7, with an activity of $5,543 \pm 0,249$ U. The total protein concentration was $2,059 \pm 0.0085$ mg/mL, with a specific activity of 1.787 U/mg. The application of enzymes accelerates the process, with optimal hair loss achieved at 48 hours for goat and sheep skin, and 72 hours for cow skin.*

Keywords : *keratinase enzyme, leather tanning, unhairing*