

ABSTRACT

Ayu Maulidina Nada Shilma, 24020121140183, *Potential and Application of Protease Enzyme of Manglicolous Yeast Isolate from Jepara as a Detergent Additive Compound. Under the guidance of Hermin Pancasakti Kusumaningrum and Arifa Rizqi Nafisa.*

The detergent industry plays an important role in modern life due to its widespread use, but detergent waste can cause environmental problems. Innovation in environmentally friendly detergent formulations is needed, one of which is through the addition of protease enzymes. Protease enzymes function to break down complex proteins, thereby increasing the effectiveness of detergents. Proteases derived from microorganisms, such as manglicolous yeast, have the potential to be developed as detergent additive compounds. This study aims to observe the morphological characteristics of manglicolous yeast isolates, determine their ability to produce protease enzymes, determine the optimal temperature and pH of protease enzyme activity, and evaluate their potential application as detergent additives. The methods used in this study include characterizing the morphology of the isolates, screening protease enzymes using Skim Milk Agar media, making a tyrosine standard curve, testing protease enzyme activity at various temperatures (30°C, 40°C, and 50°C) and pH (5, 7, and 9) and testing the effectiveness of protease enzymes as additives in detergent formulations through various washing treatments. The results showed that the JPR 9 isolate had a round colony morphology, creamy white in color, convex elevation, flat edges, oval cells, and multilateral budding. The manglicolous yeast isolate was able to produce protease enzymes with the highest proteolytic index (IP) in the JPR 9 isolate, which was 2.6. Optimal enzyme activity was obtained at a temperature of 50°C and pH 7 of 0.395 Units/mL. The combination of temperature and pH significantly affected the enzyme activity produced. The results of visual observation in the washing performance test showed that the combination of detergent solution and protease enzyme treatment provided the highest cleaning effectiveness compared to other treatments on all detergent brands tested. These results indicate the initial potential for the use of protease enzymes from manglicolous yeast as additive compounds in environmentally friendly detergent formulations.

Keywords: *detergent, protease enzyme, manglicolous yeast.*