ABSTRACT

Indah Dwi Alwiaty, 24020121140204 **Skrining dan Identifikasi Molekuler Bakteri Penghasil Selulase Kawasan Hutan Penggaron, Ungaran.** Supervised by Nurhayati and Susiana Purwantisari.

Penggaron Forest in Ungaran is dominated by teak trees (*Tectona grandis*), which produce litter with a high lignocellulose content, particularly cellulose. This composition slows down the decomposition process and potentially decreases soil quality. Cellulase enzyme was selected as the research focus due to its role in hydrolyzing cellulose into simple compounds that accelerate litter degradation. This study aimed to screen and obtain bacterial isolates from teak leaf litter that produce the highest cellulase activity, to quantitatively assess cellulase activity of the selected isolate, and to identify the best cellulase-producing isolate based on 16S rRNA gene molecular analysis. Bacterial isolation was conducted using a serial dilution method on Carboxymethyl Cellulose (CMC) medium, resulting in eight cellulolytic isolates. These isolates were characterized macroscopically, microscopically, and physiologically through catalase and cellulase tests. Screening of enzyme activity using Congo Red reagent showed variation in cellulolytic index, with the highest value of 2.16 recorded in isolate C7, which was selected for further analysis. Cellulase activity was determined using the 3,5-dinitrosalicylic acid (DNS) method with glucose as the standard at 540 nm. Observations were carried out every 4 hours for 48 hours to represent enzyme production changes during bacterial growth phases. The maximum activity was recorded at 0.306 U/mL at 40 hours, indicating the peak of enzyme production. Molecular identification through 16S rRNA gene amplification using universal primers 27F and 1492R produced a fragment of approximately 1500 bp. BLAST analysis with MEGA11 software using the Neighbor Joining method revealed 98.14% similarity with *Stenotrophomonas* sp., supported by a bootstrap value of 92. Isolate C7, identified as *Stenotrophomonas* sp., exhibited circular colonies, convex elevation, cream-white pigmentation, Gram-negative rod-shaped morphology, and positive catalase and cellulase tests, thus showing potential as a decomposer agent in lignocellulosic litter degradation..

Keywords: *cellulolytic bacteria, CMC, molecular identification 16S rRNA, Stenotropomonas sp.*