ABSTRACT

Grace Stevani Br Ginting, (24020122140213). Isolation, Characterization, and Cellulase Activity Assay of Symbiotic Bacteria from the White-Backed Planthopper (*Sogatella furcifera*). Supervised by Arina Tri Lunggani and Arifa Rizqi Nafisa

Sogatella furcifera is an important insect pest of rice plants. The insect gut is known to harbor various symbiotic bacteria, some of which have the potential to produce cellulase enzymes. Cellulase is a hydrolytic enzyme that catalyzes the hydrolysis of cellulose into simple sugars. This study aimed to isolate and characterize symbiotic bacteria from S. furcifera, screen their cellulolytic ability, assess cellulase enzyme activity, and identify the bacterial isolates using the 16S rRNA gene. Bacterial isolation was carried out on Nutrient Agar (NA) medium, followed by colony morphology characterization, Gram staining, screening of cellulolytic ability on Carboxymethyl Cellulose (CMC) medium, and assessment of cellulase enzyme activity using the 3,5-dinitrosalicylic acid (DNS) method. Molecular identification was performed through amplification of the 16S rRNA gene using the 27F and 1492R primers, followed by BLAST analysis and construction of a phylogenetic tree using the Neighbor-Joining method. The results showed that four symbiotic bacterial isolates were obtained, namely BS1, BS3, BS5, and BS8, all of which demonstrated the ability to hydrolyze CMC and produce cellulase enzymes with varying levels of activity. Molecular identification revealed that two isolates (BS1 and BS5) were closely related to the genus Pseudomonas, while the other two isolates (BS3 and BS8) were closely related to the genus Bacillus. Isolate BS1 exhibited the highest cellulase enzyme activity (8.07 U/mL), whereas isolate BS5 had the highest cellulolytic index (1.61). Based on these findings, the symbiotic bacterial isolates from S. furcifera demonstrated cellulolytic ability and show potential as a source of cellulase-producing bacteria.

Keywords: Cellulase enzyme, cellulolytic index, Sogatella furcifera, symbiotic bacteria