

ABSTRACT

Andi Raifina Hana Rosyada, 24020222140065. **Molecular Exploration and Identification of Inulinolytic Bacteria From Potato Tubers (*Solanum tuberosum* L.) Using DNA Barcoding Method** under the guidance Wijanarka dan Ditta Putri Kumalasari.

Inulin is a group of natural polysaccharides from carbohydrates composed of a combination of fructose monosaccharides, found in tubers including potatoes (*Solanum tuberosum* L.). This study isolated and identified inulinolytic bacteria from granola variety potato tubers. Samples were fermented for 10 days, then the bacteria were isolated on Nutrient Agar (NA) media and selected using Inulinase Selecting Medium (ISM). Potential isolates were measured for growth and tested for enzyme activity using DNS with variations in pH (5, 7, 9) and incubation temperature (50°C, 55°C). Data were analyzed using ANOVA and Tukey's test. Molecular identification was carried out through DNA extraction, 16S rRNA gene amplification (primer 27F/1492R), sequencing, and phylogenetic tree analysis. The results showed that 13 single bacterial isolates grew on NA media with 11 isolates able to grow on ISM media. Isolate I-13 showed the highest activity at 24 hours of incubation with an enzyme activity of 0.77 U/mL among the other 11 isolates, making it a potential isolate. Morphological characterization of isolate I-13 identified cream colonies, round in shape with smooth edges, and Gram-positive coccus-shaped cells arranged in groups. Isolate I-13 showed the highest inulinase activity, reaching 1.11 U/mL at 12 hours with a pH of 9 and a temperature of 50°C. Statistical analysis proved that incubation temperature significantly affected enzyme activity (optimal at 50°C), while pH variations did not show a significant effect. Molecular identification showed that isolate I-13 had 100% similarity to *Staphylococcus xylosus* strain Bt170. These findings expand the diversity of inulinolytic bacteria and demonstrate the potential of *S. xylosus* as an inulinase candidate for applications in the food, pharmaceutical, and bioenergy industries.

Keywords: Potato, Inulinase, Inulinolytic Bacteria, DNA Barcoding.