

## **PRODUKSI DAN KARAKTERISASI BAKTERIOSIN DARI BAKTERI ASAM LAKTAT HASIL FERMENTASI SPONTAN SHIMEJI (*Hypsizygus sp.*)**

Nahdah Adyana Putri

21/480755/BI/10831

Dosen Pembimbing: Sari Darmasiwi, S.Si., M.Biotech., Ph.D.

### **INTISARI**

Fermentasi spontan merupakan metode alami yang digunakan untuk meningkatkan aktivitas biologis dan kandungan senyawa aktif sekaligus berperan sebagai upaya preservasi hayati. Bakteri asam laktat (BAL) sebagai mikroorganisme dominan dalam proses fermentasi ini menghasilkan metabolit antimikroba seperti asam organik, CO<sub>2</sub>, hidrogen peroksida, serta bakteriosin, yaitu protein antimikroba yang disintesis secara ribosomal dan efektif melawan berbagai patogen. Penelitian ini bertujuan untuk mengisolasi dan mengidentifikasi BAL dari fermentasi spontan *Hypsizygus sp.*, serta mengkarakterisasi bakteriosin yang dihasilkan. Fermentasi dilakukan selama 6 hari pada suhu ruang ( $\pm 27^{\circ}\text{C}$ ) dengan penambahan 2% NaCl, 1% sukrosa, 3% cabai dan 2% bawang putih. Isolasi BAL dilakukan dari hari ke-0, 2, 4, dan 6 menggunakan media MRS agar, diinkubasi secara anaerob pada 37°C selama 48 jam. Sebanyak 36 isolat diperoleh dan dikarakterisasi berdasarkan morfologi koloni dan sel, pewarnaan Gram, uji katalase, toleransi suhu dan garam, serta fermentasi glukosa. Empat isolat dipilih sebagai kandidat potensial, dengan ISL-2A dan ISL-4G menunjukkan aktivitas antibakteri tertinggi terhadap *Staphylococcus aureus* dan *Escherichia coli*. Bakteriosin stabil pada pH 3–7 dan suhu hingga 80°C, namun tidak tahan terhadap enzim proteolitik. Temuan ini menunjukkan potensi BAL dari *Hypsizygus sp.* sebagai agen antimikroba alami dan agen biopreservasi untuk aplikasi di bidang pangan.

**KATA KUNCI:** BAL, Bakteriosin, Fermentasi, Jamur, Probiotik

**PRODUCTION AND CHARACTERIZATION OF  
BACTERIOSINS FROM LACTIC ACID BACTERIA FROM  
SPONTANEOUS FERMENTATION OF SHIMEJI (*Hypsizygyus*  
sp.)**

Nahdah Adyana Putri

21/480755/BI/10831

Supervisor: Sari Darmasiwi, S.Si., M.Biotech., Ph.D.

**ABSTRACT**

Spontaneous fermentation is a natural method used to enhance biological activity and the content of active compounds, while also serving as a form of biological preservation. Lactic acid bacteria (LAB), as the dominant microorganisms in this fermentation process, produce antimicrobial metabolites such as organic acids, CO<sub>2</sub>, hydrogen peroxide, and bacteriocins—ribosomally synthesized antimicrobial proteins that are effective against various pathogens. *Hypsizygyus* sp. is an edible fungus with high nutritional content but is susceptible to food spoilage so it requires preservation efforts, one of which is spontaneous fermentation. This study aims to isolate and identify LAB from spontaneous fermentation of *Hypsizygyus* sp., as well as to characterize the bacteriocins produced. Fermentation was carried out for 6 days at room temperature ( $\pm 27^{\circ}\text{C}$ ) with the addition of 2% NaCl, 1% sucrose, 3% chili fruit, and 2% garlic. LAB isolation was performed on days 0, 2, 4, and 6 using MRS agar medium, incubated anaerobically at 37°C for 48 hours. A total of 36 isolates were obtained and characterized based on colony and cell morphology, Gram staining, catalase test, temperature and salt tolerance, and glucose fermentation. Four isolates were selected as potential candidates, with ISL-2A and ISL-4G showing the highest antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*. The bacteriocins were stable at pH 3–7 and temperatures up to 80°C but were not resistant to proteolytic enzymes. These findings indicate the potential of LAB from *Hypsizygyus* sp. as natural antimicrobial agents and biopreservation agents for food applications.

**KEYWORDS:** Bacteriocin, Fermentation, LAB, Fungi, Probiotics