

INTISARI

Strain *Lactiplantibacillus* yang sebelumnya telah diteliti (*Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, Mut-7, Mut-3 dan Kita-3) yang diisolasi dari pangan fermentasi Indonesia telah dipelajari potensinya sebagai bakteri probiotik. Sejumlah penelitian menunjukkan bahwa strain *Lactiplantibacillus* dapat menghasilkan beberapa senyawa bermanfaat, seperti asam amino. *Gamma-Aminobutyric Acid* (GABA) merupakan asam amino yang memiliki beberapa fungsi fisiologis yang bermanfaat bagi kesehatan manusia. GABA dapat berperan sebagai agen penenang yang dapat membantu meningkatkan kesehatan otak. Permintaan akan GABA beserta pangan yang diperkaya GABA meningkat dikarenakan fungsi fisiologis tersebut. Penelitian ini dilakukan untuk mengetahui potensi isolat probiotik lokal dalam memproduksi GABA.

Anotasi genom dilakukan dengan menggunakan *Rapid Annotation Subsystem Technology* (RAST) untuk menyelidiki keberadaan enzim yang berperan dalam biosintesis GABA. Gen pengkode enzim dari masing-masing strain selanjutnya diselaraskan menggunakan *Multiple Sequence Comparison by Log-Expectation* (MUSCLE) untuk mengidentifikasi sekuens asam amino. Produksi GABA dianalisis dengan menggunakan Kromatografi Cair Kinerja Tinggi / *High Performance Liquid Chromatography* (HPLC).

Hasil analisis *in silico* menunjukkan bahwa keempat isolat lokal *Lactiplantibacillus plantarum* subsp. *plantarum* memiliki gen yang mengkode enzim yang berperan dalam biosintesis GABA. Sekuens asam amino menunjukkan 99% kemiripan terhadap glutamat dehidrogenase (Gdh) dan glutamat dekarboksilase (GadB) dari *L. plantarum* WCFS1. Hasil produksi GABA bervariasi pada setiap strain. *Lactiplantibacillus plantarum* subsp. *plantarum* Mut-3 memiliki produksi GABA tertinggi mencapai 41,52 mg/l setelah 48 jam fermentasi.

Kata kunci: GABA, *Lactiplantibacillus plantarum*, probiotik.

ABSTRACT

Lactiplantibacillus strains (*Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, Mut-7, Mut-3 and Kita-3) isolated from Indonesian foods have been studied as probiotic agents. Several studies show that *Lactiplantibacillus* strains could produce some beneficial compound, such as amino acid. Gamma-Aminobutyric Acid (GABA) are amino acids that have several physiological functions on human health. GABA can act as relaxing agents, which can help to improve brain health. The demand for GABA and GABA-enriched foods is raising due to this physiological function. This study was conducted to investigate and determine the potential of the local probiotic isolat in producing GABA.

The genome was annotated using Rapid Annotation Subsystem Technology (RAST) to investigate the presence of enzymes that play a role in GABA biosynthesis. The enzyme encoding genes of each strain were further aligned using multiple sequence comparison by log-expectation (MUSCLE) to identify the amino acid sequences. The GABA production were assessed using High-Performance Liquid Chromatography (HPLC).

In silico analysis showed that all *Lactiplantibacillus plantarum* subsp. *plantarum* strains have the gene encoding the biosynthesis enzyme of GABA production. The amino acid sequences showed 99% identity to glutamate dehydrogenase (Gdh) and glutamate decarboxylase (GadB) of *L. plantarum* WCFS1. The production of GABA varied within the strain. *Lactiplantibacillus plantarum* subsp. *plantarum* Mut-3 had the highest GABA production after 48 h fermentation, reached 41,52 mg/l.

Keywords: GABA, *Lactiplantibacillus plantarum*, probiotic