

**Gen Penanda Respons Stres Pada *Lactiplantibacillus plantarum* Mut-3
dan *Lactiplantibacillus plantarum* Mut-7 Melalui Analisa Whole Genome
Sequencing (WGS)**

INTISARI

Probiotik saat ini banyak di konsumsi dalam campuran beberapa matriks makanan dan memberikan manfaat kesehatan bagi inang nya. Kelangsungan hidup sel probiotik dipengaruhi oleh beberapa faktor, antara lain paparan suhu tinggi selama proses produksi dan suhu rendah selama penyimpanan. Penelitian ini melaporkan respons stres *Lactiplantibacillus plantarum* Mut-3 dan *Lactiplantibacillus plantarum* Mut-7 setelah 24 jam penyimpanan pada 4 °C dan 20 °C. Respons stres dingin dari *cold shock protein* dievaluasi melalui sekuensing seluruh genom. Hasil penelitian menunjukkan bahwa viabilitas *L. plantarum* Mut-3 dan *L. plantarum* Mut-7 dapat bertahan hidup pada suhu penyimpanan tersebut. Begitu pula mengenai viabilitas dua galur tersebut masih dapat bertahan ketika diberi suhu 40 °C selama 30 menit, namun mengalami penurunan jumlah sel pada suhu 45 °C jika dibandingkan dengan jumlah sel awal. Melalui analisis *whole genome* terdapat satu gen *CspC/CspA* yang kemungkinan berperan aktif dalam menjaga ketahanan sel pada suhu rendah karena memiliki *conserved motif* pada RNBP-1 dan RNBP-2 (RNA Binding Protein) yang mirip dengan *Listeria monocytogenes* EGD-e yang juga aktif pada suhu rendah. Kemudian, kedua galur memiliki *heat shock protein* DnaK dengan N-terminal yang sama dengan *L. plantarum* WCFS1 dan *L. plantarum* DPC2739 yang diadaptasikan pada suhu 42 °C selama 1 jam yang mengalami peningkatan ekspresi protein DnaK.

Kata kunci: *Cold shock protein*, *Heat shock potein*; *Lactiplantibacillus plantarum* Mut-3; *Lactiplantibacillus plantarum* Mut-7

**Stress Response Genes in *Lactiplantibacillus plantarum* Mut-3 and
Lactiplantibacillus plantarum Mut-7 Through Whole Genome Sequencing
(WGS) Analysis**

ABSTRACT

Probiotics are currently added to the mix of some food matrices and provide health benefits to the host. Cell survival is influenced by several factors, including exposure to high temperatures during the production process and low temperatures during storage. This study reported the stress response of *Lactiplantibacillus plantarum* Mut-3 and *Lactiplantibacillus plantarum* Mut-7 after 24-hour of storage at 4 °C and 20 °C. *Cold shock protein* as cold stress response via genome sequencing is evaluated. The results showed that the viability of *L. plantarum* Mut-3 and *L. plantarum* Mut-7 could survive at low temperatures. Similarly, the viability of the two strain could still survive at 40 °C for 30 minutes, but decreased at 45 °C when compared to the initial cell count. Through whole genome analysis there is one *CspC/CspA* gene that possibly can play a role in maintaining cell resistance at low temperatures because it has a conserved motif on RNP-1 and RNP-2 (RNA Binding Protein) as belonging to *Listeria monocytogenes* EGD-e which is also active at low temperatures. Then, those strain also had the same amino acid N-terminal sequence of *heat shock protein* DnaK as one of HSP as *L. plantarum* WCFS1 and *L. plantarum* DPC2739 adapted at 42 °C for 1 hour encounter increased of DnaK protein expression.

Keywords: Cold shock protein, Heat shock protein; *Lactiplantibacillus plantarum* Mut-3; *Lactiplantibacillus plantarum* Mut-7