

## KARAKTERISASI GEN DAN *MODELING* GLUKOSA 6-FOSFAT DEHIDROGENASE DAN PROTEASE BAKTERI ASAM LAKTAT (BAL) HASIL ISOLASI DARI BUAH KELENGKENG (*Dimocarpus longan*)

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### INTISARI

Telah dilakukan karakterisasi urutan gen dan *modeling* glukosa 6-fosfat dehidrogenase dan protease Bakteri Asam Laktat (BAL) hasil isolasi dari buah kelengkeng (*Dimocarpus longan*). Analisis gen glukosa 6-fosfat dehidrogenase dan protease dengan menggunakan *server* SWISS-MODEL. Penelitian ini bertujuan untuk mendapatkan isolat dan karakterisasi BAL, gen pengkode glukosa 6-fosfat dehidrogenase, protease, dan karakterisasi struktur 3D enzim glukosa 6-fosfat dehidrogenase dan protease dengan menggunakan *server* SWISS-MODEL. Isolasi dan karakterisasi BAL diperoleh urutan gen BAL dari proses amplifikasi dengan menggunakan primer universal dan di amplifikasi dengan polymerase chain reaction (PCR). Hasil amplifikasi gen yang didapatkan di desain primernya, berdasarkan gen dari isolat BAL hasil sekuensing dengan strain yang terdapat di Genbank. Analisis urutan nukleotida, asam amino dan struktur 3D dari gen glukosa 6-fosfat dehidrogenase dan protease yang didapatkan dengan menggunakan *server* SWISS-MODEL.

Hasil isolasi dan karakterisasi didapatkan dua strain BAL, yaitu: *L. mesenteroides subsp suionicum* strain LT-38 dan *L. mesenteroides* strain C305.16. Fragmen gen glukosa 6-fosfat dehidrogenase dan protease dari BAL telah berhasil dikarakterisasi dengan panjang fragmen gen sekitar 1112 bp dan 1147 bp, persentase kemiripan sebesar 99,41% terhadap *glucose 6-phospat dehidro-genase* dan 99,04% terhadap *PDZ domain-containing protein* strain *L. suionicum*. Karakterisasi struktur 3D permodelan enzim glukosa 6-fosfat dehidrogenase dan protease dengan hasil identifikasi dan prediksi isolat protein target, yaitu glukosa 6- fosfat dehidrogenase dengan persentase kemiripan 93,81% dan *protease Do-like, chloroplastic* dengan persentase kemiripan sebesar 37,62%.

**Kata kunci:** gen, glukosa 6-fosfat dehidrogenase, protease, BAL, kelengkeng

**GENE CHARACTERIZATION AND MODELING OF GLUCOSE  
6-PHOSPHATE DEHYDROGENASE AND PROTEASE OF LACTIC ACID  
BACTERIA (LAB) ISOLATED FROM KELENGKENG  
(*Dimocarpus longan*) FRUIT**

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**ABSTRACT**

Gene characterization and modeling of glucose 6-phosphate dehydrogenase and protease of Lactic Acid Bacteria (LAB) has been done by isolated from kelengkeng (*Dimocarpus longan*) fruit. Glucose 6-phosphate dehydrogenase and protease gene analysis using the SWISS-MODEL server. This study aims to get isolate and characterize LAB, the coding gene of glucose 6-phosphate dehydrogenase, protease, and characterization of the 3D structure from enzyme glucose 6-phosphate dehydrogenase and protease using the SWISS-MODEL server. The isolation and characterization of LAB were obtained gene sequence of LAB from the amplification process by using universal primers and amplified with polymerase chain reaction (PCR). The results of gene amplification were obtained in the primary design, based on a gene from LAB isolate sequence results with strains found in Genbank. Analysis of nucleotide sequences, amino acids and 3D structures of the glucose 6-phosphate dehydrogenase and protease genes obtained using the SWISS-MODEL server.

The results of isolation and characterization obtained two LAB strains, namely: *L. mesenteroides subsp suionicum* strain LT-38 and *L. mesenteroides* strain C305.16. The gene fragments of glucose 6-phosphate dehydrogenase and protease from LAB have been successfully characterized by length of gene fragment about 1112 bp and 1147 bp, a similarity percentage of 99.41% to *glucose 6-phosphate dehydrogenase* and 99.04% to *PDZ domain-containing protein* strain *L. suionicum*. Characterization of 3D structure modeling of *glucose 6-phosphate dehydrogenase* and protease enzymes with the results of identification and prediction of target protein isolates, namely *glucose 6-phosphate dehydrogenase* with a similarity percentage of 93.81% and *Protease Do-like, chloroplastic* with a similarity percentage of 37.62%.

**Keywords:** gene, glucose 6-phosphate dehydrogenase, protease, LAB, kelengkeng