

POTENSI DAN PRODUKSI EKSPOLISAKARIDA (EPS) ASAL *Lactiplantibacillus plantarum* ISOLAT LOKAL

INTISARI

Eksopolisakarida (EPS) merupakan polisakarida ekstraseluler, polimer dari gula monosakarida dan turunannya, dan memiliki berat molekul yang tinggi. Bakteri asam laktat merupakan salah satu jenis bakteri yang mampu menghasilkan berbagai jenis eksopolisakarida dengan berbagai struktur dan sifat fisiknya. Sifat-sifat eksopolisakarida yang beraneka ragam sangat menarik untuk aplikasi di industri pangan, *nutraceutical* dan farmasi seperti untuk *emulsifier*, *stabilizer*, *thickener*, *sweetener*, prebiotik, antioksidan, immunomodulator. Tujuan penelitian ini yaitu untuk menganalisis informasi genomik enzim *glycosyltransferase* (*Gtf*) pada strain lokal, menguji kemampuannya dalam menghasilkan eksopolisakarida dan kemampuan fungsionalnya. Terdapat total enam sekuen *glycosyltransferase* (*Gtf*) yang dibawa oleh lima strain lokal, dimana masing-masing strain membawa satu sekuen dan khusus strain K-3 membawa dua sekuen. Hasil analisis pensejajaran gen organisasi dan pohon filogenetik menyatakan bahwa lima sekuen *Gtf* kemungkinan membawa gen yang mengekspresikan *Gtf*. produksi EPS oleh kelima strain yang berbeda tidak berpengaruh nyata ($P > 0,05$). Hasil analisis menggunakan *Fourier Transformed Infrared* (FTIR) menunjukkan adanya kesamaan gelombang pada EPS produksi *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, T-3, Kita-3, Mut-3, dan Mut-7 dengan penelitian sebelumnya. Hasil analisis statistik menunjukkan bahwa EPS dari kelima strain tidak memiliki aktivitas antibakteri. Hasil uji aktivitas antioksidan EPS menunjukkan hasil yang berbeda, strain DAD-13 memiliki aktivitas yang paling tinggi sebesar 68,83%. Hasil uji indeks prebiotik EPS dari kelima strain memiliki indeks prebiotik yang sama dengan prebiotik komersial. Kesimpulannya *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, T-3, Kita-3, Mut-3, dan Mut-7 mampu memproduksi eksopolisakarida yang disandi oleh gen *glycosyltransferase*.

Kata kunci: Eksopolisakarida, bakteri asam laktat, probiotik

POTENTIAL AND PRODUCTION OF EXOPOLYSACCHARIDE (EPS) FROM *Lactiplantibacillus plantarum* LOCAL ISOLATE

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SUMMARY

Exopolysaccharides (EPS) are extracellular polysaccharides, polymers of monosaccharide sugars and their derivatives, and have a high molecular weight. Lactic acid bacteria are one type of bacteria that can produce various types of exopolysaccharides with various structures and physical properties. The diverse properties of exopolysaccharides are very interesting for applications in the food, nutraceutical and pharmaceutical industries such as for emulsifiers, stabilizers, thickeners, sweeteners, prebiotics, antioxidants, immunomodulators. The aim of this study was to analyze the genomic information of *glycosyltransferase (Gtf)* enzyme in local strains, test its ability to produce exopolysaccharide and its functional ability. There are a total of six *Gtf* sequences carried by five local strains, where each strain carries one sequence and specifically strain K-3 carries two sequences. The results of gene organization and phylogenetic tree alignment analysis suggested that the five *Gtf* sequences were likely to carry *Gtf*-expressing genes. EPS production by the five different strains had no significant effect ($P > 0.05$). The results of analysis using Fourier Transformed Infrared (FTIR) showed the similarity of waves in EPS production of *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, T-3, Kita-3, Mut-3, and Mut-7 with previous studies. The results of statistical analysis showed that EPS from the five strains did not have antibacterial activity. The results of the EPS antioxidant activity test showed different results, strain DAD-13 had the highest activity of 68.83%. The prebiotic index test results showed that EPS from the five strains had the same prebiotic index as commercial prebiotics. In conclusion, *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13, T-3, Kita-3, Mut-3, and Mut-7 were able to produce exopolysaccharides encoded by the glycosyltransferase gene.

Keywords: Exopolysaccharide, lactic acid bacteria, probiotic