IDENTIFIKASI PROTEIN YANG BERPERAN DALAM METABOLISME INULIN PADA *Lactobacillus casei* STRAIN ASAL SALURAN PENCERNAAN

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INTISARI

Lactobacillus casei strain AP dan AG adalah bakteri asam laktat hasil isolasi dari saluran pencernaan bayi yang mampu mengkonsumsi prebiotik inulin sehingga berpotensi sebagai probiotik. Namun demikian, informasi mengenai metabolisme inulin pada kedua strain ini masih terbatas. Penelitian ini bertujuan untuk mengidentifikasi protein yang diekspresikan dan mengetahui perannya dalam metabolisme inulin serta mendeteksi gen *β-fruktosidase* di *L. casei* strain AP dan AG saat ditumbuhkan dalam medium inulin (10 g/L) sebagai satu-satunya sumber karbon.

Pada penelitian ini dilakukan analisis gula, protein dan deteksi gen *β-fruktosidase* pada *L. casei* strain AP dan AG. Kandungan gula dianalisis menggunakan HPLC pada sampel intraseluler dan supernatan pasca inkubasi 6 dan 20 jam. Analisis protein dilakukan dengan SDS-PAGE pasca inkubasi 24 jam dilanjutkan analisis ESI-LC-MS/MS pada pita protein yang berbeda untuk mengetahui urutan asam amino. Deteksi gen *β-fruktosidase* dilakukan pada kedua strain bakteri dengan *Polymerase Chain Reaction* (PCR).

Inulin terdeteksi di intraseluler dan supernatan *L. casei* strain AP dan AG. Pita protein berukuran 30 kDa pada protein dinding sel teridentifikasi sebagai protein PTS manosa/fruktosa/sorbosa spesifik IID dan *ATP-binding cassette transporter*. Protein tersebut diduga berperan dalam proses transport inulin ke dalam sel di *L. casei* strain AP dan AG. Pada saat yang sama, gen *β-fruktosidase* berhasil diamplikasi pada *L. casei* strain AP dan AG, secara berurutan berukuran 501 dan 506 pb pasca pertumbuhan dalam medium inulin sebagai sumber karbon.

Kata kunci : *Lactobacillus casei*, inulin, prebiotik, protein, ESI-LC-MS/MS.

IDENTIFICATION OF PROTEIN INVOLVED ON INULIN METABOLISM IN *Lactobacillus casei* STRAIN ORIGINATED FROM GASTROINTESTINAL TRACT

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ABSTRACT

Lactobacillus casei strain AP and AG are lactic acid bacteria isolated from gastrointestinal tract of Indonesian infant which able to consume inulin prebiotics, and therefore have capability as probiotics. Yet, further information regarding to inulin metabolism on both strains is not known. The objectives of this study were identifying expressed proteins and unravelling their role on inulin metabolism and detecting *β-fructosidase* gene in *L. casei* strain AP and AG when grown in inulin medium (10 g/L) as sole carbon source.

In this study, sugar and protein, together with *β-fructosidase* gene detection were analyzed on *L. casei* strain AP and AG. Sugar content were analyzed using HPLC for intracellular and supernatant sample at 6^{th} and 20^{th} hours post incubation. Protein analysis were performed by SDS-PAGE at 24^{th} hours post incubation, followed by ESI-LC-MS/MS analysis on specific protein band to find out its amino acid sequences. Detection of *β-fructosidase* gene was carried out on both strains using *Polymerase Chain Reaction* (PCR).

Inulin is detected on intracellular and supernatant of *L. casei* strain AP and AG. Protein band sized 30 kDa in cell wall protein was identified as protein PTS system mannose/fructose/sorbose specific IID component and ATP-binding cassette transporter. These proteins are involved in inulin transport process into the cell of *L. casei* strain AP and AG. Meanwhile, *β-fructosidase* gene was successfully amplified in *L. casei* strain AP and AG, sized respectively 501 and 506 bp upon growing in inulin metabolism.

Keywords: *Lactobacillus casei*, inulin, prebiotic, protein, ESI-LC-MS/MS.