KARAKTERISASI FENOTIPIK DAN AKTIVITAS ANTIMIKROBIA BAKTERI ASAM LAKTAT PADA LIMBAH PRODUKSI TEMPE

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ABSTRAK

Tempe merupakan makanan berbahan kacang kedelai yang dalam proses pembuatannya melibatkan peran Bakteri Asam Laktat (BAL) secara tidak langsung. Bakteri Asam Laktat (BAL) merupakan kelompok bakteri penghasil asam laktat yang berpotensi sebagai agen antimikrobia. Penelitian ini dilakukan untuk mengetahui karakter fenotipik beserta aktivitas antimikrobia pada BAL yang diisolasi dari limbah produksi tempe. Isolat BAL yang diperoleh dikarakterisasi secara morfologis, biokimiawi dan fisiologis. Hasil karakterisasi dianalisis secara deskriptif dan diidentifikasi dengan metode *profile matching* yang mengacu pada *Bergey's Manual of Systematic Bacteriology*. Pengujian aktivitas antimikrobia dilakukan dengan metode *spot on the lawn* dan dianalisis secara statistik dengan menggunakan SPSS dengan metode One Way Anova (taraf kepercayaan 95%). Diperoleh 4 isolat BAL (ES1B, ES1F, ES1G dan ES2D) dengan karakter fenotipik koloni *circular* berwarna putih susu dan putih kekuningan, berelevasi *convex* dan *raised,* struktur dalam *opaque* dan *translucent*, tepi *entire,* bentuk sel batang (*bacil*) dan tidak memproduksi spora, tidak memproduksi indol dan H_2S, fakultatif heterofermentatif dan heterofermentatif, non-motil, katalase negatif, mesofilik, *aciduric* serta non-halofilik. Dari hasil identifikasi yang mengacu pada *Bergey's Manual of Systematic Bacteriology*, diketahui isolat ES1B dan ES1G teridentifikasi sebagai *Lactobacillus fermentum* serta isolat ES1F dan ES2D teridentifikasi sebagai *Lactobacillus plantarum*. Seluruh isolat BAL memiliki aktivitas antimikrobia terhadap bakteri patogen uji *Staphylococcus aureus* dan *Escherichia coli* dengan tingkat daya hambat rendah, kecuali ES2B dan ES1G yang menunjukkan tingkat daya hambat sedang terhadap *Escherichia coli* (zona hambat sebesar 16,33 ± 1,53 mm dan 17,0 ± 1,0 mm).

Kata Kunci: Antimikrobia, karakterisasi, *Lactobacillus fermentum, Lactobacillus plantarum,* limbah produksi tempe

PHENOTYPIC CHARACTERIZATION AND ANTIMICROBIAL ACTIVITY OF LACTIC ACID BACTERIA IN TEMPEH PRODUCTION WASTE

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ABSTRACT

Tempeh is one of food made from soybeans, which in the production process involves Lactic Acid Bacteria (LAB) indirectly. Lactic Acid Bacteria (LAB) are a group of bacteria which producting lactic acid that has a potential as an antimicrobial agent. This research was conducted to determine the phenotypic character and antimicrobial activity of LAB isolated from tempeh production waste. LAB isolates are characterized morphologically, biochemically and physiologically. The characterization results were analyzed descriptively and identified by the *profile matching* method which refers to *Bergey's Manual of Systematic Bacteriology*. The antimicrobial activity test was then performed using the *spot on the lawn* method and analyzed statistically using SPSS with the One Way Anova method (95% confidence level). There were 4 LAB isolates (ES1B, ES1F, ES1G and ES2D) with phenotypic characters consisted of *circular* colonies of milky white and yellowish white, elevated *convex* and *raised*, inner structured in *opaque* and *translucent*, edged is *entire*, formed of rods cells (*bacil*) and *non spore-formed*, not produced indoles and H_2S, facultative heterofermentative and heterofermentative, non-motile, negative catalyzed, mesophilic, *aciduric* and non-halophilic. From the identification which refer to *Bergey's Manual of Systematic Bacteriology*, ES1B and ES1G isolates were identified as *Lactobacillus fermentum* and ES1F and ES2D isolates were identified as *Lactobacillus plantarum*. All LAB isolates had antimicrobial activity against *Staphylococcus aureus* and *Escherichia coli* with low inhibition, except ES2B and ES1G which showed moderate inhibition against *Escherichia coli* (zone of inhibition of 16.33 ± 1.53 mm and 17.0 ± 1.0 mm).

Keywords: Antimicrobial, characterization, *Lactobacillus fermentum, Lactobacillus plantarum,* tempeh production waste