KARAKTERISASI ANTIMIKROBIA DAN IDENTIFIKASI MOLEKULAR BAKTERI ASAM LAKTAT DARI SALURAN PENCERNAAN BELUT (*Monopterus albus,* ZUIEW, 1793)

Ridwan
16/406856/PBI/1444

Intisari

Peranan menguntungkan bakteri asam laktat diberbagai sektor mendorong para peneliti untuk mengisolasi bakteri tersebut dari berbagai sumber. Penelitian ini dilakukan karakterisasi antimikroba dan identifikasi molekular bakteri asam laktat yang diisolasi dari saluran pencernaan belut. Tigabelas isolat diperoleh dari hasil isolasi bakteri yang selanjutnya dikarakterisasi secara fenotipik untuk memilih bakteri asam laktat. Hasil karakterisasi fenotipik diperoleh tujuh isolat yang sesuai dengan karakter bakteri asam laktat (ciri bakteri asam laktat bersifat gram positif dan katalase negatif). Tujuh isolat bakteri asam laktat selanjutnya diskrining untuk memilihi tiga isolat tebaik dalam menghambat pertumbuhan bakteri patogen (*Aeromonas hydrophila*, *Staphylococcus aureus,* dan *Vibrio harveyi*). Hasil skrining menunjukkan bahwa tujuh isolat bakteri asam laktat memiliki aktivitas antimikroba yang mampu menghambat pertumbuhan bakteri patogen. Tiga isolat terbaik kemudian dipilih untuk diuji satbilitas ekstrak antimikroba yang dihasilkan terhadap suhu, pH, kloroform dan proteinase K; setelah itu dilakukan identifikasi molekular. Uji stabilitas ekstrak antimikroba menunjukkan bahwa tiga isolat terpilih (B1A, B1D dan B1E) memiliki stabilitas ekstrak antimikroba yang dihasilkan terhadap pH (2, 4 dan 8), stabil terhadap suhu (100^{o}C selama 30 menit dan 120^{o}C selama 15 menit) dan stabil terhadap perlakuan kloroform; serta sensitif terhadap perlakuan enzim proteinase K (kehilangan aktivitas). Selanjutnya hasil identifikasi molekular *gen 16S rRNA* menunjukkan bahwa ketiga isolat tersebut mengandung %mol G+C 51,42 pada B1D; 51,39 %mol pada B1A dan 51,38 %mol pada B1G. Hasil %mol G+C tersebut identik dengan spesies *Lactococcus lactis.* Hasil analisis BLASTn dan analisis filogenetik juga menunjukkan bahwa ketiga isolat yang diisolasi dari saluran pencernaan belut (*Monopterus albus*) merupakan spesies *Lactococcus lactis.*

Kata kunci : bakteri asam laktat, belut (*Monopterus albus*), antimikrobia, gen 16S rRNA

ANTIMICROBIAL CHARACTERIZATION AND MOLECULAR IDENTIFICATION LACTIC ACID BACTERIA FROM THE DIGESTIVE TRACT OF EELS (*Monopterus albus,* ZUIEW 1793)

Ridwan
16/406856/PBI/1444

Abstract

The role of lactic acid bacteria in various sectors has encouraged researchers to isolate these bacteria from various sources. This study carried out antimicrobial characterization and molecular identification of lactic acid bacteria isolated from the digestive tract of eels. Thirteen isolates were obtained from the results of bacterial isolation which were then phenotypically characterized to select lactic acid bacteria. The results of phenotypic characterization obtained seven isolates that were in accordance with the character of lactic acid bacteria (characteristic of lactic acid bacteria are gram positive and negative catalase). Seven lactic acid bacterial isolates were then screened to select the three best isolates to inhibit the growth of pathogenic bacteria (*Aeromonas hydrophila, Staphylococcus aureus*, and *Vibrio harveyi*). Skrining results showed that seven isolates of lactic acid bacteria had antimicrobial activity which was able to inhibit the growth of pathogenic bacteria. The three best isolates were then selected to be tested for the efficacy of the antimicrobial extract produced against temperature, pH, chloroform and proteinase K; after that molecular identification is carried out. Stability test of antimicrobial extract showed that three selected isolates (B1A, B1D and B1E) had the stability of the antimicrobial extract produced against pH (2, 4 and 8), stable to temperature (100^{o}C for 30 minutes and 120^{o}C for 15 minutes) and stable to treatment chloroform; and sensitive to proteinase K enzyme treatment (loss of activity). Stability test of antimicrobial extract showed that three selected isolates (B1A, B1D and B1E) had the stability of the antimicrobial extract produced against pH (2, 4 and 8), stable to temperature (100^{o}C for 30 minutes and 120^{o}C for 15 minutes) and stable to treatment chloroform; and sensitive to proteinase K enzyme treatment (loss of activity). Furthermore, the results of molecular identification of the 16S rRNA gene showed that the three isolates contained G + C mol% 51.42 in B1D; 51.39 mol% on B1A and 51.38 mol% on B1G. The result of G + C mole% is identical to the species *Lactococcus lactis*. The results of BLAST analysis and phylogenetic analysis also showed that the three isolates isolated from the eel digestive tract (*Monopterus albus*) were *Lactococcus lactis* species.

Key words: lactic acid bacteria, eels (*Monopterus albus*), antimicrobial, 16S rRNA gene