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Peningkatan Aktivitas Antibakteri Lactiplantibacillus plantarum GMP1 Melalui Ko-Kultur dengan Limosilactobacillus fermentum FNCC0322 terhadap Bakteri Kontaminan Produk Perikanan
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Intisari

PENINGKATAN AKTIVITAS ANTIBAKTERI BAKTERIOSIN *Lactiplantibacillus plantarum* GMP1 DENGAN *CO-CULTURE Limosilactobacillus fermentum* FNCC0322 TERHADAP BAKTERI KONTAMINAN PRODUK HASIL PERIKANAN

Bakteriosin yang dihasilkan GMP1 berpotensi sebagai agen antimikroba alami untuk mengendalikan bakteri yang mengkontaminasi produk perikanan. Aktivitas antibakteri dapat dipengaruhi oleh interaksi antarmikroorganisme, termasuk melalui *co-culture*. Penelitian ini bertujuan untuk mengetahui pengaruh *co-culture Lactiplantibacillus plantarum* GMP1 dan *Limosilactobacillus fermentum* FNCC0322 terhadap peningkatan aktivitas antibakteri bakteriosin pada bakteri *Escherichia coli* 563B, *Staphylococcus aureus* ATCC6538 dan *Morganella morganii* TK7. Monokultur dan *co-culture* dengan beberapa rasio kepadatan sel diinkubasi selama 24 jam. Pertumbuhan bakteri dianalisis berdasarkan total plate count dan optical density, sedangkan aktivitas antibakteri cell-free supernatant (CFS) diuji menggunakan metode difusi agar setelah netralisasi dan perlakuan katalase. CFS dengan aktivitas terbaik selanjutnya dikarakterisasi menggunakan proteinase-K dan diuji melalui *minimum inhibitory concentration* (MIC). Hasil menunjukan bahwa monoculture dan *co-culture* yang dipanen dalam inkubasi 24 menunjukan adanya aktivitas antibakteri. Rasio konsentrasi *co-culture Lactiplantibacillus plantarum* GMP1 dan *Limosilactobacillus fermentum* FNCC0322 1:1 meningkatkan aktivitas antibakteri dibandingkan dengan masing-masing monokultur. Aktivitas antibakteri dikonfirmasi berasal dari bakteriosin setelah penembahan proteinase-K dengan tidak adanya zona bening yang terbentuk setelah inkubasi. Bakteriosin *co-culture* yang dihasilkan dapat mengahambat pertumbuhan bakteri *E. coli*, *Staphylococcus aureus*, *Morganella morganii* dengan nilai *minimum inhibitory concentration* (MIC) masing masing sebesar 250µg/mL

Kata Kunci: *Lactiplantibacillus plantarum* GMP1, *Limosilactobacillus fermentum* FNCC0322, *co-culture*, bakteriosin, aktivitas antibakteri.

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Abstract

ENHANCEMENT OF THE ANTIBACTERIAL ACTIVITY OF *Lactiplantibacillus plantarum* GMP1 THROUGH CO-CULTURE WITH *Limosilactobacillus fermentum* FNCC0322 AGAINST BACTERIAL CONTAMINANTS OF FISHERY PRODUCTS

Lactiplantibacillus plantarum GMP1 produces bacteriocin, which shows promise as a natural antimicrobial agent for controlling bacteria contaminating fishery products. The antibacterial activity can be influenced by interactions among microorganisms, including co-culturing. This study aimed to investigate the impact of co-culturing *Lactiplantibacillus plantarum GMP1* with *Limosilactobacillus fermentum* FNCC0322 on the bacteriocin's antibacterial efficacy against *Escherichia coli* 563B*, Staphylococcus aureus* ATCC6538, and *Morganella morganii* TK7. Monocultures and co-cultures with varying cell-density ratios were incubated for 24 hours. Bacterial growth was assessed using total plate counts and optical density, while the antibacterial activity of cell-free supernatants (CFS) was tested using the agar diffusion method after neutralisation and catalase treatment. The CFS exhibiting the greatest antibacterial effect was further analysed with proteinase-K and subjected to a minimum inhibitory concentration (MIC) assay. Both monocultures and co-cultures showed antibacterial activity after 24 hours of incubation. Notably, the co-culture at a 1:1 ratio of *Lactiplantibacillus plantarum GMP1* to *Limosilactobacillus fermentum* FNCC0322 demonstrated enhanced antibacterial activity compared to individual monocultures. Proteinase-K treatment confirmed the antibacterial effect was due to bacteriocin, as no inhibition zones appeared after treatment. The bacteriocin produced by the co-culture inhibited *E. coli*, *Staphylococcus aureus*, and *Morganella morganii*, with an MIC of 250 µg/mL against each bacterium.

Keywords: *Lactiplantibacillus plantarum* GMP1, *Limocsilactobacillus fermentum* FNCC 0322, co-culture, bacteriocin, antibacterial activity.