

IDENTIFIKASI BAKTERI ASAM LAKTAT PENGHASIL BAKTERIOSIN PADA FERMENTASI IKAN 'CHAO' SULAWESI SELATAN

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INTISARI

Bakteriosin yang dihasilkan oleh bakteri asam laktat merupakan senyawa biopreservatif dengan berbagai keunggulan sehingga mendorong pencarian isolat bakteri potensial dari berbagai sumber salah satunya fermentasi ikan 'Chao'. Tujuan penelitian ini adalah untuk mengisolasi bakteri asam laktat penghasil bakteriosin dari *chao*, mengkarakterisasi bakteriosin yang dihasilkan, melakukan karakterisasi dan identifikasi bakteri asam laktat penghasil bakteriosin asal *chao* secara molekuler serta mengetahui hubungan kekerabatan bakteri asam laktat secara genetik berdasarkan gen 16S rRNA. Isolasi bakteri asam laktat dilakukan pada sampel *chao* dan dilanjutkan uji kemampuan menghasilkan bakteriosin melalui pengujian *cell free supernatan* terhadap bakteri indikator *Staphylococcus aureus* FNCC 0047. Bakteriosin dikonfirmasi dengan perlakuan proteinase K menunjukkan terjadinya *inaktivasi* aktivitas penghambatan yang menandakan aktivitas penghambatan berasal dari protein. Supernatan yang dikonfirmasi sebagai bakteriosin dengan aktivitas tertinggi selanjutnya dikarakterisasi berdasarkan spektrum penghambatan, sensitivitas suhu, pH, surfaktan dan kloroform. Isolat bakteri terpilih penghasil bakteriosin kemudian diidentifikasi berdasarkan sifat molekuler menggunakan gen 16S rRNA dengan primer 27F dan 1492R. Isolasi bakteri asam laktat dari *chao* diperoleh 4 isolat yang menunjukkan aktivitas bakteriosin dengan aktivitas tertinggi $3.741,83 \pm 376,83$ AU/ml pada isolat IB1C dan aktivitas terendah $1.153 \pm 370,12$ AU/ml pada isolat IB3E. Aktivitas bakteriosin dari keempat isolat memiliki spektrum penghambatan yang luas dan menunjukkan resistensi terhadap suhu 100°C selama 20 menit, pH asam dan netral (3-7) namun kehilangan aktivitasnya pada pH 9 dan tidak termasuk bakteriosin tipe IV. Karakteristik molekuler dari isolat yang diidentifikasi menunjukkan %mol G+C konten yang rendah, berkisar 51,42 – 51,59. Berdasarkan analisis BLASTn dan analisis filogenetik menunjukkan isolat IB1C dan IB3B memiliki kemiripan paling tinggi dengan *Lactobacillus plantarum* sedangkan isolat IB3E dan IB3F memiliki kemiripan dengan *Pediococcus pentosaceus*.

Kata kunci : bakteriosin, bakteri asam laktat, fermentasi ikan, 16S rRNA

IDENTIFICATION OF BACTERIOCIN-PRODUCING LACTIC ACID BACTERIA FROM SOUTH SULAWESI FERMENTED FISH 'CHAO'

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Abstract

Bacteriocin that being produced by lactic acid bacteria is a biopreservative compound with many advantages causing the encouragement for search of potential bacterial isolate from various sources, including fermented fish *chao*. The aim of the study were to isolate bacteriocin-producing lactic acid bacteria from *chao*, characterization of bacteriocin, characterization and identification of bacteriocin-producing lactic acid bacteria by its molecular properties and and to know relationship between lactic acid bacteria based on 16S rRNA gene. Lactic acid bacteria were isolated from *chao* followed by the ability test to produce bacteriocin by *cell frees supernatant* against *Staphylococcus aureus* FNCC 0047 as an indicator. Bacteriocin compound was confirmed by Proteinase K-treatment and will show inactivation of inhibitory activity which indicate that the inhibition is derived from protein. Supernatants which were confirmed as bacteriocin with the highest activity later characterized based on spectrum of inhibition, thermal sensitivity, pH, surfactant and chloroform. Selected isolates of bacteriocin-producing lactic acid bacteria being molecularly identified from 16S rRNA marker using primer 27F and 1492R. The results showed that there were 4 isolates of lactic acid bacteria obtained from *chao* that showed the highest bacteriocin activity by $3,741.83 \pm 376.83$ AU/ml founded on IB1C isolate and lowest activity by $1,153 \pm 370.12$ AU/ml was observed on IB3E isolate. Bacteriocin activity that produced from the isolates showed broad spectrum of inhibitory and resistant at 100°C for 20 minutes, acid and neutral pH (3-7) but the inhibitory activity was disappear at pH 9 and excluding type IV bacteriocin. The molecular properties of the isolates showed low %mol of G+C content, around 51.42-51.59. BLASTn and Phylogenetic analysis result showed that IB1C and IB3B isolate were closely related and identified as *Lactobacillus plantarum*, IB3E and IB3F were identified as *Pediococcus pentosaceus*.

Key words : bacteriocin, lactic acid bacteria, fish fermented food, 16S rRNA