IDENTIFIKASI PEPTIDA ANTIBAKTERI HASIL HIDROLISIS PROTEIN BIJI JARAK KEPYAR (*Ricinus communis* L.) MENGGUNAKAN ENZIM KIMOTRIPSIN TERFRAKSINASI *SOLID-PHASE EXTRACTION* (SPE) PENUKAR KATION

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INTISARI

Telah dilakukan penelitian tentang identifikasi peptida yang dihidrolisis dari biji jarak kepyar (*Ricinus communis*) menggunakan kimotripsin, yang dilanjutkan dengan identifikasi peptida potensial antibakteri. Tujuan utama dari penelitian ini adalah untuk mendapatkan urutan asam amino kandidat peptida antibakteri dari protein biji jarak kepyar. Protein biji jarak kepyar diekstraksi menggunakan aseton kemudian dihidrolisis menggunakan kimotripsin. Peptida dari hidrolisat difraksinasi menggunakan *solid-phase extraction* (SPE) penukar kation kemudian dipekatkan menggunakan SPE fase-balik. Uji aktivitas antibakteri dilakukan dengan metode difusi cakram agar terhadap bakteri *Escherichia coli* dan *Staphylococcus aureus*. Urutan asam amino peptida diidentifikasi menggunakan HRMS Orbitrap. Proses ekstraksi protein biji jarak menggunakan aseton menghasilkan protein sebesar 69,80%. Protein yang dihidrolisis menghasilkan peptida dengan derajat hidrolisis 74,83%. Hasil fraksinasi menggunakan SPE penukar kation menunjukkan fraksi pada pH 7 dan 9 mempunyai aktivitas antibakteri paling tinggi. Dalam kedua fraksi tersebut, teridentifikasi tiga kandidat peptida antibakteri dengan urutan asam amino masing-masing KLNEDLIRKVF dan FNVRRAKIL pada fraksi pH 7; serta NVLRGKGMASL fraksi pH 9. Berdasarkan indeks perkiraan aktivitasnya, urutan peptida mulai dari yang lebih aktif ke hingga kurang aktif adalah FNVRRAKIL > KLNEDLIRKVF > NVLRGKGMASL.

Kata kunci: antibakteri, jarak kepyar, peptida, SPE, HRMS

IDENTIFICATION OF ANTIBACTERIAL PEPTIDES RESULTING FROM CHYMOTRYPSIN PROTEIN HYDROLYSATE OF CASTOR BEAN (*Ricinus communis* L.) FRACTIONATED USING CATION EXCHANGE SOLID-PHASE EXTRACTION (SPE)

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ABSTRACT

Research have been conducted on the identification of peptide hydrolyzed from castor bean (*Ricinus communis*) protein using chymotrypsin, followed by antibacterial identification. The main objective of this research was to obtain the amino acid sequence of antibacterial peptide candidates from castor bean proteins. Castor bean protein was extracted using acetone precipitation then hydrolyzed using chymotrypsin. The peptides from hydrolysate were fractionated using cation-exchanged solid-phase extraction (SPE), then concentrated using reverse-phase SPE. The antibacterial activity test was carried out by the agar disc diffusion method against *Escherichia coli* and *Staphylococcus aureus* bacteria. Peptides amino acid sequences were identified using Orbitrap HRMS. The protein extraction of castor seeds using acetone produced 69.80% protein. The hydrolyzed protein produced peptides with a hydrolysis degree of 74.83%. The result of fractionated using cation exchanged SPE showed that fraction eluted at pH 7 and 9 had the highest antibacterial activity. Out of these two fractions three antibacterial peptide candidate were identified with amino acid sequence of KLNEDLIRKVF and FNVRRAKIL present in pH 7 fraction; and NVLRGKGMASL present pH 9 fraction. By the prediction activity index, the peptides are ordered from the most active to the less active: FNVRRAKIL > KLNEDLIRKVF > NVLRGKGMASL.

Keywords: antibacterial, castor bean protein, peptide, SPE, HRMS