HIDROLISIS PROTEIN DARI BIJI JARAK KEPYAR (*Ricinus communis*) DENGAN KIMOTRIPSIN DAN UJI AKTIVITAS ANTIBAKTERI PEPTIDA YANG DIHASILKAN

Zehan Andriana

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INTISARI

Telah dilakukan penelitian identifikasi peptida antibakteri dari hidrolisat kimotripsin protein biji jarak kepyar *Ricinus communis* terfraksinasi dengan menggunakan *reversed-phase high performance liquid chromatography* (RP-HPLC). Protein biji jarak kepyar diekstraksi dengan SDS, TFA, dan akuades. Ekstrak protein dihidrolisis secara enzimatis menggunakan kimotripsin. Hidrolisat protein difraksinasi menggunakan RP-HPLC yang dielusi menggunakan gradien komposisi campuran 6 dan 60% asetonitril dalam 0,1% TFA yang ditingkatkan secara bertahap. Fraksi peptida diuji aktivitas antibakteri terhadap *E. coli* dan *S. aureus* menggunakan metode mikrodilusi. Fraksi peptida yang memiliki aktivitas antibakteri diidentifikasi menggunakan *high resolution mass spectrometry* (HRMS).

Ekstraksi protein biji jarak kepyar menghasilkan persen rendemen sebesar 18,55; 59,28; 68,35 dan 69,8% berturut-turut untuk ekstrak SDS dialisis, SDS amicon, TFA dan akuades. Hidrolisis protein biji jarak kepyar dengan kimotripsin menghasilkan nilai derajat hidrolisis berturut-turut untuk SDS, TFA dan akuades sebesar 32; 55,13 dan 83,92%. Fraksi peptida ekstrak akuades memiliki 5 fraksi antibakteri dengan spektrum luas yaitu fraksi 2, 3, 5, 6 dan 10 dengan nilai IC_{50} masing-masing yaitu 7,48; 12,54; 10,81; 14,12 dan 14,57 µg/mL terhadap *E. coli* serta 10,07; 9,68; 15,06; 13,37 dan 14,47 µg/mL terhadap *S. aureus*. Urutan asam amino peptida yang diduga berpotensi sebagai senyawa antibakteri yaitu NVLRGKGMASL.

Kata kunci : ekstraksi protein, biji jarak, kimotripsin, RP-HPLC, peptida antibakteri.

HYDROLYSIS OF JATHROPA-SEED PROTEIN (*Ricinus communis*) USING CHYMOTRYPSIN AND ANTIBACTERIAL ACTIVITY OF THE RESULTED PEPTIDES

Zehan Andriana

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ABSTRACT

Studies have been conducted to identify antibacterial peptidas from chymotrypsin protein hydrolysate castor bean seeds (*Ricinus communis*) fractionated with reversed-phase high performance liquid chromatography (RP-HPLC). Castor bean protein was extracted with sodium dodesyl sulfate (SDS), TFA and water. Protein extracts were hydrolyzed enzymatically using chymotrypsin. Protein hydrolysate was fractionated using RP-HPLC eluted with gradient composition of acetonitrile 6 and 60% in 0.1% TFA which increased gradually. Peptida fractions were tested for antibacterial activity against *E. coli* and *S. aureus* using the microdilution method. Peptida fractions with antibacterial activity were identified using high resolution mass spectrometry (HRMS).

Castor bean protein extraction yielded 18.55; 59.28; 68.35 and 69.8% yields respectively for dialisis SDS, amicon SDS, TFA and aquadest extracts. Hydrolysis of the protein with chymotrypsin resulted in successive hydrolysis degree values of 32; 55.13 and 83.92% for SDS, TFA and water extract. The peptide fraction of water extract has 5 antibacterial fractions with broad spectrum, namely fractions 2, 3, 5, 6 and 10 with an IC_{50} value of each fractions are 7.48; 12.54; 10.81; 14.12 and 14.57 μg/mL against *E. coli* and 10.07; 9.68; 15.06; 13.37 and 14.47 μg/mL against *S. aureus*. The amino acid sequence of the peptide that is predicted to have the potential antibacterial activity is NVLRGKGMASL.

Keywords :protein extraction, castor seed, chymotrypsin, RP-HPLC, antibacterial peptide.