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STUDI PEPTIDA BIOAKTIF PENGHAMBAT ANGIOTENSIN CONVERTING ENZYME (ACE) DARI HIDROLISAT GELATIN KULIT SAPI LOKAL INDONESIA
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STUDI PEPTIDA BIOAKTIF PENGHAMBAT *ANGIOTENSIN CONVERTING ENZYME* (ACE) DARI HIDROLISAT GELATIN KULIT SAPI LOKAL INDONESIA

INTISARI

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14/373861/SPT/00160

Tujuan penelitian untuk mengkarakterisasi gelatin kulit sapi lokal Indonesia menggunakan *curing* asam atau basa, kajian hidrolisat gelatin hasil hidrolisis enzim protease serta hasil purifikasi dengan Sep-Pak Plus C18 *cartridges* sebagai penghambat *Angiotensin Converting Enzyme* (ACE). Materi penelitian adalah kulit sapi Bali, sapi Madura dan sapi PO jantan yang dipotong pada umur potong 2,5 sampai 3 tahun. Variabel yang diukur adalah sifat fisikokimia, uji warna, BM, profil gugus fungsional, profil asam amino dan aktivitas penghambatan ACE. Analisis statistik menggunakan Rancangan Acak Kelompok (RAK) pola tersarang (*Nested Experiment Design*), 3 ulangan dilanjutkan uji *Duncan's Multiple Range Test* (DMRT). Data profil gugus fungsional dan BM di uji secara deskriptif. Hasil penelitian yaitu jenis kulit sapi berpengaruh sangat nyata pada nilai viskositas, kadar protein dan uji warna b*, dan memberikan pengaruh nyata pada nilai protein terlarut akan tetapi tidak berpengaruh pada rendemen, pH, A_w, kadar air, *gel strength*, kadar lemak, warna L* dan warna a*. Penggunaan jenis *curing* berpengaruh sangat nyata pada rendemen, pH kadar protein, protein terlarut dan berpengaruh nyata pada *gel strength* gelatin, tetapi tidak berpengaruh terhadap uji A_w, kadar air, viskositas, kadar lemak, uji warna L*, a* dan b*. Uji gugus fungsional menunjukkan bahwa intensitas serapan *infra red* gugus fungsional utama sampel yaitu O-H, C=O, C=C, C-H dan C-O memiliki daerah serapan yang berbeda-beda. Asam amino tertinggi yaitu glisin sebesar 48,73 g/100 g. Konsentrasi protein terlarut gelatin berkisar antara 11,19 sampai 12,14 mg/ml lebih tinggi dibandingkan sesudah dihidrolisis yaitu sebesar 10,20 sampai 10,31 mg/ml dan meningkat setelah dipurifikasi yaitu sebesar 11,89 sampai 12,19 mg/ml. BM mengalami penurunan berkisar antara 15 sampai 80 kDa pada gelatin, menjadi 17,39 sampai 50 kDa setelah dihidrolisis dengan pepsin dan 11,83 sampai 37 kDa yang dihidrolisis dengan tripsin kemudian setelah dipurifikasi menjadi dibawah 35 kDa pada hidrolisis pepsin sedangkan pada hidrolisis tripsin kurang terlihat. Demikian juga dengan nilai penghambatan ACE, hidrolisis dengan enzim pepsin mengalami penurunan sebesar 442,76 µg/ml menjadi 379,90 µg/ml setelah dipurifikasi serta hidrolisis dengan enzim tripsin sebesar 373,57 µg/ml menjadi 321,38 µg/ml setelah dipurifikasi. Penghambatan ACE terbaik sebesar 193,16 µg/ml dihasilkan pada hidrolisat gelatin dari kulit sapi Bali *curing* basa dan dihidrolisis dengan enzim tripsin setelah dipurifikasi. Penggunaan jenis kulit sapi lokal Indonesia dan jenis *curing* menghasilkan karakteristik gelatin yang berbeda dan hidrolisat gelatinnya berpotensi dikembangkan sebagai pangan fungsional antihipertensi.

Kata kunci: Kulit sapi lokal Indonesia, *Curing*, Gelatin, Hidrolisat, Penghambatan ACE.

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STUDY OF BIOACTIVE PEPTIDE *ANGIOTENSIN CONVERTING ENZYME* (ACE) INHIBITOR FROM GELATIN INDONESIAN LOKAL HIDE HYDROLIYZATES

ABSTRACT

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The study aims to observe the characteristics of gelatin from Indonesian cattle hide by using acid or bases curing treatment, to examine the gelatin hydrolysate by using protease enzyme, as well as purification by using Sep-Pak plus C18 cartridges as the Angiotensin Converting Enzyme (ACE) inhibitor. The materials used in this study were Bali, Madura, and PO bull hide which slaughtered at the age of 2.5 to 3 years. The measured variables include physicochemical characteristics, colour determination, molecular weight, functional group profile, amino acids profile and ACE inhibitory activities. The study was conducted by using a randomized group with nested experimental design in triplicates and followed with Duncan's Multiple Range Test (DMRT) to observe any significant differences, aside from the molecular weight which analyzed descriptively. The results showed that different cattle hide highly affected the viscosity, protein content and colour b* test of the gelatin, while also significantly affected the soluble protein, but did not affect the total yields, pH value, water activities (A_w), moisture, gel strength, fat content, colour L and a of the gelatin. Furthermore, the results also showed that the different curing treatment highly affected the total yield, pH value, protein content, soluble protein of the gelatin, while also significantly affected gel strength, but did not affect the A_w, moisture, viscosity, fat content, colour L*, a*, and b* of the produced gelatin. The observation of the functional group showed that the infra-red absorption intensity on the main functional group of the sample, namely O-H, C=O, C=C, C-H and C-O, was different. In addition, the highest observed amino acid was glycine (48.73 g/100 g). The soluble protein of the gelatin was around 11.19 to 12.14 mg/ml, which was higher prior to hydrolysis (10.20 to 10.31 mg/ml), and increased after purification into 11.89 to 12.19 mg/ml. The molecular weight of the gelatin decreased into 15 to 80 kDa from 17.39 to 50 kDa after pepsin hydrolysis and from 11.83 to 37 after trypsin hydrolysis. The pepsin purification showed molecular weight at 35 kDa, while the molecular weight of trypsin purification couldn't be observed. On the ACE inhibitory activities, pepsin hydrolysed sample showed decreasing activities from 442.76 µg/ml to 379.90 µg/ml after purified, and trypsin hydrolyzed showed a similar pattern from 442.76 µg/ml into 379.90 µg/ml after purified. The best ACE inhibition (193.16 µg/ml) was found from Bali cattle hide, cured with base treatment and hydrolyzed by trypsin following the purification. The utilization of different Indonesian cattle hides with different curing treatment resulted in various gelatin characteristics, and the hydrolysates showed the potential to be further developed as a functional food, especially for anti-hypertension.

Keywords: Indonesian local hide, Curing, Gelatin, Hydrolysate, ACE inhibitors.