KOMBINASI WAKTU HIDROLISIS ENZIM PAPAIN DAN VARIASI KONSENTRASI ASAM SITRAT TERHADAP RENDEMEN DAN MUTU NILAI GIZI DARI KOLAGEN CEKER AYAM

COMBINATION OF PAPAIN ENZYME HYDROLYSIS TIME AND CITRIC ACID CONCENTRATION ON THE YIELD AND QUALITY NUTRITIONAL VALUE OF CHICKEN FEET COLLAGEN

TUGAS AKHIR S1

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20.I1.0013

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Memenuhi persyaratan yang diperlukan untuk
Memperoleh gelar Sarjana Teknologi Pangan

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RINGKASAN

Kebutuhan gelatin dan kolagen yang meningkat di Indonesia. Kolagen terhidrolisis dari ceker ayam menjadi alternatif karena mudah ditemukan dan sesuai dengan situasi di Indonesia. Perlakuan yang tepat perlu untuk diteliti supaya mendapatkan rendemen dan mutu kolagen yang baik, khususnya dengan mengombinasikan proses hidrolisis enzim papain dan asam sitrat. Penelitian ini bertujuan untuk merumuskan pengaruh variasi konsentrasi enzim papain dan waktu hidrolisis terhadap karakteristik rendemen dan mutu kolagen ceker ayam. Penelitian ini menggunakan metode eksperimental dengan 45 unit eksperimental yang masing-masing unitnya menggunakan 75 g ceker ayam giling. Proses pembuatan kolagen adalah penggilingan ceker ayam, hidrolisis dengan larutan enzim papain 3%, ekstraksi dengan UAE selama 30 menit, hidrolisis asam sitrat selama 36 jam, netralisasi dengan NaOH, sentrifugasi untuk pemisahan supernatan dengan pelet dan lemak, serta pengeringan dengan oven 60°C selama 24-31 jam. Ceker ayam giling ini dibagi menjadi 2 kelompok perlakuan waktu hidrolisis enzim papain (4 jam, 6 jam, 8 jam) dan variasi konsentrasi asam sitrat (2%, 2,5%, 3%) dengan 5 kali pengulangan. Parameter yang digunakan adalah karakteristik fisik dan kimia. Indikator untuk mengamati karakteristik fisik dan kimia adalah rendemen, warna, pH, kadar air metode thermogravimetri, kadar lemak metode soxhlet dan kadar protein metode lowry. Analisis statistik dilakukan dengan uji kelayakan data dengan normalitas dan homogenitas, uji beda antara dua variabel bebas menggunakan Two Way ANOVA dengan perbedaan setiap kombinasi perlakuannya dengan One Way ANOVA, dan hubungan antara parameter menggunakan uji korelasi. Hasil penelitian yang didapatkan kombinasi waktu hidrolisis enzim papain dan variasi konsentrasi asam sitrat berpengaruh terhadap rendemen, kadar air, kadar protein, kadar lemak dan berdampak pada pH setelah hidrolisis enzim papain, pH setelah hidrolisis asam sitrat, dan warna. Rendemen kolagen ceker ayam paling tinggi adalah 30,96% yang didapatkan dari hidrolisis enzim papain selama 8 jam dan asam sitrat 3%. Peningkatan asam sitrat dan lama waktu hidrolisis enzim papain dapat meningkatkan rendemen. Kombinasi perlakuan yang terbaik pada mutu kolagen terbagi menjadi 3 kriteria, yaitu kadar air yang rendah, kadar lemak yang rendah, dan kadar protein yang tinggi. Kadar air terendah didapatkan dari hidrolisis enzim papain 8 jam dan asam sitrat 2%. Kadar lemak terendah didapatkan dari hidrolisis enzim papain 4 jam dan asam sitrat 3%. Kadar protein tertinggi didapatkan dari hidrolisis enzim papain 6 jam dan asam sitrat 3%. Semakin lama waktu hidrolisis enzim papain dan semakin tinggi konsentrasi asam sitrat berdampak juga terhadap penurunan pH, warna yang semakin gelap, merah, dan kuning. Diantara dua variabel waktu hidrolisis enzim papain lebih berpengaruh dibandingkan konsentrasi asam sitrat. Kesimpulan yang didapatkan adalah kombinasi waktu hidrolisis enzim papain dan variasi konsentrasi asam sitrat dapat meningkatkan rendemen dengan peningkatan kadar protein dan penurunan kadar air, dengan kadar lemak yang bervariasi.

SUMMARY

The need for gelatin and collagen is increasing in Indonesia. Hydrolyzed collagen from chicken feet is an alternative because it is easy to find and suits the situation in Indonesia. The appropriate treatment needs to be researched to obtain good collagen yield and quality, especially by combining the enzyme hydrolysis process of papain and citric acid. This research aims to formulate the effect of variations in papain enzyme concentration and hydrolysis time on the yield characteristics and quality of chicken claw collagen. This research used an experimental method with 45 experimental units, each of which used 75 g of ground chicken feet. The process of making collagen is grinding chicken feet, hydrolysis with 3% papain enzyme solution, extraction with UAE for 30 minutes, hydrolysis of citric acid for 36 hours, neutralization with NaOH, centrifugation to separate the supernatant from pellets and fat, and drying in a 60°C oven. for 24-31 hours. These ground chicken feet were divided into 2 treatment groups with papain enzyme hydrolysis time (4 hours, 6 hours, 8 hours) and varying citric acid concentrations (2%, 2.5%, 3%) with 5 repetitions. The parameters used are physical and chemical characteristics. Indicators for observing physical and chemical characteristics are yield, color, pH, water content by thermogravimetric method, fat content by Soxhlet method and protein content by Lowry method. Statistical analysis was carried out by testing the suitability of the data with normality and homogeneity, testing the difference between two independent variables using Two Way ANOVA with the difference for each treatment combination using One Way ANOVA, and the relationship between parameters using the correlation test. The research results showed that the combination of papain enzyme hydrolysis time and variations in citric acid concentration had an effect on yield, water content, protein content, fat content and had an impact on pH after papain enzyme hydrolysis, pH after citric acid hydrolysis, and color. The highest yield of chicken claw collagen was 9.38% which was obtained from hydrolysis of papain enzymes for 8 hours and 3% citric acid. Increasing citric acid and the longer hydrolysis time of the papain enzyme can increase the yield. The best treatment combination for collagen quality is divided into 3 criteria, namely low water content, low fat content and high protein content. The lowest water content was obtained from the enzyme hydrolysis of papain for 8 hours and 2% citric acid. The lowest fat content was obtained from the enzyme hydrolysis of papain for 4 hours and 3% citric acid. The highest protein content was obtained from the enzyme hydrolysis of papain for 6 hours and 3% citric acid. The longer the hydrolysis time for the papain enzyme and the higher the concentration of citric acid also has an impact on decreasing the pH, resulting in a darker, red and yellow color. Between the two variables, the hydrolysis time of the papain enzyme is more influential than the concentration of citric acid. The conclusion obtained was that the combination of papain enzyme hydrolysis time and variations in citric acid concentration could increase the yield by increasing protein content and decreasing water content, with varying fat content.