

KARAKTERISASI FISIKOKIMIA DAN TEKNO-FUNGSIONALITAS EKSTRAK PROTEIN DARI TEPUNG TEMPE GEMBUS DAN APLIKASINYA UNTUK MAYONES

INTISARI

Tempe gembus merupakan salah satu makanan tradisional Indonesia yang diperoleh melalui proses fermentasi dari limbah padat tahu atau hasil samping dari produksi tahu. Penelitian ini mengeksplorasi penerapan ekstrak protein dari tepung tempe gembus sebagai pengemulsi dalam mayones. Tujuan penelitian ini adalah mengevaluasi karakteristik fisikokimia dan teknofungsional ekstrak protein tepung tempe gembus, serta mengevaluasi karakteristik fisikokimia dan tingkat kesukaan konsumen terhadap mayones yang diformulasikan ekstrak protein tepung tempe gembus sebagai *emulsifier* nabati. Hasil penelitian menunjukkan bahwa proses ekstraksi protein tepung tempe gembus pada pH basa dan presipitasi pada pH asam dapat meningkatkan karakteristik fisikokimia dari tepung tempe gembus yang ditunjukkan dari warna ekstrak protein yang lebih cerah, penurunan warna kekuningan, peningkatan kadar protein menjadi 42.74%, penurunan kadar air menjadi 4.48% dan kadar lemak menjadi 15.67%. Selain itu, mampu meningkatkan total asam amino. Teridentifikasi 49 peptida pada ekstrak protein tepung tempe gembus dengan MW antara 816.48 – 2401.28 Da sedangkan 87 peptida pada tepung tempe gembus dengan MW 742.46 – 3644.80 Da. Memiliki mikrostruktur yang lebih halus dibandingkan tepung tempe gembus. Ekstrak protein tepung tempe gembus menunjukkan peningkatan sifat tekno-fungsional secara signifikan yaitu WHC 4.92 (g/g), OHC 1.105(g/g), dan *emulsifying properties* meliputi EAI 32.64 (min) dan ESI 52.24 (m^2/g) yang lebih tinggi dibandingkan tepung gembus. Mayones yang diformulasikan ekstrak protein tepung tempe gembus 100% (F4) secara signifikan dapat meningkatkan kandungan protein menjadi 6.40%, menurunkan kadar lemak menjadi 53.20%, meningkatkan stabilitas emulsi 99,56 %, memiliki viskositas, *storage* dan *loss modulus* yang tinggi serta memiliki rasa, aroma, *aftertaste*, tekstur dan tingkat keseluruhan yang disukai panelis.

Kata Kunci : Tempe Gembus, Ekstrak Protein, *Emulsifier*, Mayones

Physicochemical and Techno-Functional Characterization of Protein Extract from Tempeh Gembus Flour and Its Application in Mayonnaise

ABSTRACT

Tempe gembus is one of Indonesia's traditional foods, produced through the fermentation of tofu solid waste or by-products from tofu production. This study investigates the application of tempe gembus flour protein extract as an emulsifier in mayonnaise. The aim of this study was to determine the physicochemical and techno-functional characteristics of the tempe gembus flour protein extract, as well as to evaluate the physicochemical properties and consumer preference levels of mayonnaise formulated using this protein extract as a plant-based emulsifier. The results showed that the extraction of tempe gembus flour protein at alkaline pH followed by precipitation at acidic pH improved the physicochemical characteristics of tempe gembus flour. This improvement was indicated by the lighter color of the protein extract, an increase in protein content to 42.74%, a decrease in moisture content to 4.48%, and a reduction in fat content to 15.67%. Additionally, the total amino acid content also increased. A total of 49 peptides with molecular weights ranging from 816.48 to 2401.28 Da were identified in the protein extract of tempe gembus flour, while 87 peptides with molecular weights from 742.46 to 3644.80 Da were found in the original tempe gembus flour. The protein extract exhibited a finer microstructure compared to the original flour. The protein extract of tempe gembus flour also demonstrated significant improvements in techno-functional properties, including water holding capacity (WHC) of 4.92 g/g, oil holding capacity (OHC) of 1.105 g/g, and emulsifying properties characterized by an emulsifying activity index (EAI) of 32.64 m²/g and an emulsifying stability index (ESI) of 52.24 min, all higher than those of the original flour. Mayonnaise formulated with 100% tempe gembus flour protein extract (F4) showed a significant increase in protein content up to 6.40%, a reduction in fat content by up to 53.20%, and improved emulsion stability up to 99.56%. It also exhibited higher viscosity, storage modulus, and loss modulus. Sensory evaluation revealed that this formulation was preferred by panelists in terms of taste, aroma, aftertaste, texture, and overall acceptability.

Keywords: Tempe Gembus, Protein Extract, Emulsifier, Mayonnaise