

PENGARUH WAKTU FERMENTASI dan pH EKSTRAKSI TERHADAP SIFAT PEMBUSAAN DAN EMULSI KONSENTRAT PROTEIN KORO PEDANG PUTIH (*Canavalia ensiformis* (L.) DC.)

INTISARI

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Koro pedang putih (*Canavalia ensiformis*) (L.) DC.) merupakan sumber protein nabati potensial yang dapat dikembangkan menjadi konsentrat protein dengan sifat fungsional yang baik. Fermentasi dan kondisi ekstraksi alkali diketahui dapat memengaruhi struktur protein sehingga berdampak pada sifat fungsionalnya. Penelitian ini bertujuan untuk mengetahui pengaruh lama fermentasi dan variasi pH alkali ekstraksi terhadap hidrofobisitas permukaan, sifat emulsi, serta sifat foaming konsentrat protein koro pedang. Penelitian menggunakan rancangan faktorial dengan dua faktor, yaitu lama fermentasi (0, 24, dan 48 jam) menggunakan *Rhizopus oligosporus* serta pH ekstraksi alkali (8,5 dan 11). Parameter yang diamati meliputi *foaming capacity* (FC), *foaming stability* (FS), *emulsifying activity index* (EAI), *emulsion stability index* (ESI), dan *surface hydrophobicity* (SH) protein. Hasil penelitian menunjukkan bahwa lama fermentasi dan pH ekstraksi berpengaruh nyata terhadap sifat fungsional protein. Nilai FC meningkat hingga fermentasi 24 jam dan mencapai nilai tertinggi sebesar 75,04% pada pH ekstraksi 11, kemudian menurun pada fermentasi 48 jam. Stabilitas busa umumnya lebih tinggi pada pH ekstraksi 8,5 dibandingkan pH 11. Nilai EAI berkisar antara 16,86–27,44 m²/g dan ESI antara 15,67–128,02 menit, yang menunjukkan kemampuan emulsifikasi yang baik pada berbagai perlakuan. Peningkatan pH ekstraksi juga berkaitan dengan meningkatnya hidrofobisitas permukaan protein akibat paparan gugus hidrofobik. Secara keseluruhan, fermentasi dan kondisi ekstraksi alkali berperan dalam menentukan karakteristik fungsional konsentrat protein koro pedang.

Kata kunci: kacang koro pedang putih, fermentasi, pH ekstraksi, sifat emulsi, sifat foaming, hidrofobisitas permukaan.

EFFECT OF FERMENTATION TIME AND EXTRACTION pH ON FOAMING AND EMULSIFYING IN JACK BEAN (*Canavalia ensiformis* (L.) DC.) PROTEIN CONCENTRATE

ABSTRACT

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Jack bean (*Canavalia ensiformis*) (L.) DC.) is a potential plant-based protein source that can be developed into protein concentrate with desirable techno-functional properties. Fermentation and alkaline extraction conditions are known to modify protein structure and consequently affect its functional characteristics. This study aimed to evaluate the effects of fermentation time and alkaline extraction pH on surface hydrophobicity, emulsifying properties, and foaming properties of jack bean protein concentrate. A factorial experimental design was applied using two factors: fermentation time (0, 24, and 48 h) with *Rhizopus* sp. and alkaline extraction pH (8.5 and 11). The evaluated parameters included foaming capacity (FC), foaming stability (FS), emulsifying activity index (EAI), emulsion stability index (ESI), and protein surface hydrophobicity. The results showed that fermentation time and extraction pH significantly affected protein functional properties. FC increased up to 24 h of fermentation and reached the highest value of 75.04% at extraction pH 11, followed by a decrease at 48 h fermentation. Foam stability was generally higher at extraction pH 8.5 compared to pH 11. The EAI ranged from 16.86 to 27.44 m²/g and ESI ranged from 15.67 to 128.02 min, indicating good emulsifying performance under different treatments. Increased extraction pH was also associated with higher surface hydrophobicity due to greater exposure of hydrophobic protein groups. Overall, fermentation and alkaline extraction conditions influenced the functional characteristics of jack bean protein concentrate.

Keywords: jack bean, fermentation, extraction pH, emulsifying properties, foaming properties, surface hydrophobicity