

Kandungan Gizi dan Kapasitas Antioksidan Tepung Belalang Kayu Berdasarkan Fase Perkembangan sebagai Pangan Pencegah Obesitas

Ade Chandra Iwansyah¹, Afnan Firza Riandra², Fitriyono Ayustaningwarno², Lilis Wijayanti², Nurmasari Widyastuti²

ABSTRAK

Latar Belakang : Belalang kayu (*Valanga nigricornis*) merupakan serangga lokal yang berpotensi sebagai sumber protein alternatif dan pangan fungsional, seiring meningkatnya kebutuhan protein dan tingginya prevalensi obesitas di Indonesia. Serangga ini memiliki dua fase perkembangan, yaitu nimfa (muda, belum bersayap) dan imago (dewasa, bersayap), dengan komposisi gizi dan senyawa bioaktif yang berbeda.

Tujuan : Penelitian ini bertujuan untuk mengetahui perbedaan kandungan proksimat (air, abu, lemak, protein, karbohidrat), total fenol, dan kapasitas antioksidan dengan metode 2,2-difenil-1-pikrilhidrazil (DPPH) pada tepung belalang kayu fase nimfa dan imago.

Metode : Penelitian menggunakan rancangan acak lengkap dengan satu ulangan biologis dan tiga ulangan teknis per parameter. Analisis dilakukan dengan metode AOAC (modifikasi), Folin-Ciocalteu untuk fenol total, dan DPPH untuk kapasitas antioksidan. Data dianalisis menggunakan uji Shapiro–Wilk dan t-test independen ($\alpha = 0,05$).

Hasil : Hasil menunjukkan nimfa memiliki kadar air (13,11%) dan protein (70,05%) lebih tinggi serta lemak lebih rendah (5,70%) dibanding imago (6,23%, 68,80%, dan 12,76%). Total fenol nimfa (38,60 mg GAE/100 g) juga lebih tinggi dibanding imago (25,32 mg GAE/100 g). kapasitas antioksidan DPPH nimfa (28,41 mg VCE/100 g) lebih tinggi daripada imago (14,55 mg VCE/100 g).

Kesimpulan : Terdapat perbedaan kandungan gizi dan kapasitas antioksidan pada tepung belalang kayu *V. nigricornis* fase nimfa dan imago, di mana fase nimfa memiliki kadar air dan kapasitas antioksidan DPPH lebih tinggi, sedangkan fase imago menunjukkan kadar lemak dan abu lebih tinggi, sementara kadar total fenol dan karbohidrat tidak berbeda signifikan.

Kata Kunci: *Valanga nigricornis*, fase perkembangan, protein alternatif, kapasitas antioksidan pencegahan obesitas

¹Pusat Penelitian Teknologi dan Pengolahan Pangan, Badan Riset dan Inovasi Nasional, Jl. Jogja-Wonosari, Km 31,5, Gading-Playen, Gunungkidul, Yogyakarta, 55861, Indonesia

²Jurusan Ilmu Gizi Fakultas Kedokteran Universitas Diponegoro, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah, 50275, Indonesia

Nutritional Composition and Antioxidant Capacity of *V. nigricornis* Grasshopper Flour at Different Developmental Stages as Anti-Obesity Food

Ade Chandra Iwansyah¹, Afnan Firza², Fitriyono Ayustaningwarno², Lilis Wijayanti², Nurmasari Widyastuti²

ABSTRACT

Background : *Valanga nigricornis* is a local grasshopper species with potential as an alternative protein source and functional food, relevant to addressing increasing protein demands and the high prevalence of obesity in Indonesia. This insect undergoes two main developmental stages nymph (young, wingless) and imago (adult, winged) which differ in nutritional composition and bioactive compounds.

Objective : This study aims to determine the differences in proximate composition (moisture, ash, fat, protein, carbohydrates), total phenolic content, and antioxidant capacity using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method in nymph and adult stage (imago) grasshopper flour.

Methods : A completely randomized design was used with one biological replicate and three technical replicates per parameter. Proximate analysis followed modified AOAC methods; total phenolics were measured using the Folin–Ciocalteu reagent, and antioxidant capacity was assessed using the DPPH method. Data were analyzed using Shapiro–Wilk normality test and independent t-test ($\alpha = 0.05$).

Results : Results showed that nymphs had higher moisture (13.11%) and protein (70.05%) but lower fat (5.70%) than imagos (6.23%, 68.80%, and 12.76%, respectively). Nymphs also had higher total phenolic content (38.60 mg GAE/100 g) and DPPH antioxidant capacity (28.41 mg VCE/100 g) compared to imagos (25.32 mg GAE/100 g and 14.55 mg VCE/100 g).

Conclusion : There are differences in nutritional composition and antioxidant capacity of *V. nigricornis* grasshopper flour between the nymph and adult stages, where the nymph stage has higher moisture content and DPPH antioxidant capacity, while the adult stage shows higher fat and ash contents, whereas total phenolic content and carbohydrate levels are not significantly different.

Keywords: *Valanga nigricornis*, developmental stage, alternative protein, antioxidant capacity, obesity prevention

¹Research Center for Food Technology and Processing, National Research and Innovation Agency (BRIN), Jl. Jogja-Wonosari, Km 31.5, Gading-Playen, Gunungkidul, Yogyakarta, 55861, Indonesia

²Department of Nutrition Science, Faculty of Medicine, Diponegoro University, Jl. Prof. Sudarto No.13, Tembalang, Semarang City, Central Java, 50275, Indones