

Analisis Proksimat dan Tekstur Pada Crackers Tepung Hidrolisat Mealworm (*Tenebrio molitor*) Sebagai Alternatif Selingan Tinggi Protein

Hanifah Muthmainnah¹, Fitriyono Ayustaningwarno¹, Lilis Wijayanti¹, Muti'ah Mustaqimastusy Syahadah¹

Corresponding author email : hanifahmuthmainnahhh@gmail.com

ABSTRAK

Latar belakang: Peningkatan populasi dunia mendorong kebutuhan akan ketersediaan pangan yang berkelanjutan, khususnya sumber protein. *Mealworm (Tenebrio molitor)* menjadi salah satu alternatif sumber protein hewani yang potensial karena memiliki kandungan gizi yang tinggi dan memberikan dampak lingkungan yang rendah. Pengolahan *mealworm* menjadi tepung hidrolisat berpotensi meningkatkan penerimaan oleh konsumen sekaligus memperkaya nilai gizi produk pangan.

Tujuan: Mengetahui pengaruh substitusi tepung hidrolisat *mealworm* terhadap karakteristik proksimat, tekstur, dan warna produk *crackers* sebagai makanan selingan tinggi protein.

Metode: Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) dengan empat perlakuan formulasi tepung (F0, F1, F2, dan F3). Kadar air, abu, protein, lemak, karbohidrat, dan total energi diuji menggunakan metode gravimetri, *Kjeldahl*, *Soxhlet*, *by difference*, dan total kalori. Warna dianalisis dengan alat *colorimeter*, sedangkan tekstur diuji menggunakan *texture analyzer*. Analisis statistik dilakukan dengan uji One Way ANOVA beserta uji lanjut post LSD/Games-Howell, serta uji Kruskal-Wallis dengan uji lanjut Mann-Whitney.

Hasil: Penambahan tepung hidrolisat *mealworm* secara signifikan meningkatkan kadar protein dan abu ($p = 0,000$), namun menurunkan kadar karbohidrat serta total energi. Kekerasan *crackers* juga mengalami peningkatan, sementara tingkat kecerahan warnanya menurun. Formula F3 dengan kandungan 35% *mealworm* memiliki kadar protein tertinggi sebesar 28,12% dan memenuhi kriteria sebagai pangan tinggi protein, meskipun belum memenuhi batas minimum kadar air, karbohidrat, dan energi menurut standar SNI.

Simpulan: Substitusi tepung hidrolisat *mealworm* meningkatkan kandungan air dan protein secara signifikan sehingga dapat dijadikan alternatif sumber protein pada produk *crackers*, selain itu dapat menurunkan kadar abu, lemak, karbohidrat dan total energi.

Kata kunci: alternatif protein, *crackers*, hidrolisat *mealworm*, proksimat, tekstur

¹Program Studi Gizi, Fakultas Kedokteran, Universitas Diponegoro, Semarang

Proximate and Texture Analysis of Hydrolyzed Mealworm (*Tenebrio molitor*) Flour Crackers as a High Protein Snack Alternative

Hanifah Muthmainnah¹, Fitriyono Ayustaningwarno¹, Lilis Wijayanti¹, Muti'ah Mustaqimastusy Syahadah¹

Corresponding author email : hanifahmuthmainnahhh@gmail.com

ABSTRACT

Background: The increasing world population drives the need for sustainable food availability, especially protein sources. Mealworms (*Tenebrio molitor*) are one potential alternative source of animal protein because they have high nutritional content and low environmental impact. Processing mealworms into hydrolyzed flour has the potential to increase consumer acceptance while enriching the nutritional value of food products.

Objective: To determine the effect of mealworm hydrolysate flour substitution on the proximate characteristics, texture, and color of crackers products as high-protein snacks.

Methods: This study used a Completely Randomized Design with four flour formulation treatments (F0, F1, F2, and F3). The content of water, ash, protein, fat, carbohydrate, and total energy were tested using gravimetric, Kjeldahl, Soxhlet, by difference, and total calorie methods. Color was analyzed using a colorimeter, while texture was tested using a texture analyzer. Statistical analysis was performed using the One Way ANOVA test along with post hoc LSD/Games-Howell, and the Kruskal-Wallis test along with Mann-Whitney.

Results: The addition of mealworm hydrolysate flour significantly increased protein and ash content ($p = 0.000$), but decreased carbohydrate and total energy content. The hardness of the crackers also increased, while the brightness of the color decreased. Formula F3 with 35% mealworm content had the highest protein content of 28.12% and met the criteria as a high-protein food, although it did not meet the minimum limits for water, carbohydrate, and energy content according to SNI standards.

Conclusion: Substitution of hydrolyzed mealworm flour significantly increases water and protein content so that it can be used as an alternative source of protein in crackers products, in addition it can reduce ash, fat, carbohydrate and total energy levels.

Keywords: protein alternative, crackers, mealworm hydrolysate, proximate, texture

¹Nutrition Study Program, Faculty of Medicine, Diponegoro University, Semarang