

## KANDUNGAN ENERGI DAN PROTEIN *FROZEN FOOD BITTERBALLEN* YANG DISUBSTITUSI IKAN GABUS DAN LABU KUNING SEBAGAI MAKANAN SELINGAN SUMBER ENERGI PROTEIN UNTUK ANAK SEKOLAH

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### INTISARI

**Latar Belakang:** Usia sekolah merupakan masa yang sangat rentan mengalami permasalahan gizi salah satunya kekurangan energi protein (KEP). Sehingga perlu dikembangkan produk selingan sumber energi protein untuk anak sekolah. Salah satu jenis produk yang dapat dikembangkan adalah *frozen food bitterballen* yang disubstitusi labu kuning dan ikan gabus. Labu kuning mengandung berbagai zat gizi dan telah digunakan sebagai substitusi tepung terigu. Ikan gabus memiliki kandungan gizi unggulan berupa protein. Sehingga kombinasi keduanya dapat menjadi produk selingan sumber energi protein untuk anak sekolah.

**Tujuan:** Mengetahui pengaruh variasi substitusi ikan gabus dan labu kuning terhadap kandungan energi dan protein produk *frozen food bitterballen*.

**Metode Penelitian:** *Frozen food bitterballen* yang disubstitusi labu kuning dan ikan gabus menggunakan empat formula dengan formulasi perbandingan substitusi labu kuning: ikan gabus yang berbeda yakni F0 (0 : 0), F1 (1 : 4), F2 (1 : 3), F3 (1 : 2) dan parameter yang diuji yakni kandungan energi menggunakan metode *bomb calorimetri* dan kandungan protein menggunakan metode *Kjeldahl*.

**Hasil Penelitian:** Hasil uji kandungan energi dan protein pada *frozen food bitterballen* yang disubstitusi ikan gabus dan labu kuning menunjukkan nilai rata-rata yang meningkat dari F0 ke F3. Peningkatan kandungan energi total berbanding lurus dengan peningkatan kandungan protein seiring dengan penambahan jumlah substitusi labu kuning dan ikan gabus. Kandungan energi dan protein paling optimal adalah formula F3 (50% labu kuning + 100% ikan gabus).

**Kesimpulan:** Hasil uji kandungan energi dan protein produk *frozen food bitterballen* yang disubstitusi ikan gabus dan labu kuning menunjukkan adanya perbedaan yang signifikan dari empat formulasi yang dibuat. Rata-rata kandungan energi dari F0 ke F3 secara berurutan yaitu sebesar 2037,5 kal/g, 2177,59 kal/g, 2353,76 kal/g, dan 2396,26 kal/g. Rata-rata kandungan protein dari F0 ke F3 secara berurutan yaitu sebesar 9,23%, 10,21%, 11,6%, dan 12,37%.

**Kata kunci:** *Bitterballen*, *Frozen food*, labu kuning, ikan gabus, energi, protein, selingan anak sekolah

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## ENERGY AND PROTEIN CONTENT OF FROZEN FOOD BITTERBALLEN SUBSTITUTED WITH SNAKEHEAD FISH AND PUMPKIN AS A SNACK SOURCE OF ENERGY AND PROTEIN FOR SCHOOL CHILDREN

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### ABSTRACT

**Background:** School age is a period highly susceptible to nutritional problems, one of which is protein-energy malnutrition (PEM). Therefore, it is necessary to develop snack products that are a source of energy and protein for school children. One product type that can be developed is frozen food bitterballen substituted with pumpkin and snakehead fish. Pumpkin contains various nutrients and has been used as a substitute for wheat flour. Snakehead fish has a high nutritional content, particularly protein. Thus, combining both can become a snack product that is a source of energy and protein for school children.

**Objectives:** To determine the effect of substituting snakehead fish and pumpkin on the energy and protein content of frozen food bitterballen.

**Methods:** Frozen bitterballen food substituted with pumpkin and snakehead fish was made using four formulas with different substitution ratios of pumpkin to snakehead fish, namely F0 (0:0), F1 (1:4), F2 (1:3), F3 (1:2). The parameters tested were energy content using the bomb calorimetry method and protein content using the Kjeldahl method.

**Results:** The energy and protein content tests on frozen food bitterballen substituted with snakehead fish and pumpkin showed an increasing average from F0 to F3. The increase in total energy content was proportional to the increase in protein content with the addition of the amount of pumpkin and snakehead fish substitution. The optimal energy and protein content was found in the F3 formula (50% pumpkin + 100% snakehead fish).

**Conclusion:** The results of the energy and protein content tests on frozen food bitterballen substituted with snakehead fish and pumpkin showed significant differences among the four formulations. The average energy content from F0 to F3 was 2037.5 cal/g, 2177.59 cal/g, 2353.76 cal/g, and 2396.26 cal/g, respectively. The average protein content from F0 to F3 was 9.23%, 10.21%, 11.6%, and 12.37%, respectively.

**Keywords:** Bitterballen, Frozen food, Pumpkin, Snakehead fish, Energy, Protein, School children snack

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