Kandungan Makronutrien Dan Zat Besi Snack Bar Tepung Kacang Merah (*Phaseolus vulgaris L.*) Dengan Substitusi Tepung Daun Kelor (*Moringa oleifera* L.)

Rahma Fitriandra S[1], Fitriyono Ayustaningwarno[1], Nurmasari Widyastuti[1], Dewi Marfu'ah Kurniawati[1]

ABSTRAK

Latar Belakang: Remaja putri rentan mengalami kekurangan energi kronis akibat kurangnya asupan energi, makronutrien dan berisiko kekurangan besi jika terjadi dalam jangka waktu yang lama. *Snack bar* merupakan camilan yang populer karena sehat, praktis, dan dapat dilakukan inovasi pangan menggunakan bahan lokal. Tepung kacang merah tinggi kandungan protein dan tepung daun kelor membantu melengkapi kandungan zat besi *snack bar*. Camilan *snack bar* tepung kacang merah substitusi tepung daun kelor diharapkan dapat berkontribusi dalam pemenuhan kebutuhan selingan AKG remaja putri.

Tujuan: Menganalisis pengaruh substitusi tepung daun kelor terhadap kandungan makronutrien, air, abu, besi dan energi pada *snack bar* tepung kacang merah.

Metode: Eksperimental rancangan acak lengkap satu faktor dengan formulasi *snack bar* F0 (35:0), F1 (33:2), F2 (32:3), F4 (30:5). Kandungan protein, air, abu, lemak, karbohidrat, energi, dan zat besi *snack bar* secara berurutan diuji menggunakan metode Kjeldahl, gravimetri, *drying ash*, soxhlet, *by difference*, konversi total kalori, dan ICP-OES. Formulasi terbaik menggunakan *multiattribute decision using a compensatory model and additive weighting technique* (MADCAW).

Hasil: Semakin tinggi substitusi tepung daun kelor berpengaruh secara signifikan meningkatkan kadar protein, air, dan abu, namun menurunkan karbohidrat dan energi *snack bar*. Substitusi tepung daun kelor meningkatkan kandungan zat besi dan menurunkan kandungan lemak *snack bar* namun tidak berpengaruh secara signifikan. Formulasi terbaik *snack bar* yaitu F2. Satu sajian *snack bar* memenuhi kebutuhan selingan 10% AKG remaja putri. Kandungan gizi *snack bar* sudah memenuhi standar USDA 2022.

Simpulan: Substitusi tepung daun kelor mempengaruhi peningkatan kandungan protein, air, abu, serta penurunan energi dan karbohidrat namun tidak mempengaruhi peningkatan zat besi dan penurunan lemak *snack bar* tepung kacang merah.

Kata Kunci: *snack bar*, makronutrien, zat besi, daun kelor

[1]Program Studi Ilmu Gizi, Fakultas Kedokteran, Universitas Diponegoro, Semarang
e-mail: rahmafitriandra37@gmail.com

Macronutrient and Iron Content of Red Bean Flour (*Phaseolus vulgaris* L.) Snack Bar With Substitution of Moringa Leaf Flour (*Moringa oleifera* L.)

Rahma Fitriandra S[1], Fitriyono Ayustaningwarno[1], Nurmasari Widyastuti[1], Dewi Marfu'ah Kurniawati[1]

ABSTRACT

Background: Adolescent girls are prone to chronic energy deficiency due to insufficient intake of energy, macronutrients, and are at risk of iron deficiency if it occurs over a long period of time. Snack bars are a popular snack because they are healthy, practical, and can be innovated using local ingredients. Red bean flour is high in protein content and moringa leaf flour helps supplement the iron content of snack bars. Red bean flour snack bar substituted with moringa flour is expected to contribute to the fulfillment of the RDA snack needs of adolescent girls.

Objctive: Analyze the effect of moringa flour substitution on the macronutrient, water, ash, iron and energy content of red bean flour snack bars.

Methods: This was an experimental study with one-factor completely randomized design with snack bar formulations F0 (35:0), F1 (33:2), F2 (32:3), F4 (30:5). The protein, water, ash, fat, carbohydrate, energy and iron contents of the snack bars were tested sequentially using Kjeldahl, gravimetric, ash drying, soxhlet, by difference, total calorie conversion and ICP-OES methods. The best formulation using multi-attribute decision using compensation model and additive weighting technique (MADCAW).

Results: The higher substitution of moringa flour significantly increased protein, water, and ash content, but decreased carbohydrate and energy. Substitution of moringa flour increased iron content and decreased fat content but had no significant effect. The best snack bar formulation is F2. One serving of snack bar fulfills the need for a snack of 10% RDA of adolescent girls. The nutritional content of the snack bar has fulfilled the USDA 2022 standard.

Conclusion Substitution of moringa flour affects the increase in protein, water, ash, and decrease in energy and carbohydrate content but does not affect the increase in iron and decrease in fat of red bean flour snack bars.

Keywords: snack bars, macronutrients, iron, moringa leaves

[1]Nurition Science Department, Faculty of Medicine, Diponegoro University, Semarang
e-mail: rahmafitriandra37@gmail.com