

## **Kandungan Zat Besi dan Karakteristik Sensori pada Cookies dengan Penambahan Stroberi (*Fragaria Ananassa*) dan Daun Kelor (*Moringa Oleifera*)**

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### **ABSTRAK**

**Latar belakang :** Anemia pada remaja putri masih menjadi masalah kesehatan, terutama di negara berkembang. Lebih dari setengah kasus anemia yang terjadi merupakan anemia defisiensi zat besi, yaitu kondisi akibat kekurangan zat besi yang mengganggu pembentukan sel darah merah serta berbagai fungsi tubuh lainnya. Meskipun pemerintah telah mengupayakan pencegahan melalui suplementasi Tablet Tambah Darah, tingkat konsumsi masih rendah akibat efek samping yang ditimbulkan. Pendekatan berbasis pangan dinilai dapat meningkatkan konsumsi makanan kaya zat besi dan vitamin C. Inovasi pangan, seperti pengembangan cookies berbahan tepung stroberi dan tepung daun kelor, berpotensi menjadi alternatif camilan bergizi untuk membantu mengatasi anemia pada remaja putri.

**Tujuan :** Mengetahui pengaruh penambahan tepung buah stroberi dan tepung daun kelor terhadap kandungan zat besi serta mengetahui karakteristik sensori pada cookies.

**Metode :** Penelitian ini merupakan penelitian eksperimental yang terdiri 4 perlakuan dengan perbandingan rasio tepung buah stroberi dan daun kelor, meliputi: Formulasi A0 (0% 0%), A1 (90:10%), A2 (80:20%) dan A3 (70:30%). Uji kandungan Fe dianalisis menggunakan metode Spektrofotometri UV-Vis dan uji karakteristik sensori (hedonik) menggunakan 66 panelis konsumen. Analisis statistik kandungan Fe menggunakan analisis one way ANOVA dengan uji lanjut Duncan's multiple range test. Karakteristik sensori menggunakan uji Kruskal Wallis dengan uji lanjut Mann Whitney u test. Formulasi terbaik dianalisis menggunakan uji MADCAW.

**Hasil :** Penambahan tepung buah stroberi dan tepung daun kelor berpengaruh signifikan terhadap peningkatan kandungan zat besi cookies ( $p < 0,001$ ). Pada atribut warna, rasa, aroma, dan keseluruhan cookies berbeda signifikan ( $p < 0,001$ ), namun tidak memiliki perbedaan signifikan pada atribut tekstur ( $p = 0,657$ ). Formulasi terbaik terdapat pada A3, dengan nilai akhir sebesar 0,70.

**Simpulan :** Penelitian menunjukkan bahwa penambahan tepung stroberi dan tepung daun kelor secara signifikan meningkatkan kadar zat besi (Fe) dan memperbaiki karakteristik sensori, kecuali tekstur. Formulasi A3 (70:30%) diidentifikasi sebagai yang terbaik. Namun, satu sajian cookies ini belum dapat diklasifikasikan sebagai makanan selingan sehat atau sumber zat besi tanpa pengujian kandungan zat gizi makronutrien lebih lanjut.

**Kata Kunci :** Zat besi, karakteristik sensori, cookies, buah stroberi, daun kelor

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## **Iron Content and Sensory Characteristics of Cookies with the Addition of Strawberry (*Fragaria ananassa*) and Moringa Leaves (*Moringa Oleifera*)**

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### **ABSTRACT**

**Background :** Anemia in adolescent girls remained a public health issue, particularly in developing countries. More than half of anemia cases were classified as iron deficiency anemia, a condition caused by insufficient iron intake, which disrupted red blood cell formation and various bodily functions. Despite government efforts to prevent anemia through iron supplementation (Tablet Tambah Darah), consumption rates remained low due to side effects. A food-based approach was considered more effective by increasing the intake of iron-rich and vitamin C-rich foods. Food innovations, such as cookies made from strawberry flour and moringa leaf flour, had the potential to serve as nutritious snacks to help combat anemia in adolescent girls.

**Objective:** This study aimed to determine the effect of adding strawberry flour and moringa leaf flour on the iron content and sensory characteristics of cookies.

**Methods:** This experimental study consisted of four treatments with different ratios of strawberry flour to moringa leaf flour: A0 (0%:0%), A1 (90%:10%), A2 (80%:20%), and A3 (70%:30%). Iron (Fe) content was analyzed using the UV-Vis spectrophotometry method, while sensory characteristics (hedonic test) were evaluated by 66 consumer panelists. Statistical analysis of Fe content was performed using one-way ANOVA followed by Duncan's multiple range test. Sensory characteristics were analyzed using the Kruskal-Wallis test, followed by the Mann-Whitney U test. The best formulation was determined using a MADCAW technique.

**Results:** The addition of strawberry flour and moringa leaf flour significantly increased the iron content in cookies ( $p < 0.001$ ). Sensory attributes, including color, taste, aroma, and overall acceptance, showed significant differences ( $p < 0.001$ ), except for texture, which showed no significant difference ( $p = 0.657$ ). The best formulation was A3, with a final score of 0.70.

**Conclusion:** The study showed that adding strawberry flour and moringa leaf flour significantly increased iron (Fe) content and improved sensory characteristics, except for texture. Formulation A3 (70:30%) was identified as the best. However, one serving of these cookies could not yet be classified as a healthy snack or an iron source without further macronutrient adequacy testing.

**Keywords:** Iron, sensory characteristics, cookies, strawberry, moringa leaf

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