

## **Karakteristik Fisik, Kadar Zat Besi, dan Daya Cerna Protein Krekers Substitusi Tepung Daging Ikan Lele Dumbo dan Spirulina untuk Remaja Putri Anemia**

Yulisa Dwivena Tantosa<sup>1</sup>, Etika Ratna Noer<sup>1</sup>, Fitriyono Ayustaningwarno<sup>1</sup>, Martha Ardiaria<sup>1</sup>

### **ABSTRAK**

**Latar belakang :** Prevalensi anemia pada remaja putri tahun 2018 sebesar 27,2% mengalami peningkatan menjadi 31,2% pada tahun 2019. Sekitar 50% kasus anemia disebabkan oleh defisiensi zat besi yang merupakan penyebab utama anemia defisiensi besi. Krekers substitusi ikan lele dumbo dan spirulina dapat menjadi sebuah alternatif penanganan anemia.

**Tujuan :** Menganalisis kadar zat besi, daya cerna protein dan karakteristik fisik pada krekers substitusi tepung daging ikan lele dumbo dan spirulina.

**Metode :** Penelitian eksperimental dengan rancangan acak lengkap dengan perbandingan substitusi tepung daging ikan lele dumbo dan spirulina F0 (0:0), F1 (26:4), F2 (24:6) dan F3 (22:8). Analisis kadar zat besi dan daya cerna protein menggunakan metode AAS dan *in-vitro* secara enzimatis. Analisis warna dan tingkat kekerasan menggunakan *chromameter*, dan *texture analyzer*. Analisis statistik menggunakan *One-Way ANOVA* dengan uji lanjut *Games-Howell* dan *Kruskal-Wallis* dengan uji lanjut *Mann-Whitney*.

**Hasil :** Krekers substitusi tepung daging ikan lele dumbo dan spirulina memiliki kadar zat besi berkisar 18,62-22,07 mg/100g; daya cerna protein 32,95-34,01%; warna kecerahan (L\*) 48,57-52,58; warna kehijauan (-a\*) 0,09-1,37; warna kekuningan (b\*) 2,32-7,24; dan tingkat kekerasan 31,66-36,89 N. Formula terbaik adalah krekers F3 (22: 8) berdasarkan kadar zat besi, daya cerna protein, warna dan tingkat kekerasan.

**Simpulan :** Substitusi tepung daging ikan lele dumbo dan spirulina pada krekers dapat memengaruhi kadar zat besi, daya cerna protein dan karakteristik warna secara signifikan. Namun, terhadap tingkat kekerasan tidak berpengaruh signifikan.

**Kata kunci :** kadar zat besi, daya cerna protein, krekers, tepung ikan lele, spirulina

---

<sup>1</sup>Program Studi Ilmu Gizi, Fakultas Kedokteran, Universitas Diponegoro, Semarang

yulisadt07@gmail.com

## **Physical Characteristics, Iron Content, and Protein Digestibility Crackers Substitute of Dumbo Catfish Meat Flour and Spirulina for Anemia Adolescent Girls**

Yulisa Dwivena Tantosa<sup>1</sup>, Etika Ratna Noer<sup>1</sup>, Fitriyono Ayustaningwarno<sup>1</sup>, Martha Ardiaria<sup>1</sup>

### **ABSTRACT**

**Background :** The prevalence of anemia in adolescent girls in 2018 was 27.2%, increasing to 31.2% in 2019. Around 50% of anemia cases are caused by iron deficiency, which is the main cause of iron deficiency anemia. Dumbo catfish and spirulina substitute crackers can be an alternative for treating anemia.

**Objective :** Analyze the iron content, protein digestibility, and physical characteristics of crackers substituted for dumbo catfish meat flour and spirulina.

**Methods :** Experimental research with a completely randomized design with a ratio of the substitution of dumbo catfish meat flour and spirulina F0 (0: 0), F1 (26: 4), F2 (24: 6), and F3 (22: 8). Analysis of iron content and protein digestibility using AAS and enzymatic in-vitro methods. Analyze the color and hardness level using a chromameter and texture analyzer. Statistical analysis used One-Way ANOVA with Games-Howell and Kruskal-Wallis tests with Mann-Whitney tests.

**Results :** Crackers substituted with dumbo catfish meat flour and spirulina have iron content ranges from 18,62–22,07 mg/100g; protein digestibility 32,95–34,01%; brightness color (L\*) 48,57–52,58; greenish color (-a\*) 0,09–1,37; yellowish color (b\*) 2,32–7,24; and hardness level 31,66–36,89 N. The best formula is F3 crackers (22: 8) based on iron content, protein digestibility, color and hardness level.

**Conclusion :** Substitution of dumbo catfish meat flour and spirulina in crackers can significantly affect iron content, protein digestibility, and color characteristics. However, the hardness level did not have a significant effect.

**Keywords :** iron content, protein digestibility, crackers, catfish flour, spirulina

---

<sup>1</sup>Nutrition Science Department, Faculty of Medicine, Universitas Diponegoro, Semarang

yulisadt07@gmail.com