

Kandungan Fenol, Flavonoid, Aktivitas Antioksidan, Sineresis, dan Sensoris *Jelly-Stick* Okra, Kurma, Jahe Merah Sebagai Potensi *Sports Food*

Helena Noviani Surya¹, Diana Nur Afifah¹, Fillah Fithra Dieny¹, A. Fahmy Arif Tsani¹, Angga Rizqiawan¹

ABSTRAK

Latar Belakang: Olahraga *endurance* meningkatkan kebutuhan oksigen tubuh yang dapat memicu stres oksidatif, kelelahan, dan penurunan performa atlet. Suplemen sering dikonsumsi, akan tetapi penggunaannya yang berlebihan berpotensi menimbulkan efek samping. Kombinasi bahan pangan alami sumber antioksidan, seperti okra, jahe merah, dan kurma dalam bentuk *jelly-stick* berpotensi menjadi inovasi pengembangan *sports food*. Jahe merah berperan sebagai antioksidan dan analgesik. Okra sebagai sumber antioksidan, serat, dan pengental alami. Kurma mengandung gula alami dan senyawa fenolik.

Tujuan: Menganalisis kandungan fenol dan flavonoid, aktivitas antioksidan, sineresis, serta sensoris dari *jelly-stick* okra, kurma sukari, dan jahe merah.

Metode: Penelitian eksperimental dengan desain penelitian rancangan acak lengkap (RAL) dengan perbedaan perbandingan okra, jahe merah, dan kurma meliputi F0 (3:17:0), F1 (3:13:4), F2 (3:11:6), serta F3 (3:9:8). Kandungan fenol dianalisis dengan metode *Folin-Ciocalteu*. Kandungan flavonoid dianalisis dengan metode $AlCl_3$. Aktivitas antioksidan (IC50) dianalisis menggunakan metode DPPH menggunakan spektrofotometri UV-VIS. Sineresis diukur dengan menimbang *jelly-stick* sebelum dan setelah penyimpanan selama 24, 48, dan 72 jam. Uji sensoris dianalisis dengan hedonik dan *Just-About-Right-Scale* (JARS) 9 titik terhadap 66 panelis konsumen. Evaluasi produk dianalisis dengan *penalty analysis*. Formula terbaik ditentukan menggunakan metode *Multi-Attribute Decision using a Compensatory Model and Additive Weighting Technique* (MADCAW).

Hasil: *Jelly-stick* okra, kurma, dan jahe merah berpengaruh signifikan ($p < 0,05$) terhadap kandungan fenol, flavonoid, aktivitas antioksidan (IC50), sineresis, dan hedonik (aroma, rasa, tekstur, dan keseluruhan). Namun, tidak terdapat pengaruh signifikan ($p > 0,05$) terhadap hedonik parameter warna. Formula F2 (3:11:6) merupakan formulasi terbaik dengan kandungan fenol $4,80 \pm 0,06$ mg GAE/g, flavonoid $0,75 \pm 0,04$ mg QE/g, dan nilai IC50 sebesar $4424,04 \pm 257,89$ ppm.

Simpulan: Formulasi *jelly-stick* okra, kurma, dan jahe merah memiliki pengaruh signifikan terhadap kandungan fenol, flavonoid, aktivitas antioksidan (IC50), sineresis, serta hedonik (aroma, rasa, dan keseluruhan) pada produk.

Kata Kunci: *jelly-stick*, okra, jahe merah, kurma, aktivitas antioksidan

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

Email: helenanoviani@gmail.com

Phenolic Content, Flavonoid Content, Antioxidant Activity, Syneresis, and Sensory of Okra, Date, and Red Ginger Jelly-Stick as a Potential Sports Food

Helena Noviani Surya¹, Diana Nur Afifah¹, Fillah Fithra Dieny¹, A. Fahmy Arif Tsani¹, Angga Rizqiawan¹

ABSTRACT

Background: Endurance exercise increases the body's oxygen demand, which may trigger oxidative stress, fatigue, and impaired athletic performance. Supplements are commonly consumed, but excessive use can lead to adverse effects. The combination of natural antioxidant-rich food sources, such as okra, red ginger, and dates in the form of a jelly-stick, has the potential to be developed as an innovative sports food. Red ginger acts as an antioxidant and analgesic. Okra serves as a source of antioxidants, dietary fiber, and a natural thickening agent. Dates contain natural sugars and phenolic compounds.

Objective: To evaluate the phenolic and flavonoid contents, antioxidant activity, syneresis, and sensory of jelly-stick made from okra, *sukkari* dates, and red ginger.

Methods: This experimental study employed a completely randomized design with different ratios of okra, red ginger, and dates, consisting of F0 (3:17:0), F1 (3:13:4), F2 (3:11:6), and F3 (3:8:9). The total phenolic content was analyzed with Folin-Ciocalteu method, and the flavonoid content was determined using the AlCl₃ method. Antioxidant activity (IC₅₀) was measured using the DPPH method with a UV-Vis spectrophotometer. Syneresis was evaluated by weighing the jelly-sticks before and after storage for 24, 48, and 72 hours. Sensory acceptability was assessed through a 9-point hedonic test and 9-point Just-About-Right (JAR) scale involving 66 consumer panelists. Product evaluation was conducted using penalty analysis and the best formulation was determined through Multi-Attribute Decision using a Compensatory Model and Additive Weighting Technique (MADCAW).

Results: Jelly-stick formulations made from okra, dates, and red ginger showed a significant effects ($p < 0.05$) on total phenolic content, flavonoid content, antioxidant activity (IC₅₀), syneresis, and hedonic acceptability (aroma, taste, texture, and overall). However, no significant effect ($p > 0.05$) was observed on the color parameter. The best formulation is F2 (3:11:6) with a total phenolic content of 4.80 ± 0.06 mg GAE/g, a flavonoid content of 0.75 ± 0.04 mg QE/g, and IC₅₀ value of 4424.04 ± 257.89 ppm.

Conclusion: The formulation of okra, date, and red ginger jelly-sticks had a significant effects on total phenolic and flavonoid contents, antioxidant activity (IC₅₀), syneresis, and sensory acceptability (aroma, taste, and overall) of the product.

Keywords: jelly-stick, okra, red ginger, *sukkari* dates, antioxidant activity

¹ Nutrition Science Department, Medical Faculty of Diponegoro University, Semarang

Email: helenanoviani@gmail.com