

**ANALISIS LAJU PENDINGERIAN DAN KARAKTERISTIK  
FISIKOKIMIA MULTI *GRAIN FLAKES* PADA BERBAGAI SUHU  
PENGOVENAN**

**INTISARI**

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*Flakes* umumnya dibuat dari tepung gandum impor, padahal Indonesia memiliki sumber daya lokal seperti tepung jagung, beras merah, kacang merah, kacang hijau, dan pisang. Penelitian ini bertujuan untuk menganalisis pengaruh suhu pengeringan terhadap laju pengeringan serta karakteristik fisik dan kimia *flakes* berbahan baku multi *grain*. Proses pengeringan dilakukan dalam oven listrik pada suhu 130°C, 150°C, dan 170°C dengan variasi rak atas, tengah, dan bawah.

Hasil penelitian menunjukkan bahwa suhu pengeringan berpengaruh nyata terhadap laju pengeringan, karakteristik fisik, serta kimia dalam *flakes*. Konstanta laju pengeringan meningkat dengan kenaikan suhu, masing-masing sebesar 0,165%/menit, 0,098%/menit, 0,130%/menit, dengan laju pengeringan tertinggi pada suhu 170°C. Rak atas dan bawah menunjukkan laju pengeringan lebih tinggi dibandingkan rak tengah. Karakteristik fisik *flakes* pada berbagai suhu meliputi kadar air 3,113%–8,944%, densitas 0,45–0,47 g/mL, *water absorption index* 9,25–9,36 g gel/g sampel kering, dan daya rehidrasi 6,12%–7,32%. Warna *flakes* mengalami perubahan dengan kenaikan suhu, ditunjukkan oleh nilai *chroma* 18,04–22,58 dan *hue angle* -0,01–0,13.

Pada aspek kimia, suhu berpengaruh signifikan terhadap kadar air, terdapat perbedaan hasil pula pada komposisi lainnya. Kadar protein berada di kisaran 10,70%–11,22%, karbohidrat 77,46%–77,96%, lemak 7,40%–7,96%, dan energi 369,98–371,08 Kkal. Dengan demikian, suhu pengeringan yang lebih tinggi meningkatkan laju pengeringan dan memengaruhi warna serta daya rehidrasi *flakes*, dan juga mempengaruhi karakteristik kimia dari analisis hasil proksimat.

Kata kunci: *Flake*, suhu, rak, laju pengeringan, fisik, kimia

## **ANALYSIS OF DRYING RATE AND PHYSICOCHEMICAL CHARACTERISTICS OF MULTI GRAIN FLAKES AT VARIOUS OVEN TEMPERATURES**

### **ABSTRACT**

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Flakes are commonly made from imported wheat flour, even though Indonesia has abundant local resources such as corn, red rice, red beans, mung beans, and bananas. This study analyzes the effect of drying temperature on the drying rate and the physical and chemical characteristics of multi grain flakes. Drying was conducted in an electric oven at 130°C, 150°C, and 170°C, with variations in the top, middle, and bottom racks.

Results show that drying temperature significantly affects the drying rate, physical properties, and chemical composition of flakes. The drying rate constant increased with temperature, measured at 0,165%/min, 0,098%/min, 0,130%/min, with the highest drying rate at 170°C. The top and bottom racks showed higher drying rates than the middle rack. Physical characteristics varied with temperature, including moisture content (3.113%–8.944%), density (0.45–0.47 g/mL), water absorption index (9.25–9.36 g gel/g dry sample), and rehydration capacity (6.12%–7.32%). Color changes were observed as temperature increased, with chroma values ranging from 18.04 to 22.58 and hue angle from -0.01 to 0.13.

Chemically, temperature significantly affected moisture content and had impact on other components. Protein ranged from 10.70% to 11.22%, carbohydrates from 77.46% to 77.96%, fat from 7.40% to 7.96%, and energy from 369.98 to 371.08 kcal. Higher drying temperatures improved drying rates, influenced color and rehydration capacity, and also affected the chemical characteristics based on proximate analysis.

**Keywords:** Flakes, temperature, rack, drying rate, physical, chemical