Junior Science Communications
Faculty of Applied Sciences, UiTM Shah Alam
https://journal.uitm.edu.my/ojs/index.php/JSC

E-ISSN 2637-0689
Vol 63 2026

Colloquium on Applied Sciences 1 2026
7-12 January 2026, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

Physical Quality Evaluation of Ready-to-Eat Snack Bars Formulated with Soybean–Almond Composite Flour

Ayu Nabila Fadillah[a], Asmeda Rajab[a,b*]

Structured Abstract

Background: Increased demand for convenient, plant-based ready-to-eat (RTE) snack bars has driven the development of products with enhanced physical quality. Soybean powder-almond flour has gained significant interest due to their impact on the structural integrity of snack bar products. This study evaluates the physical properties of such formulations to predict the stability of low-moisture snack products.

Methods: Six different formulations of RTE snack bars were prepared, comprising a 100% wheat flour and five composite formulations (F1- F5) with varying proportions of soybean powder and almond flour. Physical analyses of the prepared RTE snack bars were carried out such as the determination of water activity, texture profile analysis, and short-term storage stability. Texture profile was employed to determine the hardness, cohesiveness, springiness, and chewiness of the RTE snack bars prepared. Short-term storage observation monitored the weight changes on days 0, 3, 6, 9, 12, and 15 and act as an indicator of moisture migration.

Results: This study shows water activity values ranged from 0.614 to 0.746 across all formulations, indicating the potential of these formulations as low-moisture snack foods. Texture profile analysis showed significant differences ($p < 0.05$) among formulations. Hardness values ranged from 2582.65 N to 41248.01 N, with the control sample exhibiting the highest hardness. Springiness ranged from 0.471 to 0.725, with formulation F1 showing significantly higher elastic recovery. Cohesiveness values varied between 0.253 and 0.541, where the control formulation demonstrated the highest cohesiveness. Chewiness values across all samples ranged from 326.44 N to 20089.10 N. The control and F4 formulations exhibited significantly higher chewiness (20089.10 N and 6488.67 N, respectively) compared to all other samples. Minimal weight fluctuations were observed throughout the 15-day storage period.

Conclusion: The incorporation of soybean powder and almond flour positively influenced the physical quality of the RTE snack bars. Wheat-based control showed the highest mechanical resistance, formulations F2 and F3 demonstrated the optimal physical stability, proving the viability of these plant-based composite flours.

Keywords: RTE snack bar, Soybean-almond composite, Texture profile analysis, Water activity, Storage stability

*Correspondence: asmeda@uitm.edu.my

[a] School of Industrial Technology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

[b] Food Science Research Group, Universiti Teknologi MARA, Shah Alam, Malaysia