

Development of a novel avocado-based (*Persea americana*) spread incorporating selected spices

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INTRODUCTION & AIM

Plant-based diets are rapidly gaining popularity due to health, environmental, and ethical reasons (D'Souza et al., 2022). This trend has increased the demand for healthier, functional alternatives to traditional fat-based spreads, which often contain high levels of saturated fats and artificial additives. Avocado (*Persea americana*) stands out as a promising ingredient because of its creamy texture, healthy fats, and nutrient content, though its short shelf life due to browning and spoilage remains a challenge (Nyakang'i et al., 2023).

Why Process Avocado?

- ✓ Short shelf life
- ✓ Seasonal availability
- ✓ Value addition
- ✓ Consumer convenience
- ✓ Reduced post-harvest losses
- ✓ Market expansion



Avocados are among the 66% of fruits and vegetables that are wasted each year due to their short shelf life. The main obstacle to increasing avocado consumption is preserving its high nutritional value throughout its supply chains and processing. Due to the activity of polyphenol oxidase (PPO) enzymes, avocados undergo discoloration within a short period when exposed to air. Inactivation of the PPO enzyme using combined methods was one of the initial approaches to preserve product quality by preventing enzymatic browning during processing.

The objective of this study was to develop an avocado fruit spread that retain the nutritional and sensory qualities of ripen avocados, while adding value through innovative formulation and product development strategies.

METHOD

All experimental work was conducted at the Food Processing, Food Analysis, and Food Microbiology Laboratories, Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka

Fresh avocados were cleaned and scooped to obtain the pulp

The spice mixture and gum composition were blended with avocado pulp to create the base formula

Each parameter was adjusted to determine the upper and lower limits of the product characteristics using trial and error method.

Final formulations were determined using the L4 orthogonal array design to evaluate key factors

Consumer preferences was accessed using 9-point hedonic scale for overall acceptability and JAR scale to identify the attributes requiring improvements.

The selected formulation was stored under refrigerated conditions for stability observation

Nutritional, physicochemical, and shelf-life analyses were conducted to evaluate product quality.

RESULTS & DISCUSSION

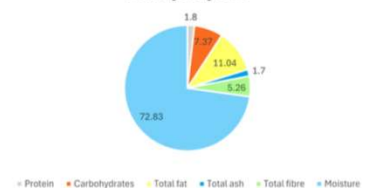
Sensory evaluation

The Taguchi approach supported the identification of optimal formulations. Based on JAR results, the avocado flavor was adjusted to a moderate level to match consumer preferences, while the creaminess was fine-tuned to enhance texture without making it overly rich or heavy

Macro nutritional profile

The developed avocado spread contains a high moisture content (72.83%), followed by fat (11.04%), carbohydrates (7.37%), and lower levels of protein (1.8%), ash (1.7%), and fiber (5.26%). These results indicate that the product is moisture-rich with a smooth, spreadable consistency and contributes to moderate energy intake.

Percentages of proximate composition in the developed spread



Phytochemical Composition

The spread showed a total phenolic content of 1.92 ± 0.16 mg GAE/g, antioxidant capacity of 5.27 ± 0.09 mg TE/g, and flavonoid content of 0.08 ± 0.003 mg QE/g, confirming its potential as a functional food.

Mineral Content

The spread is a good source of potassium and sodium, along with essential minerals such as calcium, magnesium, iron, copper, and zinc. These nutrients contribute to overall nutritional balance and support key health functions like electrolyte regulation, enzyme activity, and bone health.

Mineral	Concentration (mg/100g)
Na	221.23±0.96
K	460.42±1.92
Ca	8.15±0.51
Mg	20.47±1.10
Cu	0.0034±0.0003
Fe	0.0316±0.0006
Zn	0.0018±0.0002

Fatty Acid Profile

Oleic acid (65.73%) was the dominant fatty acid, followed by palmitic acid (19.3%) and palmitoleic acid (5.73%). The high content of oleic acid, a monounsaturated fatty acid, highlights the health-promoting potential of the spread, particularly in cardiovascular wellness.

CONCLUSION

- Through comprehensive nutritional, chemical, and microbiological analyses, the developed spread demonstrated strong potential as a functional food product.
- The developed avocado spread demonstrated a shelf life of three weeks, maintaining acceptable color, pH, and microbial stability throughout the storage period

FUTURE WORK / REFERENCES

- Future studies should focus on incorporating natural preservatives (e.g., plant extracts, essential oils) and antioxidant-rich additives to enhance microbial safety and color stability without compromising product acceptability.
- Investigating advanced packaging methods such as vacuum sealing or UV-resistant materials is recommended to minimize oxidation and prevent color degradation during storage.

D'Souza, C., Brouwer, A. R., & Singaraju, S. (2022). Veganism: Theory of planned behaviour, ethical concerns and the moderating role of catalytic experiences. *Journal of Retailing and Consumer Services*, 66, 102952. <https://doi.org/10.1016/j.jretconser.2022.102952>

Nyakang'i, C. O., Marete, E., Ebere, R., & Arimi, J. M. (2023). Physicochemical Properties of Avocado Seed Extract Model Beverages and Baked Products Incorporated with Avocado Seed Powder. *International Journal of Food Science*, 2023, 1–9. <https://doi.org/10.1155/2023/6860806>