UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA

"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"

05–06 November 2026



Development and Characterization of Innovative Plum Jam Formulations (*Prunus domestica* L.)



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Abstract

This study aimed to develop and characterize innovative plum jam formulations (*Prunus domestica L.*) by incorporating chia seeds (*Salvia hispanica L.*) and cinnamon (*Cinnamomum* spp.), ingredients valued for their chemical composition and functional properties. The influence of these additions on the physicochemical and sensory characteristics of the jam was evaluated. The results showed that the additions moderately modified the product's acidity and antioxidant potential and improved its sensory profile, the formulation containing both cinnamon and chia seeds being the most appreciated.

Keywords: plum jam, chia seeds, cinnamon, innovative formulations, physicochemical analysis, sensory evaluation.

1. Introduction

- **Plums** (*Prunus domestica L.*) are valuable fruit sources, rich in phenolic compounds, vitamins and antioxidants.
- Cinnamon and chia seeds are natural ingredients with recognized functional properties.
- **Aim:** to develop innovative plum jam formulations and to evaluate the effect of these additions on the quality and sensory characteristics of the product.



2. Materials and Methods

- **Raw materials:** ripe plums (*Prunus domestica L.*), sugar, lemon juice, ground cinnamon and chia seeds.
- **Formulations:**
  - ✓ V0 – control (plum jam);
  - ✓ V1 – plum jam + cinnamon (0.5%);
  - ✓ V2 – plum jam + chia seeds (1.0%);
  - ✓ V3 – plum jam + cinnamon (0.5%) + chia seeds (1.0%).
- **Analytical methods:** moisture (oven drying, 105 °C), °Brix (refractometry), pH (pH-meter), titratable acidity (as citric acid), total polyphenols (Folin–Ciocalteu).
- **Sensory evaluation:** 15 assessors, five-point hedonic scale (1 = very poor, 5 = excellent) for appearance, color, consistency, taste and aroma.



Technological process for plum jam

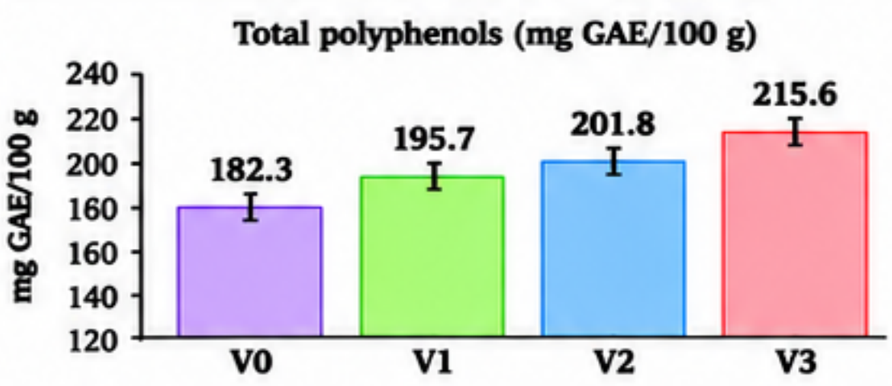
Ripe plums (selection and washing)
↓
Pitting and cutting
↓
Cooking with sugar and lemon juice
↓
Addition of cinnamon and/or chia seeds (according to formulation)
↓
Concentration (to ~65 °Brix)
↓
Hot filling and sealing (glass jars)
↓
Cooling, labeling and storage (5–20 °C)



3. Results and Discussions

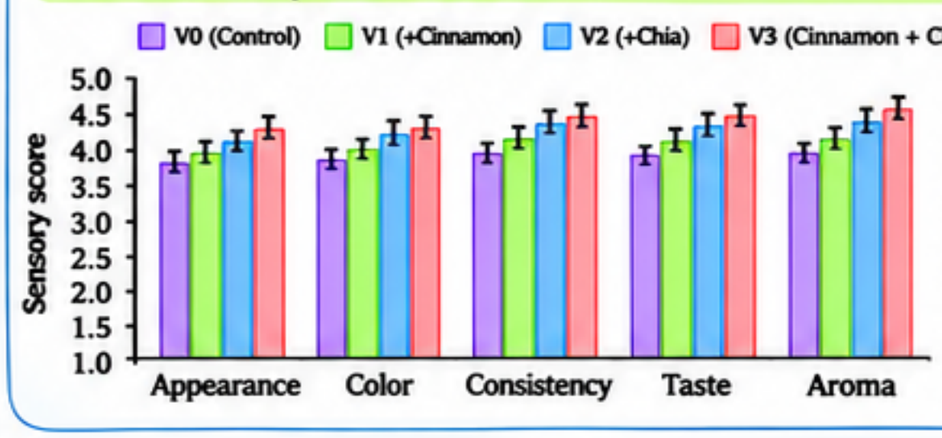
3.1. Physicochemical characterization

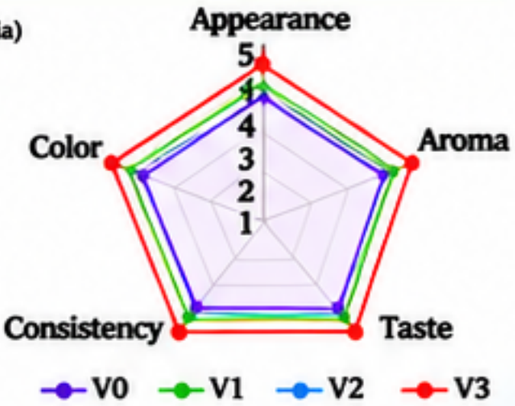
Formulation	°Brix (%)	pH	Titratable acidity (g citric acid/100 g)	Total polyphenols (mg GAE/100 g)
V0 – Control	64.8 ± 0.4	3.42 ± 0.03	0.86 ± 0.02	182.3 ± 4.5
V1 – + Cinnamon	65.1 ± 0.3	3.39 ± 0.02	0.88 ± 0.03	195.7 ± 5.1
V2 – + Chia seeds	65.0 ± 0.4	3.40 ± 0.03	0.90 ± 0.02	201.8 ± 4.9
V3 – Cinnamon + Chia	65.2 ± 0.3	3.37 ± 0.02	0.91 ± 0.03	215.6 ± 5.3





3.2. Sensory evaluation





4. Conclusions

- The addition of cinnamon and chia seeds slightly increased titratable acidity and total polyphenols.
- All formulations exhibited high °Brix values (≈65%), suitable for jam preservation.
- The sensory evaluation indicated high acceptability, with the formulation containing both cinnamon and chia seeds (V3) obtaining the highest overall scores.
- The results support the development of innovative plum jam products with improved functional and sensory properties, contributing to the diversification of fruit-based products.

Acknowledgements: *The authors gratefully acknowledge the Research Center of the Faculty of Food Engineering, University of Life Sciences "King Mihai I" from Timisoara, Romania, for its support and research infrastructure.*