EXOTIC FRUIT JAM – SENSORY AND PHYSICOCHEMICAL CHARACTERIZATION

Laura Rădulescu[1], Corina-Iuliana Megyesi [1*], Ariana-Bianca Velciov[1], Patricia Tarkany[1], Simion Alda[2], Mihaela Lacatus[1], Diana Moigradean[1], Cristina Elena Toța[2], Ioan Ladislau Caba[3], Despina-Maria Bordean[1]

[1]Faculty of Food Engineering, University of Life Sciences "King Michael I" from Timisoara, 300645, Timisoara, Romania
[2]Faculty of Engineering and Applied Technologies, University of Life Sciences "King Michael I" from Timisoara, 300645, Timisoara, Romania
[3]National Institute of Research - Development for Machines and Installations designed to Agriculture and Food Industry - INMA, Bucharest 013813, Romania;
[*]e-mail: corina.megyesi@usvt.ro

Abstract
The present study aims to highlight the sensory and physicochemica
l characteristics of three different types of jam made from exotic fruits: mango jam, pineapple jam, and mango–pineapple jam with added ginger, thus emphasizing the properties and qualities of these products. The preparation method for each jam variety is described, focusing on the development of natural and healthy products with distinct flavors imparted by the selected ingredients. The mango jam, pineapple jam, and the mango–pineapple jam with added ginger were subjected to sensory evaluation by a panel of 10 assessors. The evaluated attributes included appearance, color, consistency, aroma, and taste. The results of the evaluation showed that the mango–pineapple jam enriched with ginger was the most appreciated variety, due to the harmonious balance between flavor and texture. The physicochemical analyses focused on determining acidity, vitamin C content, and sugar content. Among the three samples, the mango–pineapple jam with added ginger exhibited the highest acidity (0.48%) and the highest vitamin C content (1338.85 mg/L), while the mango jam stood out for having the highest sugar content (74.6 °Brix).

Keywords: exotic fruit jam, fruit preserves, functional food, vitamin C content, ginger additive

Introduction

Jam is a traditional product obtained by preserving fruits in sugar and is appreciated for its pleasant taste and nutritional values [1,2]. In recent years, interest in jams made from exotic fruits has significantly increased due to their unique flavors and nutritional benefits [3]. From a nutritional perspective, jam provides energy because of its high sugar content, and by adding certain ingredients such as spices or exotic fruits, it can offer additional benefits owing to its bioactive compounds and antioxidants [4]. Ripe mango fruit is highly aromatic and sweet, with an orange-reddish color, providing an exceptionally high content of vitamins (A, C, E, B6, K), antioxidants, fibers, pectins, starch, Omega-3 and Omega-6 fatty acids, as well as copper (Cu) and zinc (Zn). Moreover, mango contains 17 amino acids, including essential ones involved in protein synthesis and various metabolic processes [5]. Pineapple is a tropical fruit valued for its sweet and sour flavor and juicy texture. It is an important source of vitamin C, manganese, dietary fibers, and the enzyme bromelain, which has anti-inflammatory properties and aids digestion. Additionally, pineapple is rich in antioxidants and bioactive compounds that contribute to overall health [6,7]. Ginger is an aromatic root widely used in both cuisine and traditional medicine, known for its anti-inflammatory, antioxidant, and digestive properties. This rhizome is rich in bioactive compounds such as gingerols, which provide beneficial effects

on the immune system, help reduce nausea symptoms, and support digestive health [8].These innovations introduced to traditional jam recipes respond to current consumer preferences for tasty and distinct products that are also functional from a nutritional standpoint.

Experimental

2.1 Materials

The raw and auxiliary materials used for the preparation of the jams were purchased from supermarkets and included mango, pineapple, lemons, ginger, and still (non-carbonated) water. Three types of jams were produced as follows: mango jam, pineapple jam, and mango–pineapple jam with added ginger. The recipes for each variety were adapted to ensure a balanced combination of fruits, sugar, lemon juice, and ginger, following traditional boiling and preservation methods.

2.2 Methods

The sensory analysis of the samples was performed using a scoring method by a panel of 10 evaluators. The sensory attributes assessed included appearance, consistency and shape retention, taste, and aroma. A maximum score of 5 points was assigned for each attribute.Physicochemical analyses were conducted to determine acidity (by titration with 0.1 N NaOH solution), vitamin C content (using the iodometric method), and sugar content (measured in degrees Brix with a refractometer). All determinations were performed in triplicate to ensure the accuracy and reliability of the results.

Results and discussion

The sensory analysis conducted with a panel of 10 evaluators highlighted the preferences for the three tested jam variants. Mango jam and the combined mango–pineapple jam with ginger were the most appreciated by the panelists, especially for taste (4.6 and 4.8, respectively) and aroma (4.4 and 4.6), receiving average scores above 4.5 points. Mango jam received a slightly lower score for consistency (4.2) compared to the combined jam variant (4.4), while pineapple jam was less uniformly appreciated, particularly for taste (4.1) and aroma (4.0). Overall, the jam with added ginger stood out as the highest rated, due to its fine balance between flavor and texture.

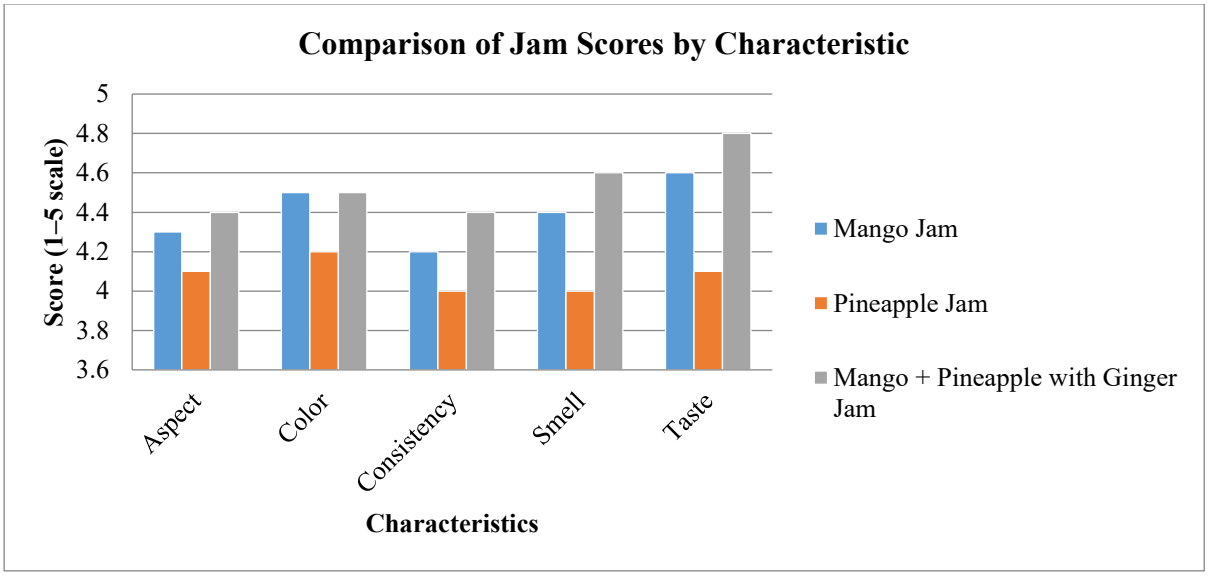

Figure 1. Sensory characterization of mango, pineapple, mango and pineapple with ginger jams

The results of the physicochemical analyses performed on the three jam variants—mango, pineapple, and mango and pineapple with added ginger—are presented in the table below, highlighting key parameters such as total acidity, refractive index, vitamin C content, and sugar concentration.

Table 1. The results of the physicochemical analyses for the three jam variants

Characteristics	Mango Jam	Pineapple Jam	Mango + Pineapple + Ginger Jam
Total acidity (%)	0,32	0,37	0,49
Refractive index	1,4672	1,4595	1,4575
Vitamin C (mg/L)	903,67	832,16	1339,73
Sugar content (°Brix)	74,9	71,8	71,2

Conclusion

Products in the jam category are appreciated for their pleasant taste and extended shelf life, but their sensory and nutritional qualities can vary significantly depending on the fruit composition as well as the additional ingredients used. This study aimed to characterize the sensory and physicochemical properties of three types of jam with different recipes and compositions: mango jam, pineapple jam, and a mixed variant with added ginger.The sensory analysis highlighted that the most appreciated variant was the mango–pineapple jam with added ginger, which recorded the highest overall average score of 4.74 points. This variant was particularly distinguished by its taste (4.8 points) and aroma (4.6 points), followed by the mango jam, which achieved a general score of 4.4 points. The pineapple jam was less favored, obtaining an average total score of 4.08 points, mainly due to lower ratings for taste (4.1) and aroma (4.0). Comparison of the physicochemical parameters of the three jam types revealed significant differences, although all samples fell within accepted limits. Total acidity ranged between 0.32% (mango jam) and 0.49% (ginger-added variant), while sugar content ranged from 71.2 °Brix to 74.9 °Brix, with the highest sugar content recorded in mango jam. Vitamin C content was significantly higher in the ginger-containing jam (1339.73 mg/L), suggesting an increased nutritional value due to the addition of ginger. The results indicate that among the three varieties, the jam with added ginger was the most appreciated sensorially and exhibited a higher concentration of vitamin C, an important bioactive compound, which suggests the potential of this variant as a functional food product.

Acknowledgements

The author wishes to express gratitude to all who contributed to the completion of this study.

References

[1] Ajila, C. M.; Naidu, K. A.; Bhat, S. G.; Prasada Rao, U. J. S., **2007**, Bioactive compounds and antioxidant potential of mango peel extract, *Food Chemistry*, 105(3), 982–988;
[2] Mohd Naeem, M. N.; Arshad, M. S.; Amjad, M.; Ahmad, R. S., **2017**, The nutritional composition of fruit jams in the Malaysian market, *Journal of the Saudi Society of Agricultural Sciences*, 16(1), 89–96;
[3] Sankaran, S.; Gupta, V., **2017**, Stability of bioactive compounds in fruit jam and jelly during processing and storage: A review, *LWT - Food Science and Technology*, 73, 445–455;
[4] Mashhadi, N. S.; Ghiasvand, R.; Askari, G.; Hariri, M.; Darvishi, L.; Mofid, M. R., **2013**, Anti-oxidative and anti-inflammatory effects of ginger in health and physical activity: Review of current evidence, *International Journal of Preventive Medicine*, 4(Suppl 1), S36–S42;

[5] Sharma, S.; Singh, A., **2018**, Nutritional composition and health benefits of mango (Mangifera indica L.): a review, *International Journal of Current Microbiology and Applied Sciences*, 7(6), 1698–1713;
[6] Morton, J. F., **1987**, Pineapple. In *Fruits of warm climates* (pp. 281–296). Miami, FL: Creative Resource Systems;
[7] Ma, Y.; Liu, D., **2018**, Nutritional composition and health benefits of pineapple (Ananas comosus), *Food Science & Nutrition*, 6(3), 789–798;
[8] Ali, B. H.; Blunden, G.; Tanira, M. O.; Nemmar, A., **2008**, Some phytochemical, pharmacological and toxicological properties of ginger (Zingiber officinale): A review of recent research, *Food and Chemical Toxicology*, 46(2), 409–420.