



1º Congresso Internacional de Agricultura, Inovação e Sustentabilidade do Amazonas

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Jonathan Felix Ribeiro Lopes

Neibe da Silva Araujo Junior

Marcelo da Silva Marques

(Orgs.)

Capa: Mayara Nascimento Pessoa

Diagramação: Juanita Quijano Niño

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TECNOLOGIA, QUALIDADE E SEGURANÇA
ALIMENTAR



COMPARATIVE EVALUATION OF ORANGES AVAILABLE FOR CONSUMPTION IN PORTUGAL

Ana S. Fajardo^{1,2}

Valéria Serra¹

António Peres³

Ana C. Veloso^{1,2}

Marta H. Henriques^{1,2}

Abstract

Citrus production in Portugal, particularly in Algarve, plays a significant role in the national and European markets. Oranges from this region are highly regarded for their exceptional quality, due to unique climatic and geographical conditions. Many of these oranges hold the Protected Geographical Indication (PGI) "Citros do Algarve" certification, ensuring their authenticity and superior characteristics. While Algarve oranges dominate the market, other varieties also reach consumers, warranting a broader comparative analysis.

This study aimed to compare 5 orange varieties, Baía, Dalmau, Navelate, Lane Late, and Salustiana, sourced from different regions, cultivation methods, and market sources. A versatile approach was used, combining physicochemical and sensory analyses, to determine their quality attributes. External properties (appearance, dimensions, and color) were measured along juice parameters such as total solids (TS), density, total soluble solids (SS) (°Brix), titratable acidity (TA), SS/TA ratio, and color. Sensory perception was assessed by an untrained panel evaluating aspects like appearance, taste, sweetness, and acidity. Additionally, an electronic tongue (E-tongue) was employed to detect and analyze chemical patterns associated with sweetness perception, ensuring precise and consistent results.

Results showed all varieties except Dalmau had over 70% sensory acceptance, with scores exceeding 4.2 on a 7-point scale. Lane Late variety was the most favored among consumers, excelling in both external attributes and taste. Lane Late physicochemical analysis supported these preferences: pH of 3.53 ± 0.12 , TA of 0.50 ± 0.12 g citric acid/100 g, SS of

¹ Polytechnic University of Coimbra, Rua da Misericórdia, Lagar dos Cortiços, S. Martinho do Bispo, 3045-093 Coimbra, Portugal. sofia.fajardo@ipc.pt; anaveloso@isec.pt; mhenriques@esac.pt.

² Research Center for Natural Resources, Environment and Society (CERNAS), Polytechnic University of Coimbra, Bencanta, 3045-601 Coimbra, Portugal

³ CIMO, LASusTEC, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal. peres@ipb.pt.



12.14 ± 0.66 °Brix, and the highest SS/TA ratio of 22.99 ± 3.27 , reinforcing its perceived sweetness.

E-tongue analysis successfully distinguished flavor profiles. A classification model using 40 lipid sensor membranes achieved a 94.4% correct classification rate. The linear discriminant analysis (LDA) model, enhanced by the simulated annealing (SA) variable selection algorithm, efficiently separated the 5 orange cultivars. Two discriminant functions (DF1 accounting for 99.8% variability and DF2 for 0.10%) effectively differentiated the samples. The E-tongue's ability to detect and classify sweet and acidic sensations contributed to its strong predictive performance.

This integrated analytical approach provided a comprehensive comparison of the sweetness profiles of oranges available in Portugal, blending objective and subjective evaluations. The study reaffirmed the superior qualities of Algarve oranges, with the PGI-certified Lane Late standing out. With an average diameter of 87.41 ± 3.76 mm, second only to Baía (92.14 ± 5.40 mm), and an intermediate peel thickness of 5.27 ± 0.58 mm, Lane Late demonstrated notable physical attributes. Its TS content ($12.01 \pm 0.72\%$) was close to Navelate ($12.62 \pm 1.49\%$), while it had the lowest ash content ($0.38 \pm 1.13\%$), reinforcing its distinctiveness.

Keywords: Orange varieties. Physicochemical analysis. Sensory evaluation. E-tongue classification. Sweetness perception.