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Assessing the quality of fresh fruits produce

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The qualification of fruits and derived products is crucial for the definition of parameters able for assurance of quality, origin, fraud identification, and future valorisation, with important market value implications. Coupled analytical methods have been assuming a higher importance for this goal, since they permit the identification, quantification, and inter-relation of an increasingly number of chemical compounds at concentration levels progressively lower.

Origin traceability and quality based on volatile composition has been considerably improved by the development of comprehensive two-dimensional gas chromatography coupled with time-of-flight mass spectrometry (GC x GC-ToF-MS). An example of the potential of this tool is the traceability of grape origin based on monoterpenoids [1].

Phenolic compounds can also be diagnostic of fruits origin and quality. This can be illustrated by the plums (*Prunus domestica* L.) of 'Green Gage' variety. In Portugal, only the fruits of a special type of 'Green Gage' variety, 'Rainha Cláudia Verde', from a delimited geographic region, can be utilized to produce the candied plum "Ameixa d'Elvas", which is a Protected Designation of Origin (PDO). The phenolic composition allows its distinction from other varieties, and from 'Green Gage' fruits of other origins.

'Green Gage' plums are also a very good example to illustrate why the well recognized criteria to determine the stage of ripening adequate for fruit harvesting cannot be applied to establish the quality of fresh fruit produce. Criteria based on ºBrix, pH, and titratable acidity are usually used to define the maturation stage of this plum for candying. However, fruits from specific orchards show frequently skin disruption and loss of pulp consistency during the boiling step applied prior to candying, originating a final soft product, with poor texture properties and no commercial value. This occurs with no apparent differences in the texture or microstructure of the fresh fruits, the reason why other criteria, based on analysis of fruit cell wall polysaccharides and activity of enzymes acting on them, have been proposed, including a quick methodology of diagnostic based on FTIR spectroscopy coupled with quimiometric data analysis.

[1] Rocha, S.M.; Coelho, E.; Zrostlíková, J.; Delgadillo, I.; Coimbra, M.A. (2007) "Comprehensive two-dimensional Gas Chromatography with Time-of-Flight Mass Spectrometry of monoterpenoids as a powerful tool for grape origin traceability", *J. Chromatogr. A*, 1161, 292–299.

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