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P.43 CHARACTERIZATION OF SUGARS IN ALMOND (*PRUNUS DULCIS*) BY HPLC-RI

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Almond tree (*Prunus dulcis*), is the most important nut tree produced in the world, especially in the Mediterranean region, from which about 28% of the world production is obtained. In Portugal, almond is a traditional crop, mainly spread through Algarve, Baixo Alentejo and "Terra Quente Transmontana", with 24522 crops spread trough 36530ha[1].

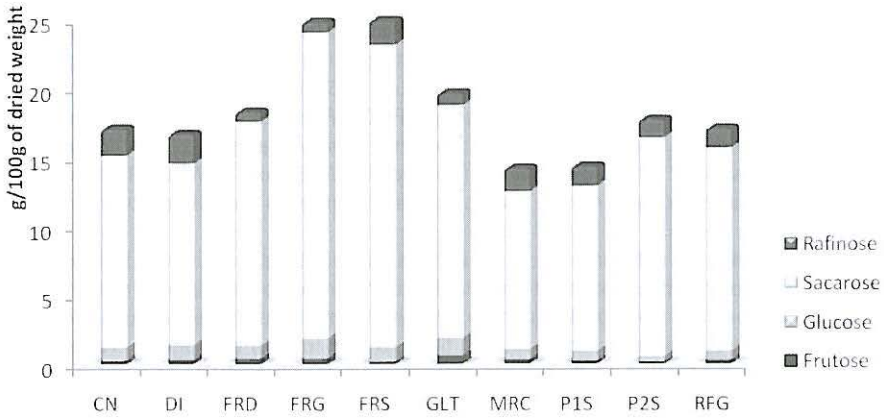
In this work, we selected commercial [*Ferraduel* (FRD), *Ferragnes* (FRG), *Ferrastar* (FRS), *Gloriette* (GLT) and *Marcona* (MRC)] and regional [*Casanova* (CN), *Duro Italiano* (DI), *Pegarinhos one seeded* (P1S), *Pegarinhos two seeded* (P2S) and *Refego* (RFG)] cultivars, produced in Trás-os-Montes region, to be screened in what concerns to their sugars composition.

Carbohydrates are relevant components in almond, especially starch, which is followed by sucrose. They are known as the most important parameter in the assessment of fruit quality, once sugar content and composition can be lowered or modified by several conditions, like storage temperature, relative humidity, harvest time, oxygen level or packaging[2]. Together with sucrose, glucose, fructose and raffinose are present in significant amounts and may contribute for cultivar characterization.

Free sugars profiles were determined by high performance liquid chromatography coupled to a refraction index detector (HPLC-RI). The HPLC equipment consisted of an integrated system with a Smartline pump 1000, a degasser system Smartline manager 5000, a Smartline 2300 RI detector (Knauer, Germany), and an AS-2057 auto-sampler (Jasco, Japan). Data were analysed using Clarity 2.4 Software (DataApex). The chromatographic separation was achieved with an Eurospher 100-5 NH_2 column (4.6x250mm, 5mm, Knauer) operating at 35°C (7971R Grace oven). The mobile phase used was acetonitrile/deionized water, 7:3 (v/v) at a flow rate of 1mL/min, and the injection volume was 20μl. The compounds were identified by chromatographic comparisons with authentic standards. The results are expressed in g/100g of dried weight, calculated by internal normalization of the chromatographic peak area. Sugar identification was made by comparing the relative retention times of sample peaks with standards.

The linearity and sensitivity of the HPLC analysis was determined and the method was validated by the instrumental precision, repeatability and accuracy, using the fruits of *Ferraduel* cultivar.

Sucrose (Figure 1) was always the main sugar (11.46±0.14 in *Marcona* to 22.23±0.59 in *Ferragnes* g/100g of dried weight). Raffinose was the second major sugar (0.71±0.05 in *Ferraduel* to 2.11±0.29 in *Duro Italiano*), followed by glucose (0.42±0.12 in *Pegarinhos two seeded* to 1.47±0.19 in *Ferragnes*) and fructose (0.11±0.02 in *Pegarinhos two seeded* to 0.59±0.05 in *Gloriette*).



F1 Proportions of each individual sugar in assayed almond cultivars.

The obtained results highlight sugar composition as a useful discrimination factor among different cultivars, making them possible to be used in authenticity studies, which are an important feature in fruits with such elevated economical importance due to their numerous applications. Sugars profile, and especially sucrose, may also be used as an indicator of almond quality, due to the already brought up importance of this parameter in the assessment of fruit quality.

References:
[1] Cordeiro, V.; Monteiro, A. Almond growing in Trás-os-Montes region (Portugal). *Acta Horticulturae*, 2001, *591*,161-165.
[2] Kazantzis, I.; Nanos, G. D.; Stavroulakis, G. G. *J. Sci. Food Agric.*, *83*, 354-359.