'ROCHA' PEAR MINERAL COMPOSITION RELATION WITH QUALITY TRAITS

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INTRODUCTION

Orchard's variability is mainly affected by two preharvest factors: cultural practices and climate conditions. In the case of 'Rocha' pear, a native cultivar from Portugal with PDO, it is produced by different producers in the region that athough inflencued by different factot try to guarantee the expected quality[1]. However, even at the same geographic region, dissimilarities between orchards exist. It is unclear whether differences are due to the producer's practices and/or biological responses to the abiotic factors, making the orchard management difficult.

Although this appears to be a bewildering complex of variables, Bramlage (1993) suggested that mineral composition at harvest accounts for most fruit variability between orchards. It is known that nutrients required are in the soil and supply by fertigation and foliar application[3]. In this way, fruit mineral characterization at harvest can give some information on how orchard factors interact with nutrients and consequently explain some physicochemical and ripening differences[4]. The objective of this study was to investigate differences in mineral composition of three 'Rocha' pear orchards from one of the most representative PDO locations and relate it with quality and ripening traits.

METHODS

A data set with fruit from three different orchards located in the "West Region" of Portugal (Cadaval and Bombarral) across 7 d of ripening was used and characterized. The orchards were installed on clay-loam soils, and pears were harvested at the optimal harvest period. Fruit quality was characterized by their firmness, skin colour, soluble solids content (SSC), sugars and organic acids, titratable acidity (TA), ethylene and esters production and respiration. Macro and micronutrients were also determined. Data collected from the three orchards across ripening were subjected to principal component analysis (PCA) to highlight which parameters are differentiating the orchards within the same geographic region and under the same climate conditions, and their interactions with minerals composition at harvest.

RESULTS AND DISCUSSION

A PCA for 0 and 7 d was done separately to exclude the influence of shelf-life. A clear differentiation between the three orchards is observed in figure 1, which is maintained across ripening. Mainly pears from O3 revealed a clear separation along PC1 from the other two orchards. It is evident that variables such as the emission of esters, SSC, sucrose, malic acid, and nutrients N, P, Cu and K showed the main influence for this differentiation. We can observe that the higher esters production is connected to higher content of Cu, K, P. Besides, O3 demonstrated to have lower sugar content. The higher esters and lower sugar content are associated with the over maturity of the fruit[3] and, thus, lower quality. This connection can reveal a different nutrition program applied to O3, which affected the postharvest secondary metabolism and, consequently, the quality of the pear, mainly in terms of higher unpleasant aroma release and lower sugars content. Moreover, although it is the same location, soil texture can be different between orchards and influence the uptake of nutrients from the soil. We can also realize that respiration is associated with Zn and affects pear's ripening from O1.

CONCLUSIONS

This research shows that some minerals are connected to the ripening and quality responses of 'Rocha' pear. This allows us to conclude that quality variation between orchards from the same location at harvest exists and can be due to several factors that producers should consider. Knowing the relation of specific minerals with quality parameters can help producers manage their orchards more efficiently to meet consumers' requests.

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