

Ethylene Production and Respiration Rate in 'Green Gage' Plums (*Prunus domestica* L.)

A.E. RATO,

Departamento de Fitotecnia, Universidade de Évora, Apartado 94, 7002-554 Évora, Portugal.

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1. Introduction

'Raíña Claudia Verde' is a regional cultivar within the 'Green Gage' plums group. Traditionally 'Raíña Claudia Verde' plums are collected for fresh market with 17% of soluble solids content (SSC) and when the endocarp detaches easily from the mesocarp. The fruits are usually consumed within three weeks after harvest. During storage the fruits become soft and shrivel very quickly which limits the time available for marketing them. Harvesting plums at a premature stage may improve fruit quality [3]. On the other hand, less mature fruits generally do not develop typical taste characteristics [4].

Ethylene and CO₂ production are closely associated with fruit ripening ([2] and [5]), while acidity, SSC and fruit firmness have a strong impact on sensory quality. The present study was carried out to investigate the postharvest behaviour of 'Raíña Claudia Verde' plums obtained at various stages of harvest maturity.

2. Material and methods

The fruits were harvested at three ripening stages: I - pre-commercial harvesting date; II - commercial harvesting date; III - post-commercial harvesting date. After harvest, the fruits were kept at room temperature (20°C) during 4 weeks, at maximum. During storage at room temperature the ethylene and CO₂ production were determined daily and titratable acidity, soluble solids content and firmness were determined weekly. For respiration and ethylene production measurements, 10 fruits were placed in a 724ml glass container and continuously ventilated with 14ml/s of air humidified to 100% RH. Samples of 1ml of gas were taken from the glass container and injected into a Gas Chromatograph, equipped with a flame ionisation detector and a 6 ft length stainless steel column packed with Porapak N (80-100 mesh) and held at 50°C. The carrier gas was Nitrogen and the column flow was 25ml/min.

The SSC were measured by refractometry using a digital Refractometer. Fruit firmness was measured with a Texture Analyser using a 3mm-diameter rod with a compression load cell of 25 Kg and the test speed was 1mm/s. The test was performed in the entire fruit. Maximum Penetration Force (MPF) and the Depth to the Maximum Penetration Force (DMPF) were measured and the MPF/DMPF was calculated.

3. Results and discussion

A large decrease in firmness (100% to 36%) was observed during the first week after harvest, in plums collected in ripening stages I and II, as has been found in other prunes [1]. As other authors observed for plums [3] and apples [4], fruits collected in pre-commercial harvesting date (I) exhibited a lower and later climacteric rise (Fig.1). Fruits collected in the post-commercial harvesting stage (III) exhibited the climacteric rise during the main loss in

flesh firmness. As harvest approached commercial harvesting date the climacteric rise occurred 7 days after the main loss in flesh firmness.

Measurements of CO₂ evolution from 'Rainha Claudia Verde' plums showed a respiration pattern of the climacteric type as described earlier for 'Victoria' plums (*Prunus domestica* L.) by [2]. The amount of CO₂ increased from approximately 0,03-0,05mlCO₂/g/h to a maximum of 0,09-0,10mlCO₂/g/h except for the first harvesting date (Fig.2). Fruits collected with 13,6% and 12,8% of SSC (ripening stage I), remained firmer during a longer period but with a lower quality (measured as titrable acidity, data not shown). The fruits collected during commercial harvest exhibited a considerable storage potential with a good ripening quality.

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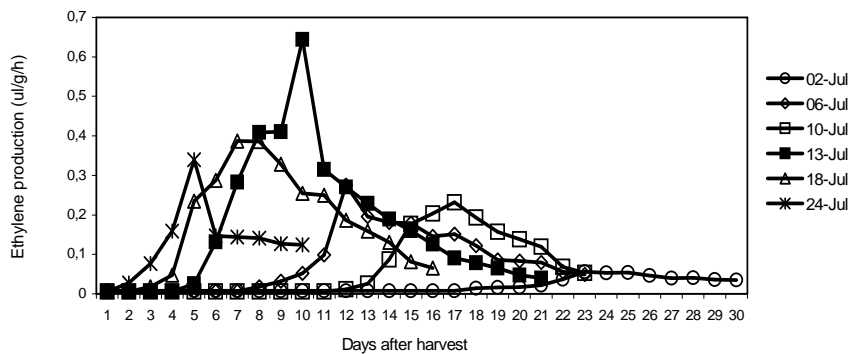


Fig.1 - Ethylene production rate of 'Rainha Claudia Verde' plums from six different harvest dates

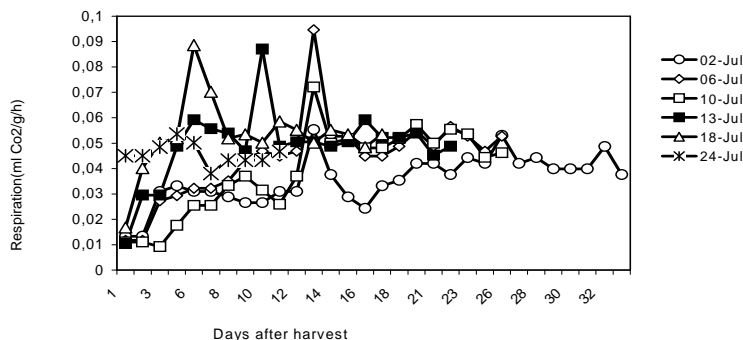


Fig.2 - Respiration rate of 'Rainha Claudia Verde' plums from six different harvest dates