Evaluation of fruit quality, chromatic parameters and anthocyanins content under foliar application of magnesium and potassium on sweet cherry (*Prunus avium* L.) cv. Burlat

M. Santos[1,2,3], H. Ferreira[2,3], M. Egea-Cortines[4], J. R. Sousa[5], F. Raimundo[2,3,5], M. Matos[1,2,3] and B. Gonçalves[2,3,5]*

[1]Department of Genetics and Biotechnology (DGB), University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
[2]Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB), University of Trás-os-Montes e Alto Douro (UTAD), Vila Real, Portugal
[3]Inov4Agro - Institute for Innovation, Capacity Building and Sustainability of Agri-food Production, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
[4]Institute of Plant Biotechnology, Polytechnic University of Cartagena, Cartagena, Spain
[5]Department of Biology and Environment (DeBA), University of Trás-os-Montes e Alto Douro, Vila Real, Portugal
* mpsantos@utad.pt

GRUPO OPERACIONAL CEREJA RESENDE

Introduction

Sweet cherries are seasonal fruits, considered one of the most popular spring-summer fruits in temperate regions of Europe due to their attractive appearance, taste, colour and sweetness, having a high economic importance.

In the North of Portugal, Resende region is the main responsible by the total cherry production due to their excellent edaphoclimatic conditions. So, an orchard located is this region was selected to carry out an assay with the aim to increase cherry quality by crop nutrition and also as mitigation strategy of sweet cherry cracking. In this follow up, magnesium (Mg) and potassium (K) were applied at foliar level and fruits were harvested at their commercial repining stage.

Material and methods

Cv. Burlat

- Control (100 g/hL of K; 250 g/hL of Mg)
- Magnesium High Dose (250 g/hL)
- Magnesium Low Dose (125 g/hL)
- Potassium High Dose (100 g/hL)
- Potassium Low Dose (50 g/hL)

Analyzed parameters

Biometric parameters
- Weight
- Height
- Larger and smaller diameters

Routine parameters
- Total soluble solids (TSS)
- pH
- Titratable acidity (TA)
- Maturity index (TSS/TA)

Chromatic parameters
- Lightness (L^*, a^*, b^*)
- Chroma (C^*)
- Hue angle (h^o)

Anthocyanins content

Results and discussion

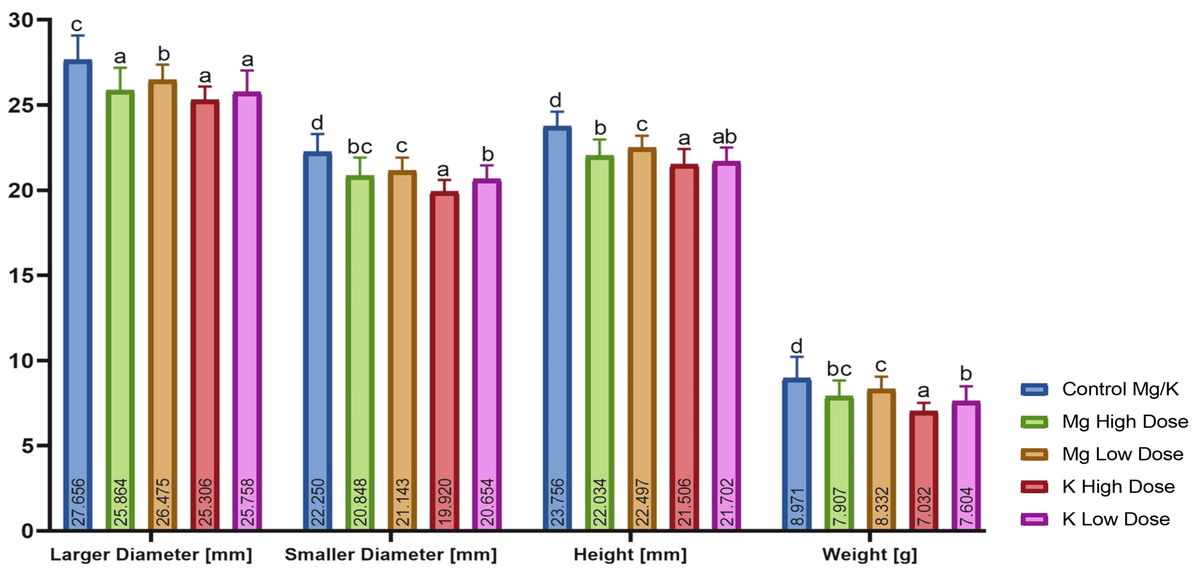

Figure 1: Fruit size (larger and smaller diameters and height) and weight for each treatment. Each value is expressed as mean±SD (n=30).

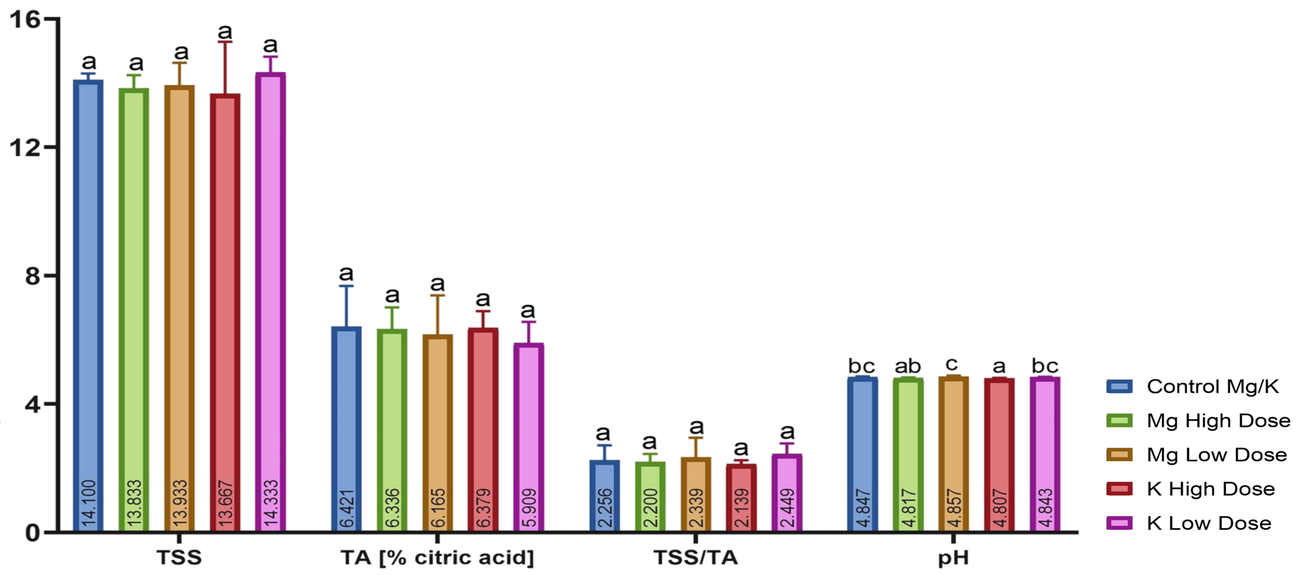

Figure 2: Total soluble solids (TSS), titratable acidity (TA), maturity index (TSS/TS) and pH for each treatment. Each value is expressed as mean±SD (n=3).

In general, control treatment presented fruits with higher weight and size, while fruits treated with potassium at high dose had lower values. Regarding to TSS, TA, TSS/TA and pH, the values were similar among all treatments. However, TSS was lower and TA was higher in cherries treated with potassium at high dose, which means that this treatment provoked a delay in fruit maturation (the maturity index was lower). The opposite occurred in cherries treated with a lower dose of potassium (higher TSS and lower TA means higher TSS/TA, therefore anticipate fruit harvest).

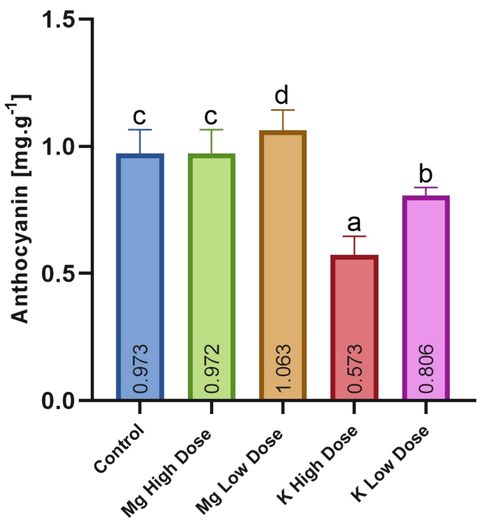

Figure 3: Anthocyanins content for each treatment determined by pH differential method. Each value is expressed as mean±SD (n=3).

Treatment	L^*	a^*	b^*	Chroma (C^*)	Hue angle (h^o)
Control	30.99±3.44 a	24.22±8.79 a	8.77±4.22 a	25.78±9.68 a	19.00±2.85 a
Mg High Dose	29.62±3.71 a	27.31±8.03 b	10.23±3.91 ab	29.18±8.87 b	19.96±2.10 b
Mg Low Dose	30.65±4.03 a	24.22±9.64 a	8.83±4.56 a	25.80±10.61 a	18.96±2.80 a
K High Dose	36.44±4.06 b	34.96±4.68 c	14.21±2.68 c	37.74±5.31 c	21.96±1.43 d
K Low Dose	29.56±4.03 a	29.34±8.34 b	11.61±4.53 b	31.57±9.41 b	20.90±2.47 c

Concerning to chromatic parameters, higher values were obtained in cherries treated with high dose of potassium, which means lighter cherries, while lower values were found in treatment with low dose of magnesium and, consequently, indicate darker and redder cherries. These results can also be correlated with anthocyanins content, once cherries treated with high dose of potassium presented the lowest anthocyanin content and cherries treated with low dose of magnesium had the highest anthocyanin content.

Note: In all figures different letters mean statistical differences among treatments (p<0.05) according to Duncan test.

Acknowledgement: This work was funded by Project Grupo Operacional para a valorização da produção da Cereja de Resende e posicionamento da subfileira nos mercados, financed by the European Agricultural Fund for Rural Development (EAFRD) and Portuguese State under Ação 1.1 «Grupos Operacionais», integrada na Medida 1. «Inovação» do PDR 2020 – Programa de Desenvolvimento Rural do Continente. Marlene Santos acknowledge the financial support provided by the FCT-Portuguese Foundation for Science and Technology (PD/BD/150257/2019), under the Doctoral Programme "Agricultural Production Chains – from fork to farm" (PD/00122/2012).