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25th International Conference on Polyphenols

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Tomato or *Solanum lycopersicum* is one of the most widely grown fruits for consumption either as raw or cooked. Beneficial health effects have been attributed to its high content in micronutrients such as carotenoids, mainly lycopene and β-carotene, and vitamin C. Phenolic compounds, which constitute the most diversified class of tomato micronutrients, participate to the fruit quality by their contribution to the colour, taste and aroma, and, owing to their antioxidant properties, could also contribute to health-promoting effects of tomato consumption. Different studies have shown that total phenolic content of tomato fruit is greatly affected by the genotype, stage of ripening and environmental factors. There is an increasing interest to study the variations of individual compounds according to these factors, especially in cherry tomatoes which are often used in genetic improvement for their high organoleptic quality.

The objectives of our study were to assess the impact of genotype on the phenolic profile of cherry tomato at two different stages of ripening (green vs red) and to examine tissue distribution of these compounds. The impact of UV-B on the content of phenolic compounds was also investigated.

Two cherry tomato genotypes, Wva 106 and Cervil, were grown in tunnels covered either with a film transmitting the whole solar radiations (+ UV-B) or with a film absorbing UV-B radiations (- UV-B). Fifteen fruits were sampled for each different condition. For the red stage, composition of the different tissues of the fruit was also studied. Epidermis, pericarp, both columella and placenta, jelly and seeds were separately collected. Fruit or tissue samples were frozen using liquid N2 before storage at -20°C. Samples were then freeze-dried before grinding to a fine powder, freeze-dried again, stored at -20°C before extraction by 70% aqueous EtOH. Contents of phenolic compounds in the extract were determined by HPLC and structural determination was achieved by HPLC/MS.

More than 70 phenolic compounds were detected in both genotypes in agreement with Moco et al. [1]. Chemically synthesized standards such as caffeic acid 4-Glc, coumaric acid 4-Glc and ferulic acid 4-Glc [2] allowed the quantitative determination of these compounds. Level of caffeoylquinic acids at the red stage was very different in the two genotypes where the content in chlorogenic acid for Wva 106 was found to be 20 times higher than in Cervil. In contrast, red fruits of Cervil exhibited di- and tri caffeoylquinic acid derivatives which were however not present at the green stage. In both genotypes, the chlorogenic acid content was very high compared to the content of large-fruited varieties given in the literature. Flavonoids, mainly represented as quercetin and naringenin glycosides, were only identified in the epidermis of Cervil. In the presence of UV-B, their content was statistically higher highlighting their screening role in fruit skin.

These results show that cherry tomato could be used in breeding program to create varieties with enhanced levels of potentially health-promoting phenolic compounds.

References

[1] Moco S. et al., J. Exp. Botany 2007, 58, 4131-4146.
[2] Galland S. et al., J. Agric. Food Chem. 2007, 55, 7573-7579.