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Quality parameters and total phenolic content in tomato fruits regarding cultivar and microclimatic conditions

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**Abstract:** The aim of this research was to evaluate the color, firmness, and total phenolic (TP) content in tomatoes according to cultivar and growing conditions. Cultivars with oval, elongated, round, and cherry-shaped fruits of determinate tomato were grown in Mediterranean (Dragonja Valley) and continental regions. Experiments in the continental region were conducted outdoors (Ljubljana-field) and under a low tunnel (Ljubljana-tunnel). Results indicated that the color and firmness were significantly influenced by the typology of the cultivars and by the maturity stage associated with the climatic conditions. Oval, elongated, and cherry fruits had darker and more intensely red fruit skins, with significantly higher  $a^*$  and lower  $L^*$  values than round fruits. The firmness of oval and elongated fruits was also higher than the firmness of round fruits. Fruits harvested in Dragonja Valley and the Ljubljana-tunnel location reached a higher level of maturity and were classified in the red maturity class ( $a^*/b^* > 0.95$ ), compared to the fruits from the Ljubljana-field location, where tomatoes were classified in the light red maturity class ( $0.65 > a^*/b^* > 0.95$ ). Variation in total phenol (TP) content was evaluated in regards to different microclimatic conditions of the Ljubljana locations, outdoors and under the low tunnel. TP content, expressed as chlorogenic acid, ranged from  $1.89 \text{ mg } 100 \text{ g}^{-1}$  to  $3.28 \text{ mg } 100 \text{ g}^{-1}$  fresh weight (fw) in field-grown tomatoes and from  $2.31 \text{ mg } 100 \text{ g}^{-1}$  to  $4.90 \text{ mg } 100 \text{ g}^{-1}$  in tunnel-grown tomatoes. Cherry tomato had a significantly higher content of TP, ranging from  $8.60 \text{ mg } 100 \text{ g}^{-1}$  fw in field-grown fruits to  $10.39 \text{ mg } 100 \text{ g}^{-1}$  fw in tunnel-grown fruits. Although the differences between TP content in tomato fruits, regarding the microclimatic environment, were not statistically significant, the increase in TP content in tunnel-grown tomato fruits could be a plant response mechanism to thermal stress.

**Key words:** Color, cultivars, firmness, growing conditions, tomato, total phenols

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