

Influence of climatic factors on the carotenoid concentration of tomato fruits and their protective mechanism when exposed to moderate UV-B before harvest

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Abstract

With the purpose of increasing the concentration of bioactive compounds and evaluating the influence of climatic factors on the tomato, cultivar 'Liberto', fruits were exposed to physical stress in a glasshouse in Berlin before harvesting through the application of moderate doses of UV-B radiation in November, 2007 and in May, 2008. The objective was to investigate whether its use had an eliciting effect on the secondary metabolism that resulted in a change in the concentration of bioactive compounds. Two UV-B radiation doses were used: a) range between 0.075 and 0.105 Wh m⁻² and b) 0.15 Wh m⁻². The mean photosynthetic photon flux density (PPDF) was 18.8 mol m⁻² d⁻¹ in May and 5.9 mol m⁻² d⁻¹ in November. After 22 hours of adaptation time, the ripe tomato fruits were harvested to determine the lycopene and β -carotene contents. The results showed that the exposure of ripe fruits to UV-B caused β -carotene accumulation in the November-treatment. Temperature and PPDF showed a strong influence on β -carotene and lycopene accumulation, as well as on the dry matter content. The May- and November-treatments differed significantly with respect to carotenoid content between the non-treated fruits and those treated with UV-B radiation.