Title Low pre- and postharvest UV-B irradiation changes aroma volatiles in tomato fruits

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Abstract

At present, UV irradiation is mainly applied to vegetables and food products for the elimination of food borne pathogens or to delay product ripening. Plants subjected to UV radiation respond with an up-regulation ofthe plant's protective stress mechanism. Due to this UV-B could trigger the biosynthesis of aroma volatiles in tomato and therefore, the objective of the present study was to determine whether a low UV-B exposure could be used as targeted pre- and postharvest treatment to enhance specific volatiles. Tomato plants were grown in controlled greenhouse conditions and a low UV-B level (0.27 kJ m^{-2} d^{-1}) was applied within 10 h using a UV-B fluorescence light source. Thereafter, red fruits were kept for 48 h without UV-B irradiation on the plant and were then harvested. After harvest, one part of fruit samples was treated again with a low UV-B dosage (0.27 kJ m^{-2} d^{-1}) within 1 h. After an adaptation time of 2, 22 or 48 h volatiles were determined by using the stir bar sorptive extraction method and GC-MS. Low UV-B irradiation in pre- and postharvest increased the biosynthesis of the terpenoid derived volatile linalool by up to 27 %. Additionally in the UV-B postharvest treatment, the fatty acid derived volatile (*E*)-2-hexenal and the carotenoid derived volatile B-cyclocitral increased by up to 34 % and 24 %, respectively. In contrast, low UV-B irradiation in pre- and postharvest decreased the concentration of the amino acid related volatile isobutylthiazole by up to 36 %. Furthermore, the adaptation time influenced the concentration of volatiles. With regard to flavour, UV-B exposure resulted in an increase of aroma volatiles with flowery and green notes but decreased musty notes.