

Effect of blue light on primary metabolite and volatile compound profiling in the peel of red pitaya

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Abstract

Blue light treatment can effectively delay the decay of many fruits during postharvest storage. However, little is known about the blue light-induced metabolites. In this study, pitaya fruit was treated with 300 lx blue light for 2 h. Result showed that the decay of pitaya fruit was significantly delayed after blue light treatment, and the change tendency of many physiological characters of pitaya fruit was also significantly weakened. Blue light treatment significantly reduced the increasing tendencies of respiratory rate, titrable acid (TA), H₂O₂ content, as well as the decreasing tendencies of total soluble solids (TSS), TSS-TA ratio, DPPH radical-scavenging activity, reducing power. To excavate the details of the change in pitaya peel, the primary metabolites and volatile compounds were determined by using gas chromatography coupled to mass spectrometry (GC-MS). A total of 84 metabolites changed significantly after blue light treatment, including 45 primary metabolites and 39 volatile compounds. Most of primary metabolites increased their levels at 1 d after blue light treatment, mainly including soluble sugars, amino acids, fatty acids, organic acids and alcohols. The increase of those metabolites might play a vital role in blue light-delayed the decay of pitaya fruit. After blue light treatment, the contents of most of volatile compounds and some primary metabolites significantly decreased at later stage of storage, mainly including cell wall monosaccharides, aldehydes, esters, ketones, alkanes and volatile alcohols, which might be related to the delay of fruit senescence by blue light treatment.