

Effectiveness salicylic acid blending in chitosan/PVP biopolymer coating on antioxidant enzyme activities under low storage temperature stress of ‘Banati’ guava fruit

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Abstract

The performance of chitosan/poly-vinyl-pyrrolidone (CS/PVP) blending in salicylic acid (SA) to increase chilling injury tolerance of ‘Banati’ guava fruit under cold otherwise the impacts of CS/PVP-SA on antioxidant enzymes were assessed. The guava fruits were coated with CS/PVP biopolymer with SA at different concentration (0,1, and 2 mM) and stored at low temperature (6 °C and 90.95% RH) for fifteen days. Fruit samples were picked every three days interval. The physical measurements weight loss%, chilling injury index (CI-index), and fruit skin color hue angle (h°) were assessed. The chemical analysis for instance soluble solid content (SSC%), titratable acidity (TA%), SSC/AT-ratio, total chlorophyll content, fruit firmness. The antioxidant enzyme activities were evaluated such as catalase (CAT, EC: 1.11.1.6), peroxidase (POD, EC:1.11.1.7), ascorbate peroxidase (APX, EC: 1.11.1.11), and superoxide dismutase (SOD, EC: 1.15.1.1). Also, plasma cell membrane compartments such as lipid peroxidation (malondialdehyde, MDA), protein oxidation (protein carbonyl group, PCG), cell membrane ion leakage (IL%), $O_2^{\bullet-}$ and H_2O_2 production rate were measured. CS/PVP-SA_{2mM} significantly reduced water loss, CI-index, h° , maintained fruit skin chlorophyll content, firmness, and delayed the qualitative changes SSC%, TA% and SSC/TA-ratio due to increase the CS/PVA and SA at 2 mM. Moreover, changes in the antioxidant capacity of CS/PVP-SA_{2mM} coated guava fruits were activated. The activation of antioxidant enzymes, alleviating CI-index and reducing plasma cell membrane damage. SA bending in Chitosan/PVP biopolymer coating and storage fruit under cold temperature was obtained using parameters to detect the effect of CS/PVP-SA treatments. CS/PVP-SA_{2mM} exhibited a reduction of chilling injury incidences compared to uncoated fruit in all in overall measurements.