

# Chitosan coating alleviates postharvest juice sac granulation by mitigating ROS accumulation in harvested pummelo (*Citrus grandis* L. Osbeck) during room temperature storage

Zhengpeng Nie, Qiang Huang, Chuying Chen, Chunpeng Wan and Jinyin Chen

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## Abstract

Juice sac granulation is a serious problem in pummelo (*Citrus grandis* L. Osbeck) fruits during postharvest storage owing to various abiotic stress conditions, which greatly reduces their attractiveness and commercial value. Hence, measures to alleviate the postharvest juice sac granulation of pummelo are of great importance. The current study was designed to investigate the effects of 1.5 % chitosan treatment on the granulation index, fruit color, nutrient contents, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) content, malondialdehyde (MDA) content, antioxidant enzymatic activities and related gene expressions in pummelo fruits stored at room temperature (20 ± 2 °C) for 150 d. The results showed that chitosan treatment significantly maintained the appearance of pummelo fruits by delaying postharvest granulation and color variation, retarded the degradation of total soluble solid (TSS), titratable acids (TA) and total sugars. The O<sub>2</sub><sup>-</sup> production rate, H<sub>2</sub>O<sub>2</sub> content and MDA content in the fruit pulp were significantly decreased whereas the contents of lycopene, ascorbic acid (AsA) and glutathione (GSH) were enhanced following chitosan treatment. The alleviation of postharvest granulation of pummelo was attributed to the higher levels of active antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR) both at the transcriptional and translational levels. The evidence from this study shows that postharvest chitosan treatment can efficiently reduce juice sac granulation and prolong the postharvest storage period of pummelo fruits by mitigating ROS accumulation, delayed fruit senescence under storage at room temperature.