

Effect of high-pressure carbon dioxide treatment on browning inhibition of fresh-cut Chinese water chestnut (*Eleocharis tuberosa*): Based on the comparison of damaged tissue and non-damaged tissue

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Postharvest Biology and Technology, Volume 179, September 2021, 111557

Abstract

In this paper, the effect of high-pressure carbon dioxide (HPCD) inhibiting the browning of fresh-cut Chinese water chestnut (CWC) was explored by comparing the differences between damaged and non-damaged tissues. The results showed that the browning of fresh-cut CWC could be effectively inhibited by 2 and 4 MPa treatment, and with these conditions, the microbial load was kept at a low and stable level during the whole storage period. In damaged tissues, the phenylalanine ammonia-lyase (PAL) activity was decreased, thus cutting off the accumulation of naringenin and eriodictyol (only slightly detected at 1 MPa). In non-damaged tissues, the activities of polyphenol oxidase (PPO), peroxidase (POD), and PAL were significantly increased to overcome the treatment stress. The structural change of PAL proved its activity reduction. The mechanism of browning inhibition could be explained by direct inactivation of PAL in damaged tissue and indirect regulation of stress resistance response in non-damaged tissue.