

# Effects of hydrogen-rich water combined with vacuum precooling on the senescence and antioxidant capacity of pakchoi (*Brassica rapa* subsp. *Chinensis*)

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## Abstract

The aim of this work was to study the effect of application of hydrogen-rich water (HRW) combined with vacuum precooling on senescence and antioxidant activity in pakchoi. The results showed that 50% HRW could effectively maintain the high content of chlorophyll and its metabolic derivatives: chlorophyllide a, chlorophyllide b, pheophytin a, and pheophorbide a, which were associated with decreased activities of chlorophyllase, Mg-dechelataase, pheophytinase, and pheophorbide a oxygenase. Additional results indicated that comparing with the groups of vacuum precooling or water + vacuum precooling, treatment with combined HRW and vacuum precooling not only significantly lowered the weight loss rate, but also maintained the contents of chlorophyll and antioxidant substances including total phenols and ascorbic acid, improved activities of antioxidant enzymes containing glutathione reductase, catalase, and superoxide dismutase, and the scavenging rates of the 2,2-diphenyl-1-picrylhydrazyl radical, superoxide anions and hydroxyl radical, and thereby, inhibited accumulation of malonaldehyde. These results suggest that a combination of treatment with HRW and vacuum precooling can be used as an acceptable environmental-friendly technology for delaying the postharvest senescence of pakchoi.