

# Development of multi-pallet unit load storage system with controlled atmosphere and humidity for storage life extension of winter kimchi cabbage (*Brassica rapa* L. ssp. *pekinensis*)

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## Abstract

In this study, a pallet unit load controlled atmosphere and humidity (PULCAH) system that can be installed in common cold storage rooms and enables the setting of different gas compositions and relative humidity (RH) levels was developed. Subsequently, kimchi cabbage was stored and evaluated under three conditions (PULCAH 1: 2% O<sub>2</sub>/5% CO<sub>2</sub> + 93 % RH; PULCAH 2: 2% O<sub>2</sub>/5% CO<sub>2</sub> + > 99% RH; PULCAH 3: 0.5% O<sub>2</sub>/10% CO<sub>2</sub> + > 99% RH) and the results compared with those obtained for storage in regular air at 85 % RH (control). After 150 days of storage at 0 °C, the weight losses under PULCAH 1 and 2 conditions were lower than those observed for the control. The trimming loss of the kimchi cabbage samples stored under PULCAH 1 condition was 13.3%, which was the lowest among the samples. Moreover, under PULCAH 1 and 2 conditions, the initial pH and moisture content, soluble solid content, and reducing sugar content were better preserved than under the control or PULCAH 3 condition. The internal disorder/decay incidence percentage during storage exceeded 30% in the case of the control but was less than 17% for PULCAH 1 and 2 conditions. These results indicate that the postharvest storage life of kimchi cabbage can be extended through application of the developed PULCAH system operating at 2% O<sub>2</sub>/5% CO<sub>2</sub> atmosphere with 93% RH.