

Title Prediction of sugar consumption in shredded cabbage using a respiratory model  
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Citation Postharvest Biology and Technology, Volume 41, Issue 1 , July 2006, Pages 56-61  
Keywords Respiration rate; Sugar; Shredded cabbage; Temperature

### **Abstract**

The relationship between respiration and sugar consumption of shredded cabbage was examined. Respiration rate (RR) of shredded cabbage was determined at 5 °C for 96 h and 20 °C for 48 h, and total CO<sub>2</sub> production estimated by integrating RR. Glucose, fructose and sucrose of shredded cabbage were also determined, and total sugar obtained as the sum of these sugars. The decrease in total sugar with time at both temperatures was recorded. Total CO<sub>2</sub> production was calculated from the decrease in total sugar, which was assumed to be caused by oxidation of sugar in a respiratory reaction. Experiments were carried out twice. Total CO<sub>2</sub> production obtained by integrating RRs was approximately equal to that calculated from the decrease in total sugar. Accordingly, it was confirmed that CO<sub>2</sub> emitted from shredded cabbage was mostly derived from sugar.

To predict sugar consumption, a previously developed respiratory model was applied. The model could sufficiently predict RRs of shredded cabbage at varying temperatures (15 → 25 → 15 °C). Therefore, the decrease in total sugar was predicted from total CO<sub>2</sub> production, obtained using the respiratory model. In addition, the predicted total sugar content agreed well with experimentally determined values. Therefore, it was considered that sugar consumption of shredded cabbage could be predicted by applying the respiratory model.