

### **Abstract**

The quality of fresh chillies changes rapidly and under Thai ambient conditions ( $30\pm 5^{\circ}\text{C}$  and  $75\pm 5\%$  RH). This rapid deterioration in quality causes a direct loss in returns in growers and marketers. The aim of this project was to use mathematical models to design appropriate modified atmosphere perforated plastic packages to extend the shelf life of fresh chillies under Thai conditions. We studied the interactive effects of packaging and storage temperatures on postharvest quality attributes (colour, firmness, weight and decay). Four storage temperatures ( $5$ ,  $10$ ,  $20$  and  $30^{\circ}\text{C}$ ) and three packaging types: unpackaged (control), non-perforated bags, and perforated bags (with different levels of perforation) were tested. Refrigerated storage temperatures ( $5$ - $10^{\circ}\text{C}$ ) with perforated plastic bags (in particular  $0.5$ - $1\%$  perforation) reduced the rate of change of quality attributes and eliminated condensation, which was extensive in non-perforated bags. Chilling injury was not detected in any of the shelf life trials conducted with green 'Cayenne' chillies. The  $\text{O}_2$  and  $\text{CO}_2$  atmospheres inside the perforated plastic bags were similar to ambient air conditions. Weight loss predictions generally agreed with experimentally observed trends. Sensitivity analyses performed on the model showed that the observed lack of fit could largely be explained by uncertainties in estimated respiration data.