

## Abstract

A rapid method, the standard saturated salt solution method (SSM) and the hygrometric instrument method for measuring sorption isotherms of Conference pear flesh tissues at low temperature (1 and 6.5 °C) and high water activity (0.8–1.0) were compared. The rapid pressure controlled method (PCM) could only be used at a minimum temperature of 6.5 °C. It was possible to determine the sorption isotherms by the saturated salt solution method using fans (SSMF) and by the hygrometric instrument method (HIM) at 1 and 6.5 °C. The three methods gave quite similar results, however, it is obvious that the SSMF method results in fewer data points than the other methods. The experimental data show that PCM has the advantage of speed, while HIM allows investigation of the influence of temperature on sorption isotherms below 6.5 °C.

The experimental data were mathematically described by the sorption models of GAB, GAB-like (Viollaz GAB and Timmermann GAB) and Ferro Fontan. The Timmermann GAB model gave the best physical explanation of the experimental observations while the Ferro Fontan model fitted the experimental data best. However, it was clear that water sorption in structured cellular foods is more complex than described by the present GAB-like models. The effect of temperature on equilibrium moisture content was large. At higher water activity, the moisture content increased sharply as the temperature was increased, resulting in a crossing of the sorption isotherms curves around  $0.91a_w$  which can be explained by the additional sugars dissolved at higher temperatures.