

Title Thermodynamic analysis of the effect of water activity on the stability of macadamia nut
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Abstract

The moisture sorption isotherms of macadamia nut were determined using a gravimetric method at 25, 35 and 45 °C, and over a range of relative humidities. The Guggenheim–Anderson–de Boer (GAB) model was found to adequately describe the sorption characteristics. Differential and integral thermodynamic parameters were calculated to provide an understanding of the properties of water associated with food stability during storage. The monolayer values obtained with the BET and GAB models were very close and moisture content corresponding to the maximum integral enthalpy was in practical terms the same. The lowest lipid oxidation took place in the nuts stored within the minimum integral entropy zone ($a_w = 0.436$, 35 °C). Penetration tests showed that the nuts stored at $a_w = 0.436$ had minimum penetration depth changes with time.