

Water Vapor Sorption Isotherm of Domestic Infant Formula Milk Products and Calculation of Isothermic Heat by BET-Model

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The objective of this study was to investigate the stability and preservation of infant formula milk powder by measuring adsorption isotherms of water vapor and isosteric heat. Adsorption isotherms of water vapor for infant formula milk powders produced by I, Y and M company in Korea were gauged at temperatures between 15, 25 and 35°C using COST-90(European Cooperation in the Field of Scientific and Technical Research).

The BET-model were applied and analyzed to compare the experimental value. Our experimental results showed that the all isotherms were sigmoidal in shape. Sample I showed the lowest monolayer value(2.98g[H₂O]/100g[solid]) and sample Y showed the highest(7.50g[H₂O]/100g[solid]). As the temperature was increased, there is a propensity for EMC(equilibrium moisture content) to decrease in all sample. Isothermic heat obtained upon application of BET-model was calculated in this field of temperature using the Clausius-Clapeyron equation. Isothermic heat was declined in all sample as EMC was higher. As the milk powder adsorbed the water vapor and the water molecule is linked in form of free water, the isosteric heat is closed to the vaporization heat of pure water.