Estimation of moisture absorption isotherms for Pistachio nuts

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In this study moisture absorption isotherms curves for Pistachio powder were obtained in 15, 25, 35 and 40°C, respectively. The curves related to pistachio kernel and whole Pistachio were obtained in 15, and 35°C as well. Hysteresis phenomenon was observed in water activity range of aw: 0.2 to 0.7. The level of hysteresis decreases in the whole pistachio, pistachio kernel, and pistachio powder respectively. Some mathematical models were studied for fitting of pistachio equilibrium moisture content (EMC) including BET, GAB, Smith, Oswin, Halsey and Henderson. Among these models, Smith model fitted most properly on the experimental results. Thermodynamic relationship of Clausius Clapeyron was used to determine the isosteric heat for absorption and desorption of pistachio moisture. The results were sketched upon moisture content on the dry basis.

The results of this study will be used to optimize the drying process, storage conditions and packaging of pistachio nuts.