

Moisture sorption isotherm and shelf-life prediction of anticaking agent incorporated spray-dried soursop (*Annona muricata* L.) powder

ABSTRACT

The moisture sorption isotherm (MSI) and shelf lives of soursop powders that had been incorporated with two commercial anticaking agents, calcium silicate (CS) and tricalcium phosphate (TCP), and inserted into aluminum laminated polyethylene pouches under room (RT, $25 \pm 1^\circ\text{C}$) and elevated (ET, $38 \pm 1^\circ\text{C}$) temperature, maintained at $93 \pm 1\%$ RH, were investigated. The powder possessed a Type III Brunauer's classification isotherm curve. The monolayer moisture content (Mo) was 0.023 ± 0.001 g H₂O/g ds. A combination of low mean relative percent deviation modulus, E (2.18–3.75%), small sum of square residual, SSR (1.03×10^{-5} – 8.51×10^{-6}), and high coefficient of determination ($R^2 > .99$) indicating the moisture sorption data was sufficiently good fit using GAB model. Powder without anticaking agent stored at ET has the shortest estimated shelf life (~86 days) while 1.0 g/100 g TCP stored at RT exhibited the longest shelf life (~316 days). This study demonstrated that the incorporation of anticaking agents is effective to maintain the quality of powder by extending the shelf life by lowering moisture adsorption. The acceptability of reconstituted soursop powder based on hedonic test showed the scores for all attributes were higher than six.