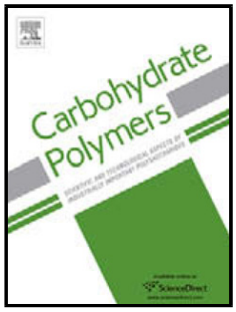

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Thermodynamic analysis for assessing the physical stability of core materials microencapsulated in taro starch spherical aggregates

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Highlights

- Encapsulation efficiency was higher for hydrophilic than hydrophobic core material
- Monolayer moisture content was relatively low for ascorbic acid microcapsules
- The adsorption process was driven by entropic mechanisms
- The critical water activity was slightly higher for hydrophobic than hydrophilic core material

Abstract

Taro starch has the ability of producing spherical aggregates under spray-drying without the addition of binding agents. This property makes taro starch suitable for microencapsulation of dietary compounds. This study addressed the physical stability of hydrophilic and hydrophobic core materials microencapsulated by spray-drying into taro starch spherical aggregates determined from a thermodynamic standpoint via vapor adsorption isotherms. Ascorbic acid and almond oil were used as compound models. Encapsulation efficiency, GAB sorption parameters, differential and integral thermodynamic properties, Gibb's free energy, entropy-enthalpy compensation, spreading pressure, effective diffusion rate, activation energy and critical water activity were determined. The