

Water sorption and water permeability properties of edible film made from potato peel waste

ABSTRACT

The water sorption and permeability properties of edible film produced from potato peel waste was investigated under different levels of relative humidity (23, 33, 43, 57, 75% RH) and temperatures (5, 30, 50 °C). The water sorption behaviour and isotherms of the film were investigated by fitting water sorption data to the Peleg model and the Guggenheim, Anderson de Boer model (GAB model). The amount of moisture content, time required for the moisture content of the film to reach equilibrium, water sorption rate, and water sorption capacity increased when the relative humidity increased. The effect of temperature on moisture content, water sorption rate, water sorption capacity, and monolayer moisture content is complex and related to the water activity as well as the moisture content. Based on R² and RMSE values, the Peleg and GAB models were respectively determined as excellent models to predict the water sorption properties of the films, thus supporting the reliability of water sorption behaviour prediction. The water vapour transmission rate and water vapour permeability increased with an increase in relative humidity and temperature. The sorption and permeability properties of the film are worth investigation since the final application of the film as food packaging is ultimately dependent on these behaviours.

Keyword: Edible film; Food packaging; Water permeability; Water sorption