Estimation of the Shelf Life of Modified Mango Seed Starch Using the ASLT Method with a Critical Moisture Content Approach Model

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ABSTRACT

Shelf life prediction is an important parameter in maintaining the quality and safety of food products during storage. Modified mango seed starch (MOSETA) produced through Heat Moisture Treatment (HMT) has potential as an alternative food ingredient; however, information regarding its shelf life is still limited. This study aimed to estimate the shelf life of MOSETA using the Accelerated Shelf Life Testing (ASLT) method with a critical moisture content approach and to analyze the effect of relative humidity (RH) on product shelf life. The study was conducted through the analysis of initial moisture content, critical moisture content, equilibrium moisture content, moisture sorption isotherm curve, and shelf life calculation using the Labuza equation. In addition, physical and chemical characteristics were evaluated, including color, swelling power, solubility, freeze thaw stability, starch digestibility, and antioxidant activity. The results showed that MOSETA had an initial moisture content of 0.0538 g H_2O/g solid and a critical moisture content of 0.0692 g H_2O/g solid. The best moisture sorption isotherm model obtained was the Oswin model with a slope value of 0.1809 and an R^2 value of 0.9981. Based on the ASLT critical moisture content approach, the shelf life of MOSETA at RH 79% was 105 days or 3.5 months. Increasing relative humidity accelerated water vapor absorption and consequently accelerated product quality deterioration. MOSETA also exhibited physical and chemical characteristics that supported product stability during storage.

Keywords : ASLT, critical moisture content, MOSETA, relative humidity, shelf life