

**MODEL KESEIMBANGAN MASSA AIR, KINETIKA, DAN
ACCELERATED SHELF LIFE TESTING UNTUK PREDIKSI UMUR
SIMPAN BERAS ANALOG BERBASIS PATI SAGU DAN GLUKOMANAN
PORANG**

INTISARI

Oleh:

TRI WULANDANI
20/460601TP/12811

Beras analog merupakan salah satu bentuk pengembangan produk untuk mendukung program diversifikasi pangan. Produk beras analog dengan kadar air rendah memiliki sifat mudah menyerap uap air sehingga diperlukan pengemasan yang tepat untuk menjaga kualitasnya. Produk pangan yang dikemas dan dipasarkan harus disertai informasi masa kadaluwarsa sehingga perlu ditentukan umur simpannya. Penelitian ini bertujuan untuk memprediksi umur simpan beras analog berbasis pati sagu yang dikemas dalam kemasan polipropilena menggunakan model keseimbangan massa air, kinetika, dan *Accelerated Shelf Life Testing* (ASLT). Beras analog berbasis pati sagu disimpan pada suhu ruang dengan berbagai kondisi kelembaban relatif ruang penyimpanan: rendah (RH 42%), sedang (RH 76%), tinggi (RH 91%), dan kontrol (RH $\pm 58\%$). Selama penyimpanan tiga bulan, perubahan kadar air, warna, tekstur, dan *bulk density* diamati. Umur simpan beras analog ditentukan berdasarkan perubahan kadar air menggunakan analisis keseimbangan massa, kinetika, dan ASLT, sedangkan perubahan *hardness* dianalisis menggunakan model kinetika. Model keseimbangan massa air yang diterapkan dianggap mampu untuk memprediksi nilai kadar air dengan baik karena nilai *Standard Error Estimate* (SEE) yang dimiliki kecil. Hasil penelitian menunjukkan semakin tinggi kelembaban relatif udara ruang penyimpanan, maka umur simpan beras analog berbasis pati sagu semakin pendek. Umur simpan beras analog berbasis pati sagu berdasarkan kadar air dapat diprediksi dengan model keseimbangan massa dengan kisaran waktu 126 hingga 457 hari. Berdasarkan perhitungan ASLT berkisar 68 hingga 441 hari dan berdasarkan perubahan kadar air dengan kinetika orde berkisar 149 hingga 1231 hari. Sedangkan berdasarkan perubahan nilai *hardness* dengan model kinetika, umur simpan beras analog berbasis pati sagu berkisar 77 hingga 191 hari.

Kata kunci : Beras analog berbasis pati sagu, umur simpan, metode ASLT, model keseimbangan massa, kadar air

**MASS BALANCE MODEL, KINETIC, AND ACCELERATED SHELF
LIFE TESTING TO PREDICT THE SHELF LIFE OF RICE ANALOG
BASED ON SAGO STARCH AND PORANG GLUCOMANNAN**

ABSTRACT

By:

TRI WULANDANI

20/460601TP/12811

Rice analog is a product developed to support food diversification programs. With its low moisture content, rice analog is hygroscopic, meaning it easily absorbs water vapor and requires proper packaging to maintain quality. Packaged food products that are marketed must be accompanied by expiration information, so the shelf life should be determined. This research aims to predict the shelf life of sago rice analog packaged in polypropylene using a mass balance model, kinetic analysis, and Accelerated Shelf Life Testing (ASLT). Sago rice analog was stored at room temperature under various relative humidity conditions: low (RH 42%), medium (RH 76%), high (RH 91%), and control (\pm RH 58%). Over a three-month storage period, changes in moisture content, color, texture, and bulk density were observed. The shelf life of sago rice analog was determined based on moisture content using the mass balance model, kinetic analysis, and ASLT, while changes in hardness were analyzed using kinetic analysis. The applied mass balance model effectively predicted moisture content due to its small Standard Error Estimate (SEE). The results indicate that higher relative humidity leads to a shorter shelf life. The shelf life of sago rice analog based on moisture content can be predicted with the mass balance model ranging from 126 to 457 days. Based on ASLT, the shelf life ranged from 68 to 441 days, and using the kinetic model for moisture content changes, it ranged from 149 to 1231 days. Meanwhile, based on hardness changes using the kinetic model, the shelf life of sago rice analog ranged from 77 to 191 days.

Keywords: Sago rice analog, shelf life, ASLT method, mass balance model, moisture content