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**Pendugaan Umur Simpan Apem Wonolelo Menggunakan Metode Extended Storage Studies dan Active Packaging
pada Berbagai Suhu Penyimpanan**
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

INTISARI

Kue Apem Wonolelo merupakan produk pangan tradisional berbahan dasar tepung beras yang memiliki umur simpan sangat terbatas, yakni hanya 1–2 hari pada suhu ruang, akibat kadar air tinggi (±39%) dan kandungan lemak yang rentan teroksidasi. Penelitian ini bertujuan menentukan umur simpan Kue Apem Wonolelo menggunakan metode *Extended Storage Studies* (ESS) dan analisis kinetika reaksi, serta mengevaluasi efektivitas kemasan *polyethylene* (PE) dengan *oxygen absorber* dalam memperlambat laju penurunan mutu produk. Sampel disimpan pada dua kondisi suhu, yaitu suhu ruang (27 ± 2°C) dan suhu *chiller* (3 ± 2°C), dengan dua perlakuan kemasan (*active packaging* berupa PE+*oxygen absorber* dan *paper box* sebagai kontrol), selama 6 hari dengan pengamatan pada hari ke-0, 2, 4, dan 6. Parameter yang diukur meliputi *hardness*, kadar air, aktivitas air (aW), pH, bilangan peroksida, dan angka lempeng total (ALT). Analisis statistik dilakukan menggunakan uji *Two-Way* ANOVA untuk parameter yang memenuhi asumsi parametrik, serta uji Scheirer-Ray-Hare dan uji lanjut Dunn-Bonferroni untuk parameter non-parametrik. Hasil penelitian menunjukkan bahwa suhu penyimpanan berpengaruh signifikan terhadap *hardness* ($p = 0{,}002$) dan lama penyimpanan berpengaruh signifikan terhadap pH ($p < 0{,}001$). Kadar air dan aW tidak menunjukkan perubahan signifikan secara statistik pada perlakuan *active packaging*. ALT tidak terdeteksi pada inkubasi standar namun melebihi batas SNI pada inkubasi diperpanjang 120 jam. Berdasarkan model kinetika ordo nol dengan parameter kritis *hardness* ($A_0 = 77{,}051$ N dan At ruang = 38,526 N; At *chiller* = 115,577 N), umur simpan Kue Apem Wonolelo dengan kemasan PE+*oxygen absorber* pada suhu ruang adalah 3 hari 18 jam, lebih panjang dibandingkan dengan kontrol (1 hari 7 jam). Umur simpan pada suhu *chiller* tidak dapat diestimasi karena model kinetika memiliki tingkat akurasi yang rendah ($R^2 = 0{,}62$).

Kata kunci: Kue Apem Wonolelo, kemasan aktif, *oxygen absorber*, *Extended Storage Studies*, umur simpan

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ABSTRACT

Kue Apem Wonolelo is a traditional rice flour-based food product characterized by a very limited shelf life of only 1–2 days at room temperature due to its high moisture content (±39%) and lipid content that is susceptible to oxidation. This study aimed to determine the shelf life of *Kue Apem Wonolelo* using the Extended Storage Studies (ESS) method and reaction kinetics analysis, as well as to evaluate the effectiveness of polyethylene (PE) packaging incorporated with an oxygen absorber in delaying product quality deterioration. Samples were stored under two temperature conditions, room temperature (27 ± 2°C) and chiller temperature (3 ± 2°C), utilizing two packaging treatments (active packaging consisting of PE + oxygen absorber, and a paper box as the control) over a 6-day period, with observations conducted on days 0, 2, 4, and 6. The measured parameters included hardness, moisture content, water activity (aW), pH, peroxide value, and total plate count (TPC). Statistical analysis was performed using Two-Way ANOVA for parameters meeting parametric assumptions, while the Scheirer-Ray-Hare test followed by the Dunn-Bonferroni post-hoc test was applied to non-parametric parameters. The results indicated that storage temperature significantly affected hardness ($p = 0.002$), and storage duration had a significant effect on pH ($p < 0.00$). Moisture content and aW showed no statistically significant changes under the active packaging treatment. TPC was undetected during standard incubation but exceeded the Indonesian National Standard (SNI) threshold upon an extended incubation of 120 hours. Based on the zero-order kinetics model with hardness as the critical parameter ($A_0 = 77.051$ N and A_t room = 38.526 N; At *chiller* = 115,577 N), the shelf life of *Kue Apem Wonolelo* in PE + oxygen absorber packaging at room temperature was determined to be 3 days and 18 hours, which was longer than that of the control (1 day and 7 hours). Conversely, the shelf life under chiller storage could not be estimated because the kinetics model exhibited low predictive accuracy ($R^2 = 0.62$).

Keywords**:** *Kue Apem Wonolelo*, active packaging, oxygen absorber, Extended Storage Studies, shelf life