

INTISARI

Analisis Matematis Pengaruh Suhu dan Konsentrasi Oksigen Ruang Simpan Terhadap Laju Respirasi dan Perubahan Kualitas Buah Salak Pondok (*Salacca edulis*)

Pada tahun 2015, produksi salak pondoh di daerah Sleman mencapai 699 ton. Dengan banyaknya salak pondoh yang dihasilkan setiap tahunnya menimbulkan berbagai macam masalah dalam hal penyimpanan salak pondoh segar. Salah satunya adalah penurunan kualitas salak pondoh segar selama penyimpanan. Penelitian ini bertujuan untuk mengkaji pengaruh suhu dan konsentrasi oksigen di dalam ruang simpan terhadap laju respirasi dan perubahan kualitas buah salak pondoh dengan menggunakan penyimpanan atmosfer termodifikasi. Penyimpanan buah salak dikaji dengan variasi suhu 10°C, 20°C, dan suhu ruang (29°C) serta konsentrasi oksigen ruang simpan 3 – 5%, 10 – 15%, dan 21% selama 8 – 34 hari. Analisis yang dilakukan adalah penentuan laju respirasi dan analisis perubahan kualitas buah meliputi susut bobot, kadar air kulit, warna, tekstur dan total padatan terlarut. Berdasarkan analisis statistik didapatkan variasi perlakuan optimal untuk penyimpanan buah salak pondoh segar pada suhu 10°C dan konsentrasi O₂ 21% dengan lama penyimpanan selama 34 hari sedangkan pada penyimpanan suhu ruang hanya dapat disimpan selama 8 hari dengan parameter perubahan kualitas meliputi susut bobot 0,821%, kadar air kulit 70,924%, warna kulit (*Lightness* 34,45; *Hue Angle* 40,95; *Chroma* 17,93), warna buah (*Lightness* 70,89; *Hue Angle* 77,57; *Chroma* 21,24), tekstur 2,69 kg/cm², dan total padatan terlarut 16,7 °brix. Pada penyimpanan salak pondoh segar suhu dan konsentrasi O₂ ruang simpan mempengaruhi laju respirasi. Semakin rendah suhu dan konsentrasi O₂ ruang simpan maka laju respirasi berjalan dengan lambat. Laju konsumsi O₂ pada penyimpanan suhu 10°C berkisar antara 1,42 – 4,04 (10⁻⁶ m³/kg.jam), pada suhu 20°C berkisar antara 0,48 – 8,20 (10⁻⁶ m³/kg.jam), dan suhu ruang berkisar antara 0,29 – 18,33 (10⁻⁶ m³/kg.jam). Laju produksi CO₂ pada penyimpanan suhu 10°C berkisar antara 0,46 – 0,80 (10⁻⁶ m³/kg.jam), pada suhu 20°C berkisar antara 0,39 – 1,09 (10⁻⁶ m³/kg.jam), dan pada suhu ruang berkisar antara 4,56 – 7,73 (10⁻⁶ m³/kg.jam).

Kata kunci : Analisis matematis, *Salacca edulis*, Suhu Penyimpanan, Konsentrasi Oksigen, Penyimpanan Atmosfer Termodifikasi

ABSTRACT

Mathematical Analysis of Effect of Temperature and Oxygen Concentration of Storage Room on Rate of Respiration and Changes in Quality of Salak Pondoh Fruit (*Salacca edulis*)

At 2015, the production of salak pondoh in Sleman area reached 699 tons. With the number of salak pondoh produced every year raises various problems in terms of salak pondoh fresh storage. One of them is a decrease in the quality of fresh salak pondoh during storage. This study aims to examine the effect of temperature and oxygen concentration in the storage on respiration rate and the change in the quality of salak pondoh using Modified Atmosphere Storage (MAS) method. Storage of salak pondoh was studied at temperature variations of 10°C, 20°C, and room temperature (29°C) as well as storage oxygen concentrations of 3 - 5%, 10-15%, and 21% for 8 - 34 days. The analysis carried out is the determination of respiration rate and analysis of changes in fruit quality including weight loss, skin moisture content, color, texture and total dissolved solids. Based on statistical analysis obtained optimal treatment variation for storage of salak pondoh by modified atmospheric method with a temperature of 10°C and 21% O₂ storage space can be stored for 34 days. Whereas at room temperature storage, salak pondoh can only be stored for 8 days with parameter of quality change covering weight loss 0.821%, skin water content 70.924%, skin color (Lightness 34.45, Hue Angle 40.95; Chroma 17.93), fruit color (Lightness 70.89; Hue Angle 77.57; Chroma 21.24), texture 2.69 kg/cm², and total dissolved solids 16.7 °brix. In the storage of salak pondoh, the temperature and the oxygen concentration affect the rate of respiration. The lower the temperature and the oxygen concentration in the storage space, the respiration rate will run slowly. The consumption rate of O₂ at 10°C storage temperature ranges from 1.42 – 4.04 (10⁻⁶ m³/(kg.hour)), at a temperature of 20°C ranging from 0.48 to 8.20 (10⁻⁶ m³/(kg.hour)), and room temperature ranged from 0.29 to 18.33 (10⁻⁶ m³/(kg.hour)). The rate of CO₂ production at 10°C storage temperature ranges from 0.46 to 0.80 (10⁻⁶ m³/(kg.hour)), at a temperature of 20°C ranging from 0.39 to 1.09 (10⁻⁶ m³/(kg.hour)) and at room temperature ranges from 4.56 – 7.73 (10⁻⁶ m³/(kg.hour)).

Keywords: Mathematical analysis, *Salacca edulis*, Storage Temperature, Oxygen Concentration, Modified Atmosphere Storage