

KAJIAN MATEMATIS LAJU RESPIRASI DAN PERUBAHAN SIFAT FISIK BUAH NANGKA (*Artocarpus heterophyllus* Lamk.) TEROLAH MINIMAL SELAMA PENYIMPANAN PADA KONDISI ATMOSFER TERMODIFIKASI

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INTISARI

Model matematika dan analisis statistika diperoleh untuk memprediksi pengaruh konsentrasi O_2 ruang simpan dan tingkat kondisi pengolahan minimal buah nangka terolah minimal terhadap perubahan laju respirasi, susut bobot, warna (L^* , a^* , b^*), tekstur, pH, dan brix. Buah nangka diberi perlakuan pengolahan minimal, yaitu buah nangka utuh, buah utuh tanpa biji, dan buah irisan. Sampel disimpan pada suhu tetap $15^\circ C$ dengan konsentrasi O_2 ruang simpan 15%, 18%, dan 21%. Percobaan menggunakan desain rancangan acak lengkap dengan tiga kali percobaan. Parameter-parameter dipelajari dengan persamaan kinetika orde reaksi. Pengukuran laju respirasi menggunakan sistem tertutup. Pemodelan laju respirasi dipelajari dengan menggunakan kinetika enzim *Michaelis Menten*. Konstanta *Michaelis Menten* diperoleh dengan analisis regresi ganda.

Hasil menunjukkan bahwa konsentrasi O_2 ruang simpan dan tingkat kondisi pengolahan buah secara signifikan mempengaruhi perubahan susut bobot, warna L^* , tekstur, pH, dan brix buah. Perlakuan terbaik dalam penelitian ini adalah buah nangka utuh dengan konsentrasi O_2 ruang simpan 18%. Validasi dilakukan dengan memplotkan data observasi terhadap model matematis dan model yang paling dapat menggambarkan laju respirasi buah nangka terolah minimal selama dalam penyimpanan adalah *Michaelis Menten* tipe *uncompetitive*.

Kata kunci : Buah nangka terolah minimal, penyimpanan O_2 rendah

**MATHEMATICAL STUDY OF RESPIRATION RATE AND PHYSICAL
CHARACTERISTICS CHANGES OF MINIMALLY PROCESSED
JACKFRUIT (*Artocarpus heterophyllus* Lamk) DURING STORAGE UNDER
MODIFIED ATMOSPHERE CONDITION**

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Abstract

Mathematical model and statistical analysis were obtained to predict the effect of the storage space O₂ concentration and the minimal processing condition of the minimum jackfruit to the change of respiration rate, weight loss, color (L*, a*, b*), texture, pH, and brix. Jackfruit treated with minimal processing, namely whole jackfruit, seedless jackfruit, and sliced jackfruit. Samples were stored at a fixed temperature of 15°C with oxygen concentrations were 15%, 18%, and 21%. The experiment was repeated three times, using a completely randomized design. The parameters were studied by the reaction kinetics equation. Measurement of the respiration rate using a closed system. Respiration rate modeling was studied using the Michaelis Menten enzyme kinetics. Michaelis Menten's constant is obtained by multiple regression analysis.

The results show that the O₂ concentration of storage space and the level of fruit processing condition significantly influence the changes of weight loss, L* color, texture, pH, and brix of fruit. The best treatment in this research is whole jackfruit with the concentration of O₂ 18%. Validation is done by plotting the observation data on mathematical model and model that can best describe the rate of respiration of the minimum processed jackfruit during storage is Michaelis Menten uncompetitive type.

Keywords : Minimally processed jackfruit, low oxygen storage