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The effects of modified atmosphere packaging on minimally processed dragon fruit (*Hylocereus polyrhizus*) stored at low temperature / Noorlistari Mohd Salleh.

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

THE EFFECTS OF MODIFIED ATMOSPHERE PACKAGING ON MINIMALLY
PROCESSED DRAGON FRUIT (*Hylocereus polyrhizus*) STORED AT LOW
TEMPERATURE

By
Noorlistari binti Mohd Salleh

Research Report submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science Agrotechnology (Post Harvest Technology)

DEPARTMENT OF AGROTECHNOLOGY
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
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2010

ENDORSEMENT

The project report entitled **The Effects of Modified Atmosphere Packaging on Minimally Processed Dragon Fruit (*Hylocereus polyrhizus*) Stored at Low Temperature** by **Noorlistari Binti Mohd Salleh**, Matric No. **UK14880** has been reviewed and corrections have been made according to the recommendations by examiners. This report is submitted to the Department of Agrotechnology in partial fulfillment of the requirement of the degree of Science Agrotechnology (Post harvest Technology), Faculty of Agrotechnology and Food Science , Universiti Malaysia Terengganu.



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DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledgement

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ABSTRACT

This study involved minimally processed (MP) red dragon fruit which also known as red pitaya. MP dragon fruit is ready-to-eat product which provides convenience as consumers do not need to peel and cut the fruits before consume it. However, the fruits is very perishable and continue to respire which resulted in degradation of products. Many techniques can be applied to increase the shelf-life of MP fruits. One of the most adopted techniques is modified atmosphere packaging (MAP) which provide optimal balanced of gases inside the package. Physico-chemical analyses of total color change, firmness, ratio of total soluble solid (TSS) to titratable acidity (TA), anthocyanin content, percentage of weight loss, and sensory evaluation were carried out to determine the storage quality of MP dragon fruits in different MAP namely polypropylene container, sealed polypropylene film, polypropylene film with vacuum for 5 seconds and PVC cling wrap which serve as control. All the samples were stored at $5\pm 1^{\circ}\text{C}$; RH 90% for 8 days and analyzed every 2 day intervals. The total color changes and percentage weight loss showed increasing patterns throughout the storage whereas, firmness, anthocyanin content and the ratio of TSS to TA showed decreasing patterns. There were significant differences ($p < 0.05$) among all the treatments in all the parameters tested except for the ratio of TSS to TA which showed no different. The sensory acceptance conducted indicates that all the packed samples were still acceptable up until day 8 with sweetness and the overall acceptability scored higher for all types of MAP treatments. However, among all the treatments, polypropylene container was the most effective packaging system for extending the shelf-life of minimally processed dragon fruits with the least changes in almost all the quality attributes.

ABSTRAK

Kajian ini melibatkan pemprosesan minima buah naga merah atau lebih dikenali sebagai pitaya merah. Pemprosesan minima buah naga adalah produk yang sedia dimakan dan memudahkan pengguna kerana tidak perlu untuk mengupas atau memotong buah tersebut sebelum memakannya. Walau bagaimanapun, buah-buahan ini sangat mudah rosak dan kerana proses respirasi yang berterusan menyebabkan kerosakan pada produk. Pelbagai teknik boleh digunakan untuk meningkatkan tempoh hayat simpanan buah-buahan terproses minima ini. Salah satu teknik yang paling banyak digunapakai adalah pembungkusan atmosfera terubahsuai (MAP) yang mempunyai keseimbangan kandungan gas yang optimum di dalam bungkusan. Analisis fiziko-kimia seperti perubahan warna keseluruhan, tekstur buah, nisbah jumlah pepejal terlarut (TSS) kepada asid tertitrat (TA), kandungan antosianin, peratus kehilangan berat dan penilaian deria telah dijalankan untuk menentukan kualiti simpanan pemprosesan minima buah naga yang dibungkus di dalam pembungkusan atmosfera terubahsuai yang berbeza iaitu bekas polipropilena, filem polipropilena, filem polipropilena dengan pembungkusan vakum selama 5 saat dan filem polivinilklorida (PVC) sebagai kawalan. Semua sampel disimpan pada suhu $5\pm 1^{\circ}\text{C}$; kelembapan relative 90% selama 8 hari dan dikeluarkan selang 2 hari untuk dianalisa. Perubahan warna keseluruhan dan peratus kehilangan berat menunjukkan peningkatan sepanjang tempoh penyimpanan manakala tekstur, kandungan antosianin dan nisbah TSS kepada TA menunjukkan penurunan. Perbezaan yang ketara ($p < 0.05$) ditunjukkan oleh setiap jenis pembungkusan ke atas semua parameter yang dikaji kecuali pada nisbah TSS kepada TA yang menunjukkan tiada perbezaan. Penerimaan penilaian deria yang dijalankan menunjukkan semua sampel masih boleh diterima sehingga hari ke 8 di mana atribut kemanisan dan penerimaan keseluruhan mendapat skor yang tinggi bagi semua rawatan MAP. Walau bagaimanapun, daripada semua jenis pembungkusan MAP yang digunakan, bekas polipropilena adalah yang paling efektif untuk memanjangkan tempoh penyimpanan pemprosesan minima buah naga kerana ia menunjukkan perubahan yang paling sedikit untuk semua atribut.