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Effects of selected anti-browning treatments on the storage  
quality of fresh-cut banana / Nurul Syazila Abd Rani.

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**HAK MILIK**  
PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

**EFFECTS OF SELECTED ANTI-BROWNING TREATMENTS ON THE STORAGE  
QUALITY OF FRESH – CUT BANANA**

By

**Nurul Syazila Bt Abd Rani**

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

**DEPARTMENT OF AGROTECHNOLOGY  
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
2010**

## ENDORSEMENT

The project report entitled **Effects of Selected Anti-Browning Treatments on the Storage Quality of Fresh-Cut Banana** by **Nurul Syazila bt Abd Rani** Matric Number **UK15115** has been reviewed and corrections have been made according to the recommendations by examiners. This project is submitted to the Department of Agrotechnology in partial fulfillment of the requirement of degree of Science in 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 acknowledged

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## ABSTRACT

Anti-browning agents are the edible chemical that can be used to reduce the damage and spoilage that occurs on the fresh produces due to enzymatic browning when the produces are being cut especially for minimally process (MP) industry. Enzymatic browning is a chemical reaction which occurs in fruits and vegetables by the enzyme polyphenoloxidase which reacts in the presence of oxygen, which resulted in brown pigments, which is also known as *o-quinone*. Enzymatic browning is detrimental to quality, particularly in post-harvest storage of fresh fruits and fruits products. Enzymatic browning may be responsible for up to 50% of all losses during fruit and vegetables production. The effectiveness of three different anti-browning agents were investigated individually or in combination on the MP sliced banana. The anti-browning agents used in this study were glutathione (0.5 M), N-acetylcysteine (0.05 M), citric acid (0.5 M), combination of glutathione (0.5 M) and citric acid (0.5 M), combination of N-acetylcysteine (0.05 M) and citric acid (0.5 M) where MP sliced banana without any treatment served as Control. The storage quality of the tested MP sliced bananas were assayed in terms of their total color change and physico-chemical characteristic (texture, titratable acidity, pH, percentage of weight loss, total soluble solid and browning index) over the chilled storage at  $5\pm 1^{\circ}\text{C}$ ; relative humidity (RH) 95% for 15 days. All the treatments showed increasing patterns in total color change, pH, percentage of weight loss, total soluble solid and browning index over the storage. However, texture and titratable acidity were decreasing. The rate of increasing and/or decreasing of each parameters were different among the treatments. The combination of N-acetylcysteine (0.05 M) and citric acid (0.5 M) was the most effective inhibitory of browning activities in sliced bananas.

## ABSTRAK

Agen penyahperang adalah bahan kimia yang boleh dimakan yang digunakan untuk mengurangkan kerosakan dan kemusnahan yang berlaku kepada produk segar yang disebabkan oleh keperangan berenzim apabila produk segar tersebut dipotong terutama sekali untuk industri pemrosesan minimal. Keperangan berenzim adalah satu tindakbalas kimia yang berlaku kepada buah-buahan dan sayur-sayuran oleh enzim polifenoloksida yang berlaku dengan kehadiran oksigen dan mengakibatkan terjadinya pigmen berwarna perang, juga dikenali sebagai *o-kuinon*. Keperangan berenzim akan mendatangkan keburukan dari segi kualiti, terutamanya kepada penyimpanan lepas tuai buah-buahan segar dan produk-produk berasaskan buah-buahan. Keperangan berenzim boleh menyumbang kepada hampir 50% kehilangan hasil pengeluaran buah-buahan dan sayur-sayuran. Keberkesanan tiga agen penyahperang telah dikaji secara individu atau secara kombinasi terhadap proses minimal hirisan pisang. Agen penyahperang yang digunakan dalam kajian ini adalah glutation (0.5 M), N-asetilsisteina (0.05 M), asid sitrik (0.5 M), kombinasi glutation (0.5 M) dan asid sitrik (0.5 M), kombinasi N-asetilsisteina (0.05M) dan asid sitrik (0.5 M), manakala proses minimal hirisan pisang tanpa agen penyahperang bertindak sebagai kawalan. Kualiti penyimpanan terhadap proses minimal hirisan pisang yang telah disei dari segi perubahan warna keseluruhan dan ciri-ciri fiziko-kimia (tekstur, asid tertitrat, pH, peratus kehilangan berat, jumlah pepejal larut, dan index keperangan) sepanjang penyimpanan sejuk-dingin pada suhu  $5\pm 1^{\circ}\text{C}$ ; kelembapan relatif (RH) 95% selama 15 hari. Semua rawatan menunjukkan peningkatan dalam perubahan warna keseluruhan, pH, peratus kehilangan berat, jumlah pepejal larut, dan index keperangan sepanjang tempoh penyimpanan. Walau bagaimanapun, tekstur dan asid tertitrat menunjukkan penurunan. Kadar peningkatan dan/atau penurunan setiap parameter adalah berbeza antara rawatan-rawatan yang terlibat. Kombinasi N-asetilsisteina (0.05 M) dan asid sitrik (0.5 M) merupakan rawatan penyahperangan yang paling berkesan bagi hirisan pisang.