EFFECTS OF POSTHARVEST HEAT AND ANOXIC
TREATMENTS ON THE MANIFESTATION OF
CHILLING INJURY IN SEBERANG BATANGA

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EFFECTS OF POSTHARVEST HEAT AND ANOXIC TREATMENTS ON THE MANIFESTATION OF CHILLING INJURY IN 'BERANGAN' BANANA

By
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Research Report submitted in partial fulfillment of
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DEPARTMENT OF AGROTECHNOLOGY
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ENDORSEMENT

The project report entitled **Effects Of Postharvest Heat And Anoxic Treatments On The Manifestation Of Chilling Injury In 'Berangan' Banana** by **Megat Hazeq bin Megat Hashimi** Matric Number **UK16174** 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 in my own except for quotations and summaries which have been duly acknowledged

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ABSTRACT

Chilling injury is a serious disorder that can be observed in plant tissues, especially those of tropical and subtropical origin. One of the most susceptible produces to chilling injury is banana which resulted in the blackening of the peel from the exposure of susceptible banana tissues to temperature lower than 15°C. However the critical temperature at which chilling injury symptoms are manifested varies among different cultivars and commodities. Chilling injury causes the release of metabolites , such as amino acids and sugar , and minerals from cells and together with the degradation of cell structure. This study was carried out to investigate the effects of different post harvest treatments to reduce the manifestation of chilling injury in 'Berangan' banana. The treatments involved were hot water treatment at 50°C, hot air treatments at 30°C and 50°C, anoxic treatment and bananas without any treatment were served as control. The treated bananas were stored at 13°C; RH 90% for 3 weeks followed by storage at ambient (25±1°C) for another one week. The physico-chemical analyses and the manifestation of chilling injury were observed at weekly intervals. The total color change of the pulp and peel, chilling injury scores, and TBA values were increasing over the storage time. Peel to pulp weight ratio and firmness were decreasing over the storage time. However among all the treatments, the best treatment for extending shelf life and reducing the manifestation of chilling injury in 'Berangan' banana was observed to be the anoxic treatment followed by hot water treatment at 50°C, hot air treatments at 50°C, control and lastly hot air treatments at 30°C.

ABSTRAK

Kecederaan sejuk-dingin adalah satu kerosakan yang boleh dikesan pada tisu tumbuhan, terutamanya tumbuhan tropika dan subtropika. Salah satu produk pertanian yang mudah terkena kecederaan sejuk-dingin adalah pisang yang akan menyebabkan terjadinya kehitaman pada kulit pisang yang diletakkan pada suhu rendah daripada 15°C. Walau bagaimanapun, suhu kritikal yang akan menyebabkan terjadinya simptom-simptom ini adalah berbeza mengikut kultivar dan komoditi. Kecederaan sejuk menyebabkan pelepasan metabolik, seperti amino asid dan gula, dan mineral dari sel dan bersama-sama ini menyebabkan kerosakan struktur sel. Kajian ini dijalankan adalah untuk mengkaji kesan terhadap rawatan lepas tuai yang berbez-beza untuk mengurangkan kejadian kecederaan sejuk-dingin pada pisang Berangan. Rawatan tersebut melibatkan rawatan air panas pada 50°C, rawatan udara panas pada suhu 30°C dan 50°C, rawatan anoksik dan juga tanpa rawatan yang akan bertindak sebagai kawalan. Pisang yang telah dirawat disimpan pada suhu 13°C; RH 90% untuk 3 minggu dan diikuti dengan penyimpanan pada suhu bilik (25±1°C) untuk satu minggu. Analisis yang melibatkan analisis fiziko-kimia dan juga kewujudan kecederaan sejuk-dingin diperhatikan pada sela masa satu minggu. Jumlah keseluruhan perubahan warna pada isi dan kulit, skor bagi kerosakan sejukidingin, dan bacaan asid thiobarbiturik (TBA) sepanjang masa penyimpanan. Nisbah berat kulit kepada isi dan kekerasan adalah menurun sepanjang tempoh tersebut. Walaubagaimanapun, dalam kesemua rawatan yang telah dijalankan, rawatan yang terbaik dalam memanjangkan jangka hayat dan mengurangkan kewujudan kecederaan sejuk-dingin pada pisang Berangan adalah dengan penggunaan rawatan anoksik dan diikuti dengan rawatan air panas pada suhu 50°C, rawatan udara panas pada suhu 50°C, kawalan dan akhir sekali rawatan udara panas pada suhu 30°C.