

**EFFECT OF OSMOTIC DEHYDRATION USING SUCROSE
SOLUTION ON THE DRYING KINETICS AND FINAL QUALITY
OF DRIED PAPAYA (*Carica papaya* L.)**

**PENGARUH DEHIDRASI OSMOSIS DALAM LARUTAN
SUKROSA TERHADAP KINETIKA PENGERINGAN DAN
KUALITAS AKHIR PEPAYA KERING (*Carica papaya* L.)**

THESIS

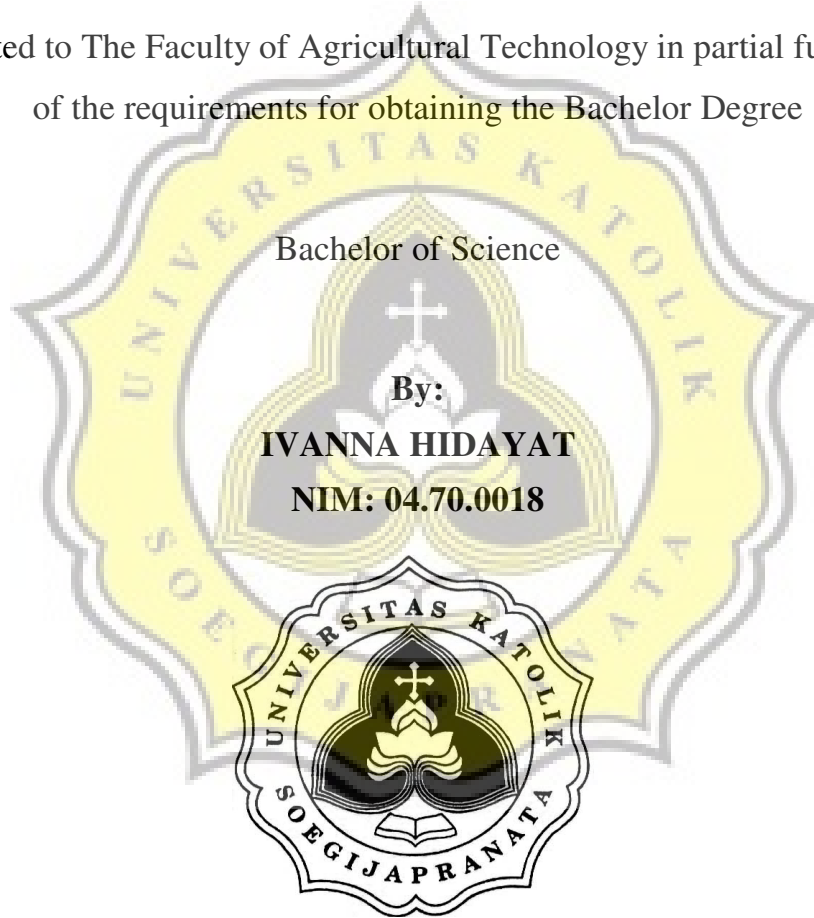
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By:

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SEMARANG**

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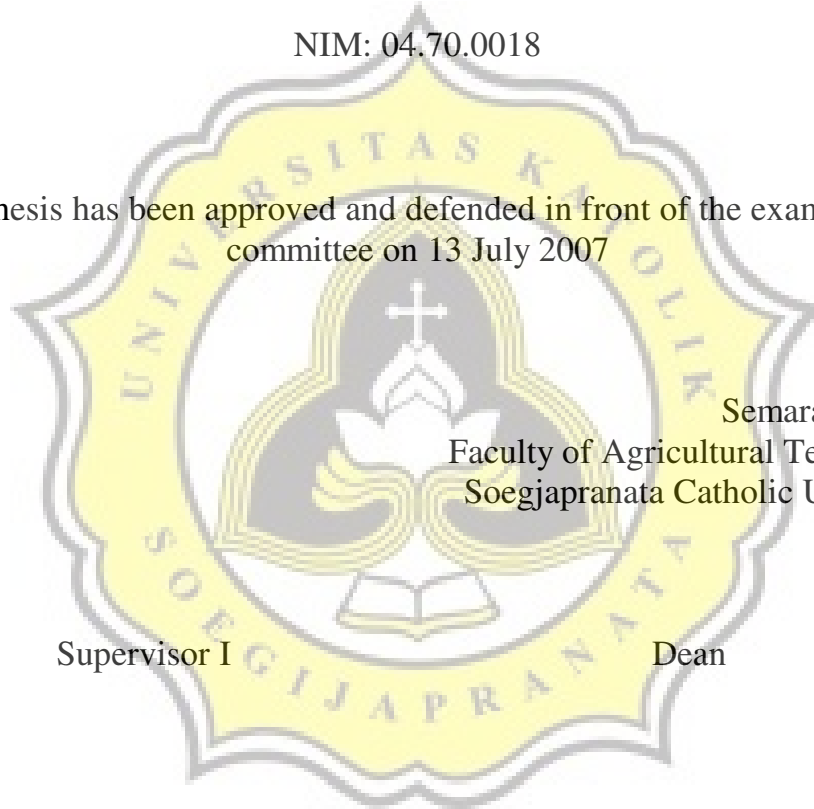
**PENGARUH DEHIDRASI OSMOSIS DALAM LARUTAN
SUKROSA TERHADAP KINETIKA PENDINGINAN DAN
KUALITAS AKHIR PEPAYA KERING (*Carica papaya* L.)**

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SUMMARY

Papaya (*Carica papaya* L.) is a kind of fruit which has a high nutritional value, especially its antioxidant content. However, papaya is a perishable fruit which is easily spoiled after harvesting. Drying is a processing technology which is used to prolong shelf life of papaya by removing water content from the fruit material. To overcome disadvantages of drying process, blanching and osmotic dehydration are considered as suitable pre-drying treatments. The aims of this research are to find out the effect of osmotic dehydration using sucrose solution on the drying time of papaya, and also to analyze the chemical characteristics (vitamin C, anti oxidant, and moisture content), physical characteristics (density and size reduction) and sensory characteristics of dried papaya. This research are using three concentrations of sucrose solution (15⁰Brix, 30⁰Brix, and 45⁰Brix), four drying temperatures (50⁰C, 60⁰C, 70⁰C, and 80⁰C), two kind of papaya (unripe and medium-ripe) and the use of citric acid soaking as another pre-treatment. The result showed that osmotic dehydration has capability to shorten drying time. The most effective treatment to shorten drying time was osmotic dehydration in 45⁰Brix sucrose solution. However, osmotic dehydration was also decreased vitamin C content and antioxidant activity along with the increase of sucrose concentration and drying temperature. Based on Arrhenius equation, from four drying temperature, papaya soaked in 45⁰Brix sucrose solution concentration has the lowest E_a value which means its vitamin C and antioxidant activity is easily damaged. While based on Page's model, from four drying temperatures, the 45⁰Brix sucrose solution concentration pre-treated papaya has the lowest k value (degradation weight of water) compared to the others. Size reduction of dried papaya is not affected by the differences of four drying temperatures but it is affected by the differences of sucrose solution concentrations which the higher sucrose solution concentration the lower size reduction of dried papaya. There is no significant difference bulk density among the pre-treated papayas but there is significant difference bulk density between the pre-treated papaya and the untreated one. The result of sensory analysis showed that papaya soaked in 45⁰Brix sucrose solution and dried in 60⁰C drying temperature solution were most liked by panelist.

Key words: osmotic dehydration, sucrose, papaya, mathematical model

RINGKASAN

Pepaya (*Carica papaya L.*) merupakan salah satu jenis buah yang memiliki nilai gizi yang tinggi, terutama kandungan antioksidannya. Namun pepaya termasuk buah yang bersifat *perishable* (mudah rusak) setelah pemanenan. Pengeringan merupakan salah satu teknologi pengolahan yang mampu memperpanjang umur simpan buah pepaya dengan cara menghilangkan sebagian besar air yang terkandung dalam bahan. Untuk mengatasi kekurangan dari proses pengeringan, maka *blanching* dan dehidrasi osmosis dipertimbangkan sebagai *pretreatment* sebelum pengeringan. Penelitian ini bertujuan untuk mengetahui pengaruh dari dehidrasi osmosis dengan larutan sukrosa terhadap waktu pengeringan pepaya, serta mengetahui karakteristik kimia (vitamin C, aktivitas antioksidan, dan kadar air), fisik (densitas dan pengurangan ukuran), dan sensoris dari pepaya kering yang dihasilkan. Dalam penelitian ini digunakan tiga konsentrasi larutan sukrosa (15⁰Brix, 30⁰Brix, dan 45⁰Brix), empat suhu pengeringan (50⁰C, 60⁰C, 70⁰C, dan 80⁰C), dua tingkat kematangan pepaya (mentah dan mengkal) serta perendaman dalam larutan asam sitrat sebagai perlakuan pendahuluan lainnya. Dari hasil penelitian diketahui bahwa dehidrasi osmosis mampu mempercepat waktu pengeringan pepaya. Perlakuan yang paling efektif dalam mempercepat waktu pengeringan adalah perendaman dalam larutan sukrosa 45⁰Brix. Namun dehidrasi osmosis juga menyebabkan penurunan kadar vitamin C dan aktivitas antioksidan seiring dengan meningkatnya konsentrasi larutan sukrosa dan suhu pengeringan. Berdasarkan persamaan *Arrhenius*, dari empat suhu pengeringan, pepaya dengan perendaman dalam larutan sukrosa 45⁰Brix memiliki nilai *Ea* (aktivasi energi) yang paling rendah yang berarti kadar vitamin C dan aktivitas anti oksidannya paling rentan terhadap kerusakan. Sedangkan berdasarkan model persamaan *Page*, dari empat suhu pengeringan, pepaya dengan perendaman dalam larutan sukrosa 45⁰Brix juga memiliki nilai *k* (laju penurunan berat kandungan air) yang paling rendah dibanding dengan yang lainnya. Terjadinya pengurangan ukuran pada pepaya kering tidak dipengaruhi oleh empat parameter suhu pengeringan yang digunakan, tetapi justru dipengaruhi oleh tiga konsentrasi larutan sukrosa yang berbeda, di mana semakin tinggi konsentrasi sukrosa yang digunakan, semakin rendah pengurangan ukuran yang terjadi pada pepaya kering. Tidak ada hasil densitas yang beda nyata antara pepaya yang diberi perlakuan perendaman tetapi ada hasil densitas yang beda nyata antara pepaya yang direndam dengan yang tidak. Hasil analisa sensoris menunjukkan bahwa pepaya dengan perlakuan perendaman dalam larutan sukrosa 45⁰Brix dan dikeringkan pada suhu 60⁰C adalah pepaya yang paling disukai oleh panelis.

Kata kunci: dehidrasi osmosis, sukrosa, pepaya, model matematis