

**PRODUCTION OF INULIN-SUPPLEMENTED DADIH USING THE CRUDE  
LEAF EXTRACT OF KESINAI (*STREBLUS ASPER*)**

**By**

**RUZAINA BT ISHAK**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirement for the Degree of Master of Science.**

**October 2006**

This thesis is dedicated to  
My mother Sofiah bt Yaakob,  
My father Ishak b. Mat Saman,  
My fiancée Amirudin,  
My brothers Zulkifli, Jafri and Raslan.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Master of Science.

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**Chairman: Professor Mohd. Yazid b. Abd. Manap, PhD**

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The effects of extraction buffer pH, temperature, calcium chloride and enzyme concentration on milk coagulating activities of kesinai crude leaf extract were evaluated. The color of crude extract increased up to 47.90% by the increasing extraction buffer pH from 6.0 to 7.4. The protease and milk-coagulating activity of the crude extract was optimum at extraction buffer pH 7.2. Milk-coagulating activity was optimum at 70°C. The addition of calcium chloride in the range 1 to 10 mM concentration into fresh milk has increased milk- coagulating activity by 12.42 to 20.15%, respectively. Milk coagulating activity also increased from 1.74 to 37.97% by the increasing of enzyme concentration in the range 10 to 100% v/v, respectively.

The effect of sodium metabisulphite on color, protease and milk coagulating activity of kesinai crude leaf extract were also investigated. The required concentration of sodium metabisulphite for browning inhibition ranged from 0.5 to 10.0 mM, which

decreased color by 61.90 to 87.60 % and increased protease activity by 11.26 to 14.15%, respectively. Milk coagulating activity increased from 11.29 to 18.03% for the similar concentration. The minimum threshold for inhibition of browning was 1 mM, with the treated extract, having a higher protease and milk coagulating activity as compared to the control.

‘Dadih’ was made from skim milk and fresh milk fortified with 5% to 9% of inulin and coagulated with kesinai leaf extract. Inulin increased the hardness, fracturability, cohesiveness and decreased syneresis of ‘dadih’. Sensory attributes tested for both types of ‘dadih’ were creaminess, sweetness, bitterness, firmness and total acceptance. The best product judged by the trained panelists was ‘dadih’ made from fresh milk with 9% of inulin. The findings indicate that inulin can be used as an additive in ‘dadih’ in order to improve the physical and sensory properties of ‘dadih’.

Abstrak thesis yang dikemukakan kepada Senat Universiti Putra Malaysia bagi memenuhi keperluan untuk ijazah Master Sains.

**PENGHASILAN DADIH-DITAMBAHBAIKAN INULIN MENGGUNAKAN EKSTRAK KASAR DAUN KESINAI (*STREBLUS ASPER*)**

Oleh

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Kesan pH pengekstrakkan, suhu, kalsium klorida dan kepekatan enzim ke atas aktiviti protease dan koagulasi susu dinilai. Warna ekstrak kasar meningkat kepada 47.90% pada peningkatan pH larutan pengekstrakkan daripada pH 6.0 kepada 7.4. Aktiviti protease dan koagulasi adalah optimum pada pH 7.2. Aktiviti koagulasi adalah optimum pada suhu 70°C. Penambahan kalsium klorida dalam had kepekatan 1 sehingga 10 mM ke dalam susu segar telah meningkatkan aktiviti koagulasi pada 12.42 sehingga 20.15%, masing-masing. Aktiviti koagulasi juga meningkat daripada 1.74 sehingga 37.97% pada peningkatan kepekatan enzim dalam had 10 sehingga 100% v/v, masing-masing.

Kesan sodium metabisulfit ke atas warna, aktiviti protease dan koagulasi susu untuk ekstrak kasar daun kesinai juga dikaji. Kepekatan sodium metabisulfit yang diperlukan untuk penghalangan keperangan dihadkan daripada 0.5 sehingga 10.0 mM yang mana mengurangkan warna pada 61.90 sehingga 87.60% dan meningkatkan aktiviti protease pada 11.26 sehingga 14.15%. Aktiviti koagulasi susu meningkat daripada 11.29 sehingga 18.03% untuk kepekatan yang sama. Ambang minimum untuk penghalangan bagi keperangan adalah 1mM, dengan ekstrak yang dirawat, mempunyai aktiviti protease dan koagulasi yang tinggi berbanding dengan kawalan.

Dadih dihasilkan daripada susu skim dan susu segar diperkayakan dengan 5% sehingga 9% inulin dan dikoagulasikan dengan ekstrak daun kesinai. Inulin meningkatkan kekerasan, kepecahan, kelekitan dan mengurangkan sineresis dadih. Ujian atribut sensori diuji untuk kedua-dua jenis dadih adalah kekriman, kemanisan, kepahitan, keteguhan dan penerimaan keseluruhan. Produk terbaik yang diadili oleh panel terlatih adalah dadih diperbuat daripada susu segar dengan 9% inulin. Penemuan menunjukkan bahawa inulin boleh digunakan sebagai bahan penambah di dalam dadih untuk memperbaiki ciri-ciri fizikal dan sensori dadih.

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I certify that an Examination Committee has met on 28<sup>th</sup> October 2005 to conduct the final examination of Ruzaina bt. Ishak on her Master of Science thesis entitled “Production of Inulin-Supplemented Dadih Using the Crude Leaf Extract of Kesinai (*Streblus asper*)” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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## **DECLARATION**

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently for any other degree at UPM or other institutions.

.....  
**RUZAINA ISHAK**  
**DATE: 5 FEBRUARY 2006**

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