UNIVERSITI PUTRA MALAYSIA

IN VIVO EVALUATION OF ANALGESIC, ANTI-INFLAMMATORY AND ANTIPYRETIC ACTIVITIES OF AQUEOUS EXTRACT FROM THE FRUIT OF *TAMARINDUS INDICA* L.

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By

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MASTER OF SCIENCE

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master Science

IN VIVO EVALUATION OF ANALGESIC, ANTI-INFLAMMATORY AND ANTI PYRETIC ACTIVITIES OF AQUEOUS EXTRACT FROM THE FRUITS OF *Tamarindus indica L.*

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June 2011

Chairman: **Professor Mohd Roslan Sulaiman, PhD**

Faculty: **Medicine and Health Sciences**

Pharmacological studies were conducted with the aqueous extract of *Tamarindus indica* L. fruits (TFAE) on experimental animals for evaluating the analgesic, antipyretic, anti-inflammatory activities and to elucidate its mechanism of action. In the analgesic test, three experimental models of nociception used to study the analgesic activity of extract namely, acetic acid-induced abdominal constrictions test and hot-plate test in mice and formalin test in rats. TFAE produced inhibitory effect in all experimental models used. Further study showed that the extract elicited inhibitory activity in both the early and late phases of the formalin test. In addition, TFAE also produced significant inhibition effect ($p<0.001$) in glutamate and capsaicin-induced paw licking models. Pre-treatment with 5 mg/kg naloxone, a non-selective opioid receptor antagonist, significantly ($p<0.001$) antagonised the antinociceptive effect of the extract in all tests. This shows the analgesic effect is associated with stimulation of opioid receptors in central brain system. In addition, TFAE also showed anti-

inflammatory activity through carrageenan-induced paw edema model and significantly ($p<0.001$) inhibited inflammation-induced by carrageenan edemogens. In acute chronic inflammation model, Tamarind provoked a significant reduction of both proliferative and transudative phase when tested on cotton pellet-induced granuloma model. At 600mg/kg, TFAE caused maximum inhibition of granuloma with 22.00%. TFAE also elicited antipyretic action when tested in yeast-induced hyperthermia in mice. In the rota rod test, TFAE treated mice did not show any significant motor performance alterations with the dose of 600 mg/kg and this shows that TFAE has no sedative effect. Furthermore, subacute toxicity of 28 consecutive days also shown, there were no deaths or toxic signs recorded in the rats given 1.5, 2.25 and 5.0 g/kg of TFAE.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PENILAIAN AKTIVITI ANTI-NOSISEPTIF, ANTI-RADANG DAN ANTI-DEMAM DARI ESTRAK BUAH *Tamarindus indica L.*

Oleh

SYAMIMI MD KHALID

June 2011

Pengerusi: **Profesor Mohd Roslan Sulaiman, PhD**
Fakulti: **Perubatan dan Sains Kesihatan**

Kajian secara farmalogikal telah dijalankan menggunakan astrak buah *Tamarindus indica* L. (TFAE) ke atas mencit dan tikus bagi mengenalpasti kesan antinosiseptif, anti radang, anti demam dan menjelaskan mekanisma tindakan. Dalam ujian antinosiseptif, tiga model eksperimen digunakan untuk menyiasat kesan anti-nosiseptif ekstrak, iaitu ujian pengecutan abdomen, ujian piring panas yang dijalankan ke atas mencit, ujian formalin dijalankan ke atas tikus. TFAE mengurangkan peratus kesakitan bagi kesemua model eksperimen. Kajian seterusnya juga menunjukkan TFAE telah mengurangkan peratus kesakitan pada kedua-dua fasa awal dan akhir. Tambahan lagi, TFAE juga menghasilkan pengurangan peratus kesakitan secara signifikan ($p<0.001$) pada model eksperimen Glutamate dan Capsaicin merangsang kesakitan. Pra-rawatan dengan Naloxone (5mg/kg, i.p.), antagonis reseptor opioid bukan selective telah menyekat semua aktiviti analgesik bagi TFAE secara signifikan ($p<0.05$). Ini menunjukkan kesan analgesik adalah berkaitan dengan rangsangan reseptor opioid dalam sistem otak sentral. Tambahan lagi, TFAE juga menunjukkan

aktiviti anti-radang melalui ujian Carrageenan merangsang radang tapak kaki dan juga secara signifikan ($p<0.001$) megurangkan radang yang diterbitkan oleh agen2 peradang. Dalam kajian separa kronik pula, TFAE menghasilkan pengurangan radang yang dihasilkan pada kedua-dua iaitu prolifarasi dan transudaksi, dalam model ekperimen peluru kapas merangsang pembentukan granul. Pada dos 600 mg/kg, TFAE mengurangkan pembentukan granul secara maksimum sebanyak 22.00%. TFAE juga telah menunjukkan tindakan ke atas model ekperimen anti-demam ke atas tikus dengan mengurangkan suhu badan subjek setelah suhu demam dirangsang menggunakan yis. Malah, dalam model eksperimen rod berputar juga, tiada perubahan secara signifikan pada sistem motor pada mencit setelah diberikan rawatan TFAE (600mg/kg) dan menunjukkan TFAE tidak memberikan kesan sedatif. Tambahan lagi, kajian toksik sub akut selama 28 hari berturut-turut juga telah menunjukkan tiada kematian subjek direkodkan adan tiada tanda-tanda toksik dikesan pada tikus-tikus yang telah diberikan TFAE pada dos 1.5, 2.25 dan 5.0 g/kg.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment as the requirement for the degree of Master. The members of the Supervisory Committee were as follows:

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I certify that a Thesis Examination Committee has met on 17 June 2011 to conduct the final examination of Syamimi binti Md Khalid on her thesis entitled "*In Vivo* Evaluation of Analgesic, Anti-Inflammatory and Antipyretic Activities of Aqueous Extract from *Tamarindus indica* L. Fruit" in accordance with the Universities and University College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master of Science.

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DECLARATION

I hereby declare that the thesis on my original work except for quotation and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institution.

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SYAMIMI MD KHALID

Date:

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