UNIVERSITI PUTRA MALAYSIA

SCREENING OF MALAYSIAN MEDICINAL/HERBS AND AQUATIC PLANTS FOR PANCREATIC LIPASE INHIBITORY ACTIVITIES AND IDENTIFICATION OF ACTIVE CONSTITUENT

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By

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Masters of Science

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Chairperson : **Professor Hasanah Mohd Ghazali, PhD**

Faculty : **Food Science and Technology**

The compounds that help to slow down the digestion of triacylglycerols inside pancreatic and small intestine of human play an important role in the control of obesity. In this study the effects of 80% methanol extracts of different parts (seeds, fruits, leaves, flowers, roots) of some medicinal/herbals and aquatic plants for their anti-lipase activity was determined. The effect of each plant extract on porcine pancreatic lipase was measured based on titrimetric method. The results revealed of the one hundred (100) plant samples screened, eighty eight (88) of the extracts were observed to inhibit while twelve (12) were found to promote the activity and only two extracts did not show any activity on the enzyme. Four of the plant extracts *Archidendron jiringa* (Jack) I.C Nielsen, *Averrhoe carambola* L. *Cynometra cauliflora* and *Alevrites moluccana* (L.) Willd have shown the highest anti-lipase activity of 100%, and twenty one (21) extracts observed to have high

activity above 70%. Eighteen (18) out of these twenty one (21) have anti-lipase activity of greater than 80%. Thirteen (13) have presented moderate inhibition with a high proportion of 62% exhibited lower inhibition. Twenty nine (29) extracts out of these (86) can be regarded as very poor inhibitors, as their percent inhibition was less than 20% and only 1.74% was shown to have no inhibitory activity. In the process of isolating the active compounds, liquid-liquid partitioning of the crude methanolic extract of *Cynometra cauliflora* leaves was carried out. Five different fractions hexane, DCM, EtOAc, n-BuOH and aqueous was obtained. All the fractions were tested for anti-lipase activity and the active components reside manily in ethyl acetate fraction. The isolation and identification of active compounds from the most active fraction (ethyl acetate) was further fractionated using silica gel column chromatography (normal phase). The active fraction was further purified by the use of Sephadex LH-20 chromatography. The structure of the active compound from ethyl acetate fraction of *Cynometra cauliflora* was found to be kaempferol-3-*O*-rhamnoside. The structure of this active compound was identified from spectroscopic data analysis of IR, MS, ^{1}H NMR, ^{13}C NMR and 2D-NMR.

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

PENYARINGAN TUMBUHAN UBATAN/HERBA DAN TUMBUHAN YANG TERDAPAT DI MALAYSIA UNTUK AKTIVITI PERENCATAN LIPASE PANKREAS DAN PENGENALPASTIAN KOMPONEN AKTIF

Oleh

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Pengerusi : Profesor Hasanah Mohd Ghazali, PhD

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Komponen yang melambatkan penghadaman triasilgliserol di dalam pankreas dan usus kecil manusia, memainkan peranan yang penting dalam mengawal kegemukan. Kesan metanol ekstrak daripada pelbagai bahagian yang berlainan (biji, buah, daun, bunga dan akar) daripada tumbuhan ubatan/herba dan akuatik telah dikaji bagi aktiviti anti-lipase Kesan setiap ekstrak tumbuhan ini terhadap lipase porcine pankreas diukur berdasarkan kaedah pentitratan. Keputusan menunjukkan daripada seratus (100) sampel tumbuhan yang di periksa, lapan puluh lapan (88) daripadanya didapati menunjukkan perencatan manakala dua belas (12) lagi didapati menggalakkan aktiviti enzim tarsebut. Empat ekstrak tumbuhan iaitu *jering, belimbing besi*, *nam-nam dan buah keras* telah menunjukkan aktiviti anti-lipase yang paling tinggi iaitu 100%, dengan dua puluh satu

(21) ekstrak didapati mempunyai aktiviti yang tinggi melebihi 70%. Lapan belas (18) daripada dua puluh satu (21) mempunyai aktiviti anti-lipase yang melebihi 80%. Tiga belas (13) telah mempamerkan perencatan secara sederhana dengan sebahagian besar iaitu 62% menunjukkan perencatan yang lebih rendah. Dua puluh sembilan (29) ekstrak daripadanya (88) boleh dipertimbangkan sebagai perencat yang lemah, disebabkan oleh peratusan perencatannya yang kurang daripada 20% dan hanya 1.74% menunjukkan tiada aktiviti. Proses penulenan komponen aktif daripada pokok nam-nam dimulakan dengan proses pempartisian cecair-cecair terhadap ekstrak metanol memberikan 5 fraksi iaitu heksana, diklorometha na, etil asitat, butanol dan air. kesemua fraksi ini di uji aktiviti anti-lipase dan di dapati komponen bioaktif kebanyakannya terdapat dalam fraksi etil asetat. Pengasingan komponen aktif ini daripada fraksi yang paling aktif (etil asitat) kemudiannya di teruskan lagi dengan manggunakan kaedah kromatografi turus gel silika (fasa normal). Pecahan yang aktif daripada kromatografi fasa normal ini kemudiannya di tulenkan dengan menggunakan kromatografi pembezaan saiz, Sephadex LH-20. Komponen aktif daripada pokok nam-nam dihenalpasti sebagai kaempferol-3-*O*-rhamnosida. Struktur ini komponen dikenalpasti menggunakan analisis data spektroskopik IR, MS, ^{1}H NMR, ^{13}C NMR, dan 2D-NMR.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Masters of Science. The members of the Supervisory were 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, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

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MUHAMMAD ABUBAKAR ADO

Date: 29th June 2010

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