



UNIVERSITI PUTRA MALAYSIA

**POTENTIAL HYPOGLYCEMIC PROPERTY OF *ALBIZA MYRIOPHYLLA*
BENTH. IN STREPTOZOTOCIN-NICOTINAMIDE INDUCED DIABETIC
RATS**

AZMAH SA'AT

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RATS**

By

AZMAH SA'AT

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Chairman: Prof. Rozita Rosli, PhD

Faculty : Medicine and Health Sciences

Diabetes is a global health problem. The number of people with diabetes is increasing due to population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. Due to the current global interest on natural or traditional remedies, the present work on *Albizzia myriophylla* or *tebu gajah* may provide another alternative to the treatment of diabetes. Initially, oral glucose tolerance test was carried out in normal rats treated with 5 mg/kg, 25 mg/kg and 50 mg/kg of aqueous bark extract of *Albizzia myriophylla*, respectively. This was then followed by administration of the same extract, at doses of 5 mg/kg and 25 mg/kg, respectively, to normal and streptozotocin-nicotinamide induced diabetic rats for 4 weeks. Subsequently, fasting blood glucose levels, changes in body weight, serum insulin, C-peptide, the liver enzymes including aspartate transaminase, alanine transaminase, the renal function test including urea and creatinine, together with cholesterol and triglyceride level were investigated in normal

and diabetic rats. Additional histological findings of the kidney and liver of normal and diabetic rats were also evaluated. The results of the investigation reinforce the anti diabetic claims of *Albizia myriophylla* whereby significant reduction of the glucose levels were seen in diabetic rats treated with *Albizia myriophylla* at 5 mg/kg and 25 mg/kg for 28 days, compared to diabetic control rats. In addition, normal rats treated with *Albizia myriophylla* at 5 mg/kg and 25 mg/kg did not show any significant changes in the liver enzymes, renal function test and the percentage of necrotic kidney and liver cells compared to normal control rats. This may indicate the safety of consumption of *Albizia myriophylla*. Furthermore, *Albizia myriophylla* at 5 mg/kg has hepatoprotective and nephroprotective effect, as a result of better regulation of blood glucose levels, as suggested by the significant reduction in the liver enzymes, the renal function test and the liver and kidney histology after 28 days of treatment. In conclusion, *Albizia myriophylla* at 5 mg/kg and 25 mg/kg, respectively showed hypoglycemic activity and nephroprotective effect in streptozotocin-nicotinamide induced diabetic rats with no obvious toxicological effects on the liver and kidney. In addition, *Albizia myriophylla* at 5 mg/kg was able to ameliorate the liver damage induced by diabetes.

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

**CIRI-CIRI POTENSI HYPOGLYSEMIA DARIPADA *ALBIZIA MYRIOPHYLLA* BENTH. DI KALANGAN TIKUS DIABETES MELALUI
PENGARUHAN STREPTOZOTOCIN-NIKOTINAMIDA**

Oleh

AZMAH SA'AT

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Diabetes merupakan suatu masalah kesihatan global. Bilangan orang yang menghidapi penyakit diabetis semakin meningkat akibat daripada pertumbuhan penduduk, penuaan, urbanisasi dan peningkatan masalah kegemukan dan ketakaktifan fizikal yang tersebar luas. Pada masa kini, disebabkan peningkatan minat secara global terhadap penggunaan bahan semulajadi sebagai ubatan, kajian terhadap *Albizia myriophylla* atau *tebu gajah* sebagai suatu rawatan alternatif bagi penyakit diabetes telah dijalankan. Pada peringkat awal, ujian toleransi glukosa oral dilakukan terhadap tikus sihat, dengan menggunakan ekstrak air dahan *Albizia myriophylla* pada dos 5 mg/kg, 25 mg/kg dan 50 mg/kg. Ini diikuti dengan pemberian *Albizia myriophylla* pada dos 5 mg/kg dan 25 mg/kg kepada tikus sihat dan selama 4 minggu kepada tikus diabetes melalui pengaruh streptozotocin-nikotinamida. Seterusnya kadar glukosa darah ketika berpuasa, perubahan di dalam berat badan, kadar serum insulin, C-peptida, Kadar enzim hati seperti *aspartate transaminase* dan *alanine transaminase*, ujian fungsi ginjal seperti urea dan

creatinine, bersama dengan kolesterol dan trigliserida, turut dikaji. Di samping itu, kajian histologi terhadap hati dan ginjal tikus yang sihat serta tikus diabetic turut dinilai dan dikaji. Hasil keputusan kajian yang menunjukkan penurunan signifikan di dalam paras glukosa darah apabila tikus diabetik dirawat dengan *Albizia myriophylla* pada dos 5 mg/kg dan 25 mg/kg selama tempoh 28 hari menguatkan pengesahan bahawa *Albizia myriophylla* sememangnya bertindak sebagai anti diabetik. Di samping itu, keputusan kajian juga telah membuktikan bahawa *Albizia myriophylla* adalah selamat untuk digunakan melalui keputusan ujian biokimia dan ujian histopatologi. Kedua-dua ujikaji telah menunjukkan tiada kesan signifikan kepada tikus sihat yang telah dirawat dengan *Albizia myriophylla* pada dos 5 mg/kg dan 25 mg/kg bila dibandingkan dengan tikus sihat tanpa rawatan. Tambahan lagi, *Albizia myriophylla* pada 5 mg/kg didapati dapat membendung kerosakan pada hati dan ginjal akibat pengawalan paras gula dalam darah yang lebih baik, sebagaimana dicadangkan melalui penurunan yang signifikan pada keputusan di dalam ujian enzim hati, ujian fungsi ginjal dan kajian histologi terhadap hati dan ginjal selama tempoh 28 hari kajian dijalankan. Secara keseluruhan, kesimpulan yang boleh dibuat adalah bahawa *Albizia myriophylla* pada dos 5 mg/kg and 25 mg/kg berkebolehan untuk menurunkan paras gula di dalam darah dan membendung kerosakan pada hati dan ginjal di kalangan tikus diabetes melalui teknik pengaruh streptozotocin-nikotinamida tanpa menunjukkan kesan toksik kepada hati dan ginjal. Di samping itu, *Albizia myriophylla* pada dos 5 mg/kg berkebolehan di dalam mengurangkan kesan kerosakan pada hati akibat penyakit diabetes.

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I certify that a Thesis Examination Committee has met on 29th December 2011 to conduct the final examination of Azmah Binti Sa'at on her thesis entitled "**Potential Hypoglycemic Property of *Albiza Myriophylla* Benth. in Streptozotocin-Nicotinamide Induced Diabetic Rats**" in accordance with the Universities and University Colleges 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 declare that the thesis is 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 other institutions.

AZMAH SA'AT

Date: 29 December 2011



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