ABSTRACT

The phytochemical analysis was carried out using hexane, chloroform and water extraction of the leaves and stems of *L. flavescens*. The detection methods used were thin layer chromatography (TLC), high performance liquid chromatography (HPLC) and liquid chromatography mass spectrometry combined with mass spectrometry (LCMS/MS). The TLC of all extracts using three solvents screened for flavonoids, alkaloids, saponins, terpenoids and essential oils. The HPLC have been identified quercetin, gallic acid and tannic acid using authentic standards. The HPLC chromatograms were poorly separated and not very convincing to confirm the three compounds. However the liquid chromatography mass spectrometry combined with mass spectrometry (LCMS/MS) has successfully identified 13 metabolites.

The leaves of water crude extracts showed the highest total phenols have 163.61 GAE mg/g dry mass. While the leaves of hexane crude extracts showed the highest total flavonoids have 145.55 QE mg/g dry mass. The enzymatic bioassay system results showed the highest inhibition of GP is leaves of water extracted 86.56 %, hexane extract of leaves gives 83.58 % GP inhibition, chloroform of leaves extract gives 81.59 % GP inhibition. While the stems of hexane crude extract gives 64.67 % GP inhibition, stems of chloroform extract gives 56.71% and stems of water extract gives 44.77 %. These indicated that the GP inhibitions are due to the presence of phenols and flavonoids. Determination of LC_{50} value of the crude extract from brine shrimp lethality assay (BSLA) showed the highest LC_{50} value was chloroform extraction of stems 609.14 µg/ml, while the lowest LC_{50} value was chloroform extract from leaves 21.54 µg/ml.

The effect of *L. flavescens* in alloxan induced diabetic rats such determination the oral glucose tolerance test (OGTT) in normal rats showed the leaves and stems water extract at doses of 0.2 g/kg and 0.5 g/kg produced a maximum fall at 60 minutes after glucose administration, the determination acute toxicity of *L. flavescens* in normal rats showed the water extract of *L. flavescens* did not show any mortality and none of the treated rats showed any visible symptoms of toxicity up to a doses of 0.5 g/kg. The effects of administration of *L. flavescens* extracts in diabetic rats by measuring fasting blood glucose level (FBGL) of leaves and stems of water extract at 0.2 g/kg and 0.5 g/kg significantly decreased the FBGL of the diabetic rats from an initial level and became to normal by 20th day, the effect on serum lipid profile and liver function study showed the administration of the leaves and stems (0.2 g/kg and 0.5 g/kg) of *L. flavescens* water extract and Glipizide (5 mg/kg) tended to bring significantly toward normal values. The changes in body weight (BW) were no significant difference between the *L. flavescens* water extract and Glipizide in diabetic rats treated. These showed that the *L. flavescens* water extract can control in the loss of body weight as compared to the diabetic control group that loss of body weight.

ABSTRAK

Analisis fitokimia telah dijalankan menggunakan ekstrak heksana, klorofom dan air dari daun dan batang *L. flavescens*. Kaedah analisis yang digunakan ialah "*thin layer chromatography"*(TLC), "*high performance liquid chromatograhy"*(HPLC) dan "*liquid chromatography mass spectrometry combined with mass spectrometry"*(LCMS / MS). Analisis TLC menunjukkan ekstrak-ekstrak tersebut mengandungi flavonoid, alkaloid, saponin, terpenoid dan minyak pati. HPLC telah mengenalpasti quercetin, asid Gallic dan asid tannic menggunakan standard yang sahih. Kromatogram HPLC menunjukkan kurang pengasingan sebatian dan pengesahan tiga sebatian tidak begitu meyakinkan. Walau bagaimanapun, "*liquid chromatography mass spectrometry combined with mass spectrometry"* (LCMS-MS) telah berjaya mengenal pasti 13 jenis metabolit.

Ekstrak mentah air daun menunjukkan jumlah fenol tertinggi 163.61 GAE mg / g berat kering. Manakala ekstrak mentah heksana daun menunjukkan flavonoid jumlah tertinggi 145.55 QE mg / g berat kering. Keputusan bioesei sistem enzim menunjukkan perencatan tertinggi glikogen fosforilase (GP) ekstrak air daun 86.56%, ekstrak heksana daun menunjukkan perencatan 83.58% GP, ekstrak klorofom daun menunjukkan perencatan 81.59% GP. Manakala ekstrak mentah heksana batang menunjukkan perencatan 64.67% GP, ekstrak klorofom menunjukkan 56.71% dan ekstrak air menunjukkan 44.77%. Ini menunjukkan bahawa perencatan GP adalah disebabkan kehadiran fenol dan flavonoid. Penentuan LC_{50} nilai ekstrak mentah dari "*brine shrimp lethality assay"*(BSLA) menunjukkan nilai LC_{50} tertinggi adalah pengekstrakan klorofom daripada batang adalah 609.14 μg / ml, manakala nilai LC_{50} yang terendah adalah klorofom daripada daun 21.54 μg / ml.

Kesan *L. flavescens* terhadap tikus diabetis (suntikan alloxan) ditentukan oleh "*oral glucose tolerance test"* (OGTT) pada tikus normal (tanpa diabetis) menunjukkan ekstrak air daun pada dos 0.2 g / kg dan 0.5 g / kg menghasilkan penurunan maksimum pada 60 minit selepas pengambilan glukosa, penentuan ciri ketoksikan *L. flavescens* pada tikus normal menunjukkan ekstrak air *L. flavescens* tidak menunjukkan apa-apa kematian dan tikus yang dirawat tiada menunjukkan sebarang gejala yang kelihatan ketoksikan hingga kepada dos 0.5 g / kg. Kesan pengambilan ekstrak air *L. flavescens* terhadap tikus diabetis dengan mengukur paras glukosa darah puasa (FBGL), daun dan batang ekstrak air pada dos 0.2 g / kg dan 0.5 g / kg menurunkan FBGL tikus diabetis dari peringkat awal rawatan dan menjadi normal pada hari ke-20 rawatan, kesan ke atas profil lipid serum dan fungsi hati kajian menunjukkan pengambilan ekstrak air daun dan batang *L. flavescens* (0.2 g / kg dan 0.5 g / kg) dan Glipizide (5 mg / kg) cenderung mengembalikan kepada keadaan normal. Perubahan berat badan (BW) pada tikus diabetik yang diberi rawatan tiada perbezaan yang signifikan antara ekstrak air *L. flavescens* dan Glipizide. Ini menunjukkan bahawa ekstrak air *L. flavescens* boleh mengawal kehilangan berat badan berbanding dengan kumpulan kawalan diabetis yang kehilangan berat badan.

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