**UNIVERSITI TEKNOLOGI MARA**

# EFFECT OF *Labisia pumila* AQUEOUS EXTRACT ON THE ESTROGENIC ACTIVITY AND METABOLIC DISEASE MARKERS IN BILATERAL OVARIECTOMIZED RATS

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**MSc**

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# AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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# ABSTRACT

Menopause is a permanent cessation that occurs in women in Malaysia is between 45 to 55 years old. It is often associated with increased body weight and body fat distribution due to the deprivation of estrogen hormone. *Labisia pumila* is an herbal plant that Malaysian women widely consume as a herbal tonic. This herb helps in regulating menstruation, feminine vitality and hormonal imbalance. It is speculated to exhibit phytoestrogenic activity that has similar structures to estrogen hormone. This study was conducted to determine the antioxidant activities i.e., total phenolic and flavonoids; and the present of polyphenols compound in commercially produced *L. pumila* aqueous extract with excipients (LPE). The study also aimed to assess the acute and subacute oral toxicity studies; and to evaluate the effects of supplementation of the LPE on body weight changes, female reproductive hormone (estradiol, follicle-stimulating hormone, and luteinizing hormone) and metabolic disease marker (glucose, insulin, adiponectin, leptin, and resistin) of menopause induced rats. In antioxidant activities, LPE was high in total phenolic content with 58.42 ± 5.42 mg GAE/g compared to the total flavonoids content is 0.91 ± 0.06 mg QuE/g. Moreover, five polyphenols, which were gallic acid, caffeic acid, vanillin, cinnamic acid and rutin, were identified in the LPE extract. In acute toxicity studies, six female Wistar rats at eight weeks were randomly divided into two groups: Normal (NC) and LPE 2000 (2000 mg/kg) and were administered with the extract on day one and observed for 14 days. While in subacute toxicity studies, forty-two female Wistar rats at eight weeks was randomly divided into seven groups: Normal control (NC), LPE 50 (50 mg/kg/day, LPE 250 (250 mg/kg/day), LPE 500 (500 mg/kg/day), LPE 1000 (1000 mg/kg/day), satellite control (SC) and satellite treatment (ST 1000 mg/kg/day). Rats from respective groups were administered accordingly to respective dosages for 28 days. The administration of LPE in acute and subacute toxicity studies did not show any signs of toxicity effects or morbidity. The blood serum biochemistry analysis and haematological analysis did not show major statistically significant changes ($p>0.05$). While in estrogen activities studies, thirty-six female Wistar rats at 8 weeks old underwent bilateral ovariectomy procedure and after thirty-days of the recovery period, the rats were randomly divided into six groups: Normal (SHAM), ovariectomized (OVX), LPE 17.5 (17.5 mg/kg/day), LPE 35 (35 mg/kg/day), LPE 75 (75 mg/kg/day) and positive control (CEE). The results showed that 60-day treatment with LPE at doses of 35 mg/kg resembled the estradiol level in the SHAM control group. There was a significant elevation of estrogen, suppression of LH and FSH compared to the OVX control group ($p>0.05$). In metabolic disease markers, the administration of LPE at a dose 35 mg/kg improved adipocytokines involved in the development of the metabolic disease. Overall, these studies suggest commercialized LPE possesses phytoestrogen or estrogenic effects that can reduce post-menopausal symptoms and the risk of developing metabolic disease caused by post-menopausal effects.

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