

**UNIVERSITI TEKNOLOGI MARA**

***PRISMATOMERIS GLABRA:*  
ERGOGENIC EFFECTS AND SEXUAL  
FUNCTION IN MICE**

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of the requirements for the degree of  
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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.

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## ABSTRACT

A decoction of the roots of *Prismatomeris glabra* (PG), family Rubiaceae, has been traditionally used by rural people for wellness, improvement of stamina and for aphrodisiac effects. However there were no scientific data to support the folkloric use of this plant. This research was thus conducted to determine whether aqueous extract of *P. glabra* roots possess antioxidant capacity, produce ergogenic effects and improve sexual function. Toxicity studies were performed to estimate safety for human consumption. PG extract was prepared by boiling powdered roots for 10 minutes before drying in spray dryer. Toxicity studies in mice were conducted for acute, subacute and subchronic effects. OECD guidelines were used for 14-day observation following acute dose given to male and female mice intraperitoneally. In all experiments, age-matched control mice were given normal saline. Gross necropsy, hematology and biochemistry analyses were conducted following killing. Toxicity studies *in vitro* were conducted using selected cell lines. Antioxidant capacity was determined *in vitro* and *in vivo* using established methods. Ergogenic effects were studied in weight-bearing mice performing forced swim test (FST) to exhaustion following treatment with 500 mg/kg/d p.o. PG. Mice were killed immediately after the final FST for blood biomarker assays. Castrated/non-castrated mice were used to determine the effect of PG (500 mg/kg/d p.o.) on testosterone levels. Males were introduced to sexually receptive female for mounts and intromissions activities assessment. *In vitro*, cultured Leydig cells (CRL1714) were treated with PG for testosterone production. Results show PG to be safe. Mice were able to tolerate PG to a maximum single dose of 3 g/kg, p.o., 500 mg/kg/d, p.o., daily for 14 days, and at 100 mg/kg/d, p.o., daily for 3 months, respectively, without showing signs of toxicity or abnormal biochemical markers and hematology. PG also showed no genotoxic and cytotoxic effects. Results also show PG is a potent antioxidant when phenolic content, lipid- and water-soluble antioxidant capacities of PG were  $6.82 \pm 0.71\%$ ,  $36.61 \pm 1.39$   $\mu\text{g}/\text{mg}$  of ascorbic acid equivalent and  $8.28 \pm 1.23$   $\mu\text{g}/\text{mg}$  of trolox equivalent, respectively. PG scavenged DPPH radicals, reduced ferric ions and inhibited *tert*-BOOH-induced lipid peroxidation with values of  $239.31 \pm 70.48$   $\mu\text{g}/\text{ml}$  ( $\text{EC}_{50}$ ),  $0.298 \pm 0.026$   $\mu\text{mol Fe}^{2+}/\text{mg}$  and  $188.7 \pm 15.3$  ( $\text{IC}_{50}$ ), respectively. PG also did not affect malondialdehyde levels of major organs and plasma. In ergogenic studies, mice treated with PG showed greater exercise performance than control ( $p=0.000$ ) or L-arginine ( $p=0.001$ ) groups. Post-exercise blood glucose levels of PG-treated mice was greater than those of control exercised ( $p=0.011$ ) but similar to control non-exercised and L-arginine groups. PG did not influence blood lactate and serum corticosterone following exercise. Testosterone and corticosterone were also not influenced by administration of PG. Mice treated with PG showed greater frequency of mounting than control in 1<sup>st</sup> ( $p=0.021$ ) and 2<sup>nd</sup> ( $p=0.032$ ) sexual meeting. PG-treated mice also showed greater intromission duration ( $p=0.01$ ) and frequency ( $p=0.02$ ) than control in 3<sup>rd</sup> meeting. PG also had no effect on luteinizing hormone. In conclusion, based on toxicity data, PG root aqueous extract is generally safe for consumption. PG roots may not be an important source of antioxidants although it apparently has sufficient antioxidant capacity to enhance wellness. Findings of this study provide evidence to confirm the traditional use of PG roots to increase stamina; improve physical performance and as aphrodisiac.

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