

UNIVERSITI TEKNOLOGI MARA

**COMPARATIVE REPRODUCTIVE
ASSESSMENT OF MALE MICE, *Mus
musculus* FOLLOWING
CONSUMPTION OF ETHANOLIC
EXTRACT OF *Averrhoa bilimbi*,
Cosmos caudatus AND *Pereskia bleo***

MARYSIA JULIUS BOOH

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ABSTRACT

Averrhoa bilimbi, *Cosmos caudatus* and *Pereskia bleo* are among the local herbs found in Malaysia. These plants are frequently consumed due to the belief that they are able to strengthen and boost up general health, besides prevalently used in traditional medication. The present study assessed the reproductive potential of male ICR mice treated with ethanolic extract of *A. bilimbi*, *C. caudatus* and *P. bleo* plants, following the Organization for Economic Co-operation and Development (OECD) Guidelines 407 and 421. The evaluation involved 4 dosages of 50, 125, 500 and 1000 mg/kg b.wt of each plant, with 5 male mice per treatment. Meanwhile, mating analysis involved groups that gave higher and lower sperm quality only, where each of the treated male mice from the selected groups were mated with 3 female mice. The control group received saline. Treatment with *A. bilimbi* extract at 500 and 1000 mg/kg b.wt both had significantly reduced sperm count to $24.8 \times 10^6/\text{ml}$ and $20.8 \times 10^6/\text{ml}$, respectively, and produced the lowest percentages of normal sperm morphology with $28.40 \pm 1.86\%$ and $23.60 \pm 4.96\%$, respectively, as compared to control mice ($52.20 \times 10^6/\text{ml}$ of sperm count and $66.60 \pm 5.44\%$ of normal sperm morphology). All concentrations of *A. bilimbi* extract also had significantly reduced testosterone level (177.83 ± 0.03 pg/ml, 266.07 ± 0.05 pg/ml, 281.48 ± 0.03 pg/ml and 266.07 ± 0.00 pg/ml) compared to control mice (515.82 ± 0.01 pg/ml). Significant detrimental effects of *A. bilimbi* extract were observed on the mean diameter of seminiferous tubules and width of spermatocytes layer at all concentrations and reduced width of spermatogonial layer, at both 50 and 1000 mg/kg b.wt. However, treatment of *A. bilimbi* at 125 mg/kg b.wt had improved the spermatogenic cells. Meanwhile, *P. bleo* extract had significantly reduced width of spermatogonial layer at all concentrations (12.22 ± 0.49 μm , 11.48 ± 0.45 μm , 10.78 ± 0.59 μm and 11.28 ± 0.48 μm) compared to control mice (15.56 ± 0.61 μm). *P. bleo* treatment also recorded significant reduction on the diameter of seminiferous tubules, at 50 and 500 mg/kg b.wt and width of spermatocytes layer, at 500 and 1000 mg/kg b.wt. Similarly, *C. caudatus* caused significant reductions on width of spermatocytes layer at 500 mg/kg b.wt (21.23 ± 1.05 μm) and width of spermatogonia layer at 500 and 1000 mg/kg b.wt (12.99 ± 0.86 μm and 10.72 ± 0.45 μm , respectively). However, significant enlargement on the width of spermatid-sperm layer (36.23 ± 1.61 μm and 33.56 ± 1.73 μm , respectively) was recorded with 125 and 1000 mg/kg b.wt of *P. bleo* treatments, and improvement of spermatogenic cells at 1000 mg/kg b.wt of *C. caudatus* and both at 50 and 125 mg/kg b.wt of *P. bleo* extracts. Male mice treated with 500 mg/kg b.wt of *C. caudatus* had impregnated all females (100%) and produced higher means of pups ($30.50 \pm 1.55\%$), followed by treatment of 125 mg/kg b.wt of *A. bilimbi*, with $93.40 \pm 6.60\%$ mean of pregnant females and $30.40 \pm 2.71\%$ of pups. The lowest values were recorded in males treated with 125 mg/kg b.wt of *P. bleo* with $33.50 \pm 19.34\%$ and $10.25 \pm 5.92\%$, respectively, of pregnant females and pups. Therefore, the findings support the usage of *C. caudatus* in traditional medication to circumvent infertility. The study also discovered the potential of *A. bilimbi* in improving male fertility as well as procurement of *P. bleo* plant in reducing male reproductive performance at 125 mg/kg b.wt from *A. bilimbi* and *P. bleo* ethanolic extracts. Hence, the reproductive enhancing capacity of ethanolic extracts of the selected plants in male mice can be ranked as *C. caudatus* > *A. bilimbi* > *P. bleo*.

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