

**UNIVERSITI TEKNOLOGI MARA**

**REPRODUCTIVE, BIOCHEMICAL  
AND HAEMATOLOGICAL  
PARAMETERS OF MALE MICE  
TREATED WITH *Cosmos caudatus*, *Piper  
sarmentosum* AND *Premna cordifolia*  
ETHANOLIC EXTRACT**

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## ABSTRACT

Over the past decades male infertility cases have alarmingly increased among men worldwide. This issue calls for treatments. However, based on previous studies, existing treatments gave detrimental effects on male health especially on the male reproductive system itself. Thus, this study aims to discover new natural-based treatment that will enhance the reproductive parameters and at the same time gave insignificant side effects on the body system. This study was conducted to compare the effects of *Cosmos caudatus*, *Piper sarmentosum* and *Premna cordifolia* ethanolic extracts treated mice on haematological, biochemical, hormonal, reproductive parameters, selected organs histological structure and body weight changes. Twenty four sexually matured male mice were divided into 4 groups with 6 mice each. Group 1 (n=6) was given 0.9% saline solution (SS) and served as the control. Groups 2-4 (n=6, each group) were administered orally with 500 mg/kg bwt of CCEE, PSEE and PCEE respectively, for 30 days. The body weights were recorded before and after the treatments. MCHC of PSEE group was significantly higher than SS and CCEE groups but insignificant to PCEE group. In biochemical analysis, alanine aminotransferase (ALT) concentration of CCEE treated mice ( $45.13 \pm 0.65$  U/L) was significantly higher ( $p < 0.05$ ) than SS ( $27.85 \pm 1.77$  U/L) and PSEE ( $30.90 \pm 2.86$  U/L) groups. Meanwhile, aspartate aminotransferase (AST) concentration in PCEE group ( $128.73 \pm 10.91$  U/L) was significantly higher ( $p < 0.05$ ) than SS group ( $57.68 \pm 3.36$  U/L). The total protein of CCEE treated mice ( $71.00 \pm 3.06$  g/L) was significantly higher ( $p < 0.05$ ) than SS ( $54.55 \pm 1.21$  g/L) and PSEE ( $56.30 \pm 0.86$  g/L) groups but not to PCEE group ( $64.20 \pm 3.46$  g/L). Testosterone level of PSEE treated mice ( $4.47 \pm 0.87$  ng/ml) was significantly higher ( $p < 0.05$ ) in comparison with SS ( $2.12 \pm 0.71$  ng/ml), CCEE group ( $1.77 \pm 0.14$  ng/ml) and PCEE ( $2.32 \pm 0.21$  ng/ml). Sperm motility of mice treated with PSEE ( $47.17 \pm 5.93\%$ ) significantly increased ( $p < 0.05$ ) compared to only SS group ( $16.60 \pm 4.26\%$ ). PCEE treated mice significantly decreased ( $p < 0.05$ ) the percentage of normal sperm morphology ( $70.80 \pm 3.76\%$ ) compared to SS group ( $92.78 \pm 2.51\%$ ). PCEE group showed significantly the highest score ( $9.43 \pm 0.04$ ) in Johnsen scoring when compared to SS ( $8.98 \pm 0.05$ ) and CCEE ( $9.29 \pm 0.04$ ) groups. Both testis and cauda epididymis tissue sections from all groups showed normal morphology. However, liver and kidney of CCEE and PCEE treated mice showed minor histological changes. In conclusion, PSEE has the potential in enhancing sperm parameters with insignificant side effects to the studied organs.

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# CHAPTER ONE

## INTRODUCTION

Chapter One consisted of the background, problem statement, significance, objectives, the scope and limitations of the study.

### 1.1 Background of the Study

The global fertility rate has shown an alarming decline for the past 50 years with estimation of 2.5 children per woman in the present year (Roser, 2019). According to the Vital Statistics Malaysia 2018 Report, total fertility rate (TFR) has been continuously declining for the past 38 years with 1.9 babies per woman in Malaysia (Mahidin, 2018). This number is expected to further decline to as low as 1.8 babies per woman in 2030 (United Nations, 2015). Unfortunately, due to cultural notion and natural child-bearing ability, females are likely to be blamed. However, various studies have proven the contribution of male reproductive parameters abnormalities as one of the contributing factors. Previous study conducted revealed 8-12% couples worldwide were affected with infertility and impaired fecundity, by which 50% were contributed by male factor. Up to 2% of males in those cases showed suboptimal sperm parameters. The males either exhibited low sperm count, poor sperm motility, abnormal morphology of sperm or worse, any combination of the above mentioned (Kumar and Singh, 2015). A staggering amount of 40% decline of semen quality includes semen quality in Malaysia includes semen volume, sperm counts, progressive sperm motility percentage and sperm morphology (Fong, 2015).

Local and global studies have shown the decrease in sperm parameters qualities are contributed by many factors including, stress (Abd Wahab, 2010; Loughlin, 2012). Unconsciously, living a stressful lifestyle can lead to elevated cortisol level activated by the hypothalamic–pituitary–adrenal axis. Increased in cortisol level then resulted in an increase of reactive oxygen species (ROS) causing oxidative stress that negatively affecting all body systems, including reproductive function (Pressman *et al.*, 2018). The oxidative stress may induces an increase in seminal plasma malondialdehyde (MDA) and decreases the superoxide dismutase (SOD) levels, which could lead to disturbance