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**EFFECT OF PATERNAL SUPPLEMENTATION OF PALM OIL
(Tocotrienol Rich Fraction) ON MALE FERTILITY**

BY

NORZEILA BINTI SULAIMAN

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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 result 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 Undergraduate, University Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Norzeila Binti Sulaiman
Student I.D No : 2012672732
Programme : Bachelor of Medical Laboratory Technology (Hons)
Faculty : Faculty of Health Science
Title : Improvement of Male Fertility Through Supplementation of Tocotrienol Rich Fractions

Signature of Student : 

Date : July 2015

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ABSTRACT

Infertility is a biological inability of an individual to conceive and half of the cases are related to male infertility. Tocotrienols, a component of vitamin E, demonstrated the ability to improve the functions of male reproductive system. This study was performed to investigate the anti-infertility effects of Tocotrienol Rich Fractions (TRF) from palm oil extract on male rat model. Fifteen male Wistar rats were randomly divided into 5 groups (n=3). Control negative group (F) was orally administered with distilled water (0.1 ml), control positive group (G) was orally administered with vitamin E-free corn oil (0.1ml) and treated groups were orally administered with three different concentrations of TRF, at a dose of 30 mg/kg (H), 60 mg/kg (I) and 90 mg/kg (J) respectively. After 7 days of acute treatment, the blood of the rats was collected using retro orbital sinus technique for biochemical investigation and hormonal analysis. The rats were sacrificed using cervical dislocation. The sperm were collected from cauda epididymis for analysis. TRF supplementation induced improvement in sperm morphology and motility compared to control negative group (F). In similar manner, TRF also provide positive effects to liver and renal function by reducing blood glucose and bilirubin level. Hormonal analysis demonstrated the ability of TRF to enhance LH production, which enhance spermatogenesis, thus helps in boosting fertility. This study suggested that TRF possesses the potential as anti-infertility agent and beneficial to the renal and liver function.

CHAPTER ONE

INTRODUCTION

1.1 Background

Approximately 15% of couples around the world are affected by infertility. Half of the cases are due to male factor (Lombardo et al, 2011). Infertility in male is due to various problems with sperm. The exact causes to each of these problems are currently being studied extensively. There are major concerns relating to paternal factors, including the effects of lifestyle habits such as smoking, alcohol consumption, and obesity as well as the environment and workplace effects on fertility. Researchers have also attempt to find a connection between male infertility with the overproduction of reactive oxygen species (ROS) and hormonal effects. Over the years, they have found a strong link between reactive oxygen species (ROS) and sperm deficiency. They revealed that ROS production is increased by abnormal sperm morphology and during lipid peroxidation (Sharma and Agarwal, 1996: Armstrong et al., 1999).

These findings have prompted researchers to turn to antioxidants as the likely candidate that holds the answer to these problems. Antioxidants certainly live up to expectations by being a reliable protector of cell membrane against ROS and lipid peroxidation, as well as improving sperm deficiency and anomalies. However, further studies suggested that the antioxidants produced by the body are not enough for strong protection, and therefore started investigating on the in vitro antioxidant supplementation (Bansal & Bilaspuri, 2009).

Vitamin E is the major component of the antioxidant system responsible in protecting the sperm. Vitamin E is composed of tocopherols and tocotrienols that have 4 different isomers in each of them (α , β , γ , and δ). It is known as a fat-soluble vitamin that can contribute to human health, especially in fertility and oxidative stress. Findings from previous studies revealed the effectiveness of Vitamin E in providing protection to sperm motility, in addition to help improving fertilization rate in men with decreased sperm motility (Suleiman et al., 1996). This study is aimed to focus on the antioxidant properties of one of the components of vitamin E which is tocotrienols, sourced from palm oil, also known as tocotrienol rich fractions (TRF).