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THE EFFECTS OF *EURYCOMA LONGIFOLIA* AND *POLYATHIA BULLATA* ON ENZYME CYP17A1 EXPRESSION AND ANDROSTENEDIONE LEVELS IN MALE SPRAGUE-DAWLEY RATS

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ABSTRACT

Eurycoma longifolia (Simaroubaceae family), famously known as "Tongkat Ali" in Malaysia, is a popular traditional remedy to improve male sexual libido, sexual dysfunction, power tonic and male idiopathic infertility. *Polyalthia bullata* (Annonaceae family), also known as "Tongkat Ali Hitam" by the local, is a plant that is known traditionally due to its aphrodisiac properties. This study is about the effects of both plants on the morphometric changes, enzyme CYP17A1 expression and the androstenedione level in healthy male Sprague-Dawley rats. 24 male rats were divided into control group, *E. longifolia* group, and *P. bullata* group with 8 rats in each group respectively. Both treatment groups were given dose of 800 mg/kg body weight of both plants that were orally administered daily for 14 days. The control group was given distilled water. The gene expression of enzyme CYP17A1 was carried out by Real-time PCR and the fold change value was calculated using the 2^-ddct method. The androstenedione level was determined by using the enzyme-linked immunosorbent assay (ELISA) method using the blood serum from the rats. The morphometric study showed that *P. bullata* significantly ($p<0.05$) decreases the body weight of the rats, while the reproductive organs weight showed no significant difference between the groups. Androstenedione level of the rats showed a significant ($p<0.05$) decrease in group treated with *P. bullata* when compared to control group. Gene expression of CYP17A1 enzyme showed a trend of upregulation up to 5-folds and 0.8-fold for *E. longifolia* and *P. bullata* treated group. However, this data is not significant ($p>0.05$). Therefore, the above study provides information on the effects of *E. longifolia* and *P. bullata* regarding the aphrodisiac properties of both plants based on the morphometric changes, enzyme CYP17A1 expression and androstenedione level.

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CHAPTER 1: INTRODUCTION

Aphrodisiac is an agent that has the ability to enhance sexual libido or sexual desire either through performance or the sexual organs itself (Krychman, Gubili, Pereira, Holstein, & Cassileth, 2007). It is marketed in variety of products or form including beverages, food, vitamins, minerals and synthetic substances. The possibility of bioactive aphrodisiacs which may be derived from plants, animals or minerals, has attract many interest throughout the recorded history (Taur & Patil, 2011).

Aphrodisiac plants had been widely used traditionally and had been passed down from generation to generation. A total of four species are being referred by locals with the name Tongkat Ali which are *Eurycoma longifolia, Entomophthora apiculata, Polyalthia bullata* and *Goniothalamus sp.* Among them, *E. longifolia* is known to be the most widely used species among the locals (Athimulam, Kumaresan, Foo, Sarmidi, & Aziz, 2006). *E. longifolia* contains multiple classes of biologically active compounds such as quassinoids group which are β-carboline alkaloids, canthin-6-one alkaloids, triterpene-type tirucallane, squalene derivatives and bioactive steroids. There are also active compound eurycolactone, eurycomalactone, laurycolactone and biphenyl neolignan found in the plant (Rehman, Choe, & Yoo, 2016).