

THE EFFECT OF POLYSACCHARIDES KRESTIN BIOACTIVITY FROM *Coriolus versicolor* TO ESTRADIOL LEVELS ON *Mus musculus* ESTROUS CYCLE

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ABSTRACT

This study aimed to determine the activity of polysaccharide krestin (PSK) from *Coriolus versicolor* extract to the duration of estrous cycle and estradiol levels. PSK was administrated for 24 days in female *Mus musculus*, strain Balb/C, 10 weeks old, weight about 25-30 grams. Polysaccharide krestin given in sub-chronic dose. There were 4 groups, i.e K0 (0 mg/kg BW), P1 (15 mg/kg BW), P2 (30 mg/kg BW), and P3 (60 mg/kg BW). Each treatment group contained 7 replications. Data were analyzed using One Way ANOVA and Duncan test at $\alpha = 5\%$. The duration of estrous cycle was determined by vaginal smear methods. The estradiol levels were measured using ELISA kit. The results show that the administration of PSK decreased the duration of estrous cycle with an average of 4.4 days. Polysaccharide krestin dose of 15 and 60 mg/kg BW did not affect the estradiol levels. Decrease of estrous cycle duration was still in the range of normal estrous time between 4-6 days. PSK dose of 15 and 60 mg/kg BW can be used as a therapeutic dose.

Keywords: polysaccharides krestin (PSK), *Coriolus versicolor*, estrous cycle, estradiol

INTRODUCTION

The usage of mushroom as anti-viral and anti-cancer has been proven. More than 50 species have been tested on animals. *Coriolus versicolor* mushroom or yun zhi been known at the time of the Ming Dynasty of China. The mushroom is classified in sub-class Homobasidiomycetes and family Polyporaceae (Ho *et al.*, 2006).

Polysaccharopeptide can be obtained from *C. versicolor*, known as *Coriolus versicolor* polysaccharides (CVP) or polysaccharides krestin. The main component of PSK is β -glucan (Zhang *et al.*, 2001). Polysaccharides krestin have many pharmacological activities, as an adjuvant in the immune system (Noguchi *et al.*, 1995), increasing the number of leukocytes and macrophages (Wahyuningsih, 2006).

With the facts and the description above, the benefits of PSK from the mushroom *C. versicolor* is not in doubt. Nevertheless, PSK component is not necessarily safe. Excessive use may cause a bad influence. According Murtini *et al.* (2010), all the substances that enter into body would potentially be toxic materials. The toxicity of the material depends on the dose consumed and the long period of usage.

PSK is beneficial to increase the production of cytokines, such as interleukin-1 (IL-1), IL-2, IL-4, IL-6, IL-7 and IL-8 (Noguchi *et al.*, 1995). Cytokines IL-1, IL-2,

and IL-6 give a signal to the brain to activate the hypothalamic-pituitary-adrenal (HPA) axis in response to an immune stress. HPA axis actively stimulates the secretion of adrenocorticotrophic hormone (ACTH). The ACTH stimulates the secretion of glukortikoid. If the use of PSK in the long run, it will increase the secretion of gluco-corticoids and will suppress the HPG axis at a rate supra-pituitary. It will suppress gonadotropin-releasing hormone (GnRH) produced by the anterior pituitary. A decrease of GnRH will reduce production of the reproduction hormone, such as follicle stimulating hormone (FSH) and luteinizing hormone (LH). GnRH suppression can reduce the production of FSH and LH. Decrease of FSH production will inhibit the ovarian follicles maturation, thus it also inhibits ovulation. If ovulation is inhibited, it will extend the duration of the estrous cycle. LH decline will also affect the production of the hormone estrogen or estradiol (Kirby *et al.*, 2009).

The estrous cycle is a period that is physiologically can receive a stud or a series of events related to the preparation of the uterus for the reception and implantation of the ovum. The estrous cycle can be divided into four stages: proestrus, estrus, metestrus, and diestrus. This cycle coincides with the maturation of ovarian follicles stimulated by FSH. FSH production stimulated by GnRH (Freeman, 1994; Sarkar *et al.*, 1976).

Estrogen is a female reproductive hormone in animals. This hormone is mainly secreted by the granulosa cells of ovarian follicles constituent. Estrogen takes role on GnRH regulation. On the basis of this study wanted to test the effect of extracts of PSK from *C. versicolor* against the estrous cycle length and estradiol levels in mice (*Mus musculus*).

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