

PHAGOCYTOSIS INDEX OF PERITONEAL MACROPHAGES OF MICE INDUCED BY SALMONELLA TYPHI WITH SPIRULINA PLATENSIS TREATMENT

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PHAGOCYTOSIS INDEX OF PERITONEAL MACROPHAGES OF MICE INDUCED BY *SALMONELLA TYPHI* WITH *SPIRULINA PLATENSIS* TREATMENT

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ABSTRACT : *Salmonella typhi* or *Salmonella paratyphi* causes typhoid fever. Typhoid fever often occurs in developing countries like Indonesia. This disease reaches a prevalence level of 358 - 810 / 100,000 population in Indonesia. Treatment of typhoid fever using chloramphenicol can cause the emergence of resistance, thus triggering an increase in the number of new sufferers and typhoid carriers that make a vicious cycle of infection spreading. Therefore, the new preventive alternative made from nature with low side effects that are immunomodulatory to improve the immune system and prevent the body from infection with *Salmonella typhi*. One of the natural ingredients that have immunomodulatory activity is microalgae *Spirulina platensis*. The purpose of the study is to determine the effect of *Spirulina platensis* as an immunomodulator on the phagocytosis index of macrophages in mice infected with *Salmonella typhi*. This type of research is an experimental laboratory research design using the Post Test Only Control Group Design. The population in this study was 24 male Balb/c mice treated with *Spirulina platensis* 400 mg/kg, 800 mg/kg and *Salmonella typhi* and then a specimen of peritoneal fluid was then used taken. To examine the macrophage index. The data obtained were analyzed using the One-Way ANOVA Test. The average value of the phagocytosis index in the positive control group was 2.17. This value is lower than the positive control group of 2.49. While, the treatment group given *Spirulina platensis* 400 mg/KgBB and 800 mg/KgBB phagocytosis index value was higher than the control group, 4.10 and 5.21. From the One-Way ANOVA test, the value of $p < 0.05$ was obtained. The conclusion *Spirulina platensis* administration affected the phagocytosis index of peritoneal macrophages of mice infected with *Salmonella typhi*.

Key words : *Salmonella typhi*, medicine, *Spirulina*, phagocytosis index, communicable disease, infectious disease.

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INTRODUCTION

Salmonella typhi or *Salmonella paratyphi* causes typhoid fever. *Salmonella* infections are responsible for the burden of morbidity and mortality worldwide. WHO estimates that around 11–21 million cases of typhoid fever and approximately 128,000–161,000 deaths each year, most of which occur in South and Southeast Asia (WHO, 2018). In Indonesia, typhoid fever cases have been reported to typhoid and national paratyphoid monitoring systems. This disease reaches a prevalence level of 358 - 810 / 100,000 population in Indonesia. The treatment of typhoid fever so far is still using chloramphenicol. Still,

the ease of obtaining this antibiotic and its improper use increases licensing so that it can increase the number of new sufferers and typhoid countermeasures (Maulana, 2019). One of the natural ingredients with immunomodulatory activity is microalgae *Spirulina platensis*, which contains antioxidant composition (β -carotene and phycocyanin), essential fatty acids and essential proteins (Wu *et al*, 2016). The content in *Spirulina platensis* can be accessed by cytokine secretions such as IL-2, IL-12, IL-4, IL-10 and INF- γ , which ultimately cannot directly support the increase in macrophage cells (O'Shea *et al*, 2004; Aryaean *et al*,

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