PENGARUH *Euglena gracilis* TERHADAP PROFIL LEUKOSIT, FAGOSITOSIS MAKROFAG, DAN KADAR IgG TIKUS (*Rattus norvegicus* (Berkenhout, 1769)) YANG DIINDUKSI *Escherichia coli*

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INTISARI

Infeksi bakteri *E. coli* merupakan masalah kesehatan yang serius karena dapat menyebabkan diare, sepsis, dan resistensi antibiotik. Alternatif penanganan infeksi *E. coli* adalah menggunakan imunostimulan alami seperti *E. gracilis*, mikroalga penghasil β-1,3-glukan yang diketahui memiliki potensi imunomodulator. Penelitian ini bertujuan untuk mengevaluasi pengaruh ekstrak *E. gracilis* terhadap profil leukosit, fagositosis makrofag, dan kadar IgG pada tikus (*Rattus norvegicus* (Berkenhout, 1769)) yang diinduksi *E. coli*. Tikus jantan umur 2-3 bulan dengan berat rata-rata 200 gram dibagi dalam 5 kelompok: 3 kelompok perlakuan dengan konsentrasi ekstrak 250, 500, dan 750 mg/kg BB, kontrol negatif (tanpa induksi dan ekstrak), serta kontrol positif (diinduksi *E. coli*). Ekstrak diberikan secara per Oral dan induksi bakteri dilakukan secara intraperitoneal selama 10 hari. Koleksi darah dilakukan melalui *retro-orbital plexus*. Parameter yang diamati meliputi profil leukosit dari plasma darah tikus dengan metode *Automated Hematology Analyzer,* kadar IgG dari serum darah tikus dengan metode ELISA, dan fagositosis makrofag dari cairan peritoneal dengan metode *Macrophage Phagocytosis Assay* (*in vitro*). Data dianalisis menggunakan uji analisis statistik (normalitas dan homogenitas), uji perbandingan parametrik (*One-Way, Welch's* dan *Repeat Measures* ANOVA), uji perbandingan non-parametrik (*Kruskal-Wallis* dan *Friedman Test*), dan uji lanjutan (*Tukey* dan *Games-Howell Post Hoc*, *Mann Whitney U-Test* dan *Wilcoxon Signed-Rank Test*). Hasil penelitian menunjukkan bahwa ekstrak *E. gracilis* 500 mg/kg BB merupakan konsentrasi optimal yang secara signifikan meningkatkan jumlah leukosit, aktivitas fagositosis makrofag, dan kadar IgG. Efek ini diperoleh melalui aktivasi reseptor Dectin-1 oleh β-1,3-glukan yang memicu transduksi sinyal imun dan produksi sitokin. Penelitian ini mengindikasikan bahwa ekstrak *E. gracilis* berpotensi sebagai imunostimulan alami dalam mendukung respons imun terhadap infeksi bakteri *E. coli*.

Kata kunci: *Euglena gracilis*, imunostimulan, *Escherichia coli*, IgG, fagositosis makrofag.

THE EFFECT OF *Euglena gracilis* ON LEUKOCYTE PROFILES, MACROPHAGE PHAGOCYTOSIS, AND IgG LEVELS IN RATS (*Rattus norvegicus* (Berkenhout, 1769)) INDUCED BY *Escherichia coli*

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ABSTRACT

E. coli bacterial infection is a serious health problem as it can lead to diarrhea, sepsis, and antibiotic resistance. An alternative treatment for *E. coli* infection is the use of natural immunostimulants such as *E. gracilis,* a microalga that produces β-1,3-glucan known for its immunomodulatory potential. This study aims to evaluate the effect of *E. gracilis* extract on leukocyte profile, macrophage phagocytosis, and IgG levels in rats (*Rattus norvegicus* (Berkenhout, 1769)) induced with *E. coli.* Male rats aged 2–3 months with an average weight of 200 grams were divided into 5 groups: 3 treatment groups with extract concentrations of 250, 500, and 750 mg/kg BW, a negative control group (without induction and extract), and a positive control group (induced with *E. coli*). The extract was administered orally and bacterial induction was performed intraperitoneally for 10 days. Blood collection was conducted through the retro-orbital plexus. The observed parameters included leukocyte profile from rat blood plasma using the Automated Hematology Analyzer method, IgG levels from rat blood serum using the ELISA method, and macrophage phagocytosis from peritoneal fluid using the Macrophage Phagocytosis Assay (in vitro) method. Data were analyzed using statistical analysis tests (normality and homogeneity), parametric comparative tests (One-Way, Welch's, and Repeat Measures ANOVA), non-parametric comparative tests (Kruskal-Wallis and Friedman Test), and post hoc tests (Tukey and Games-Howell Post Hoc, Mann-Whitney U-Test, and Wilcoxon Signed-Rank Test). The results showed that *E. gracilis* extract at 500 mg/kg BW was the optimal concentration that significantly increased leukocyte count, macrophage phagocytosis activity, and IgG levels. This effect was achieved through the activation of Dectin-1 receptors by β-1,3-glucan which triggered immune signal transduction and cytokine production. This study indicates that *E. gracilis* extract has potential as a natural immunostimulant in supporting immune responses against E. coli bacterial infections.

Keywords: *Euglena gracilis*, immunostimulant, *Escherichia coli*, IgG, macrophage phagocytosis.