

Pengaruh Pemberian Ekstrak Kloroform Daun Adas (*Foeniculum vulgare* Mill.) Terhadap Gambaran Histopatologi *Lien* Mencit yang Diinfeksi *Plasmodium berghei*

ABSTRAK

Latar Belakang – Malaria disebabkan oleh *Plasmodium sp.* menjadi prioritas SDGs 2030, dengan Indonesia mencatat 529.967 kasus positif dan 120 kematian pada 2024. Resistensi obat mendorong eksplorasi herbal seperti ekstrak kloroform daun adas (*Foeniculum vulgare* Mill.) yang mengandung senyawa fenolik, alkaloid, terpenoid dan flavonoid. Model *Plasmodium berghei* pada mencit ideal untuk studi histopatologi *lien* dengan parameter sel megakariosit, hemozoin, serta sel yang mengalami nekrosis. Studi ini diharapkan mampu mengembangkan terapi antimalaria lokal berkelanjutan.

Tujuan – Penelitian ini bertujuan untuk mengetahui pengaruh pemberian ekstrak kloroform daun adas (*Foeniculum vulgare* Mill.) terhadap gambaran histopatologi *lien* mencit yang diinfeksi *Plasmodium berghei*.

Metode – Penelitian eksperimental dengan rancangan *post-test only control group design*. Sebanyak 40 ekor mencit jantan dibagi menjadi delapan kelompok: dua kontrol negatif (DMSO 3% dan ekstrak adas 400 mg/kg BB), satu kontrol positif (infeksi *Plasmodium berghei* tanpa ekstrak), dan lima kelompok perlakuan yang diberi ekstrak kloroform daun adas dosis 50, 100, 200, 400, dan 800 mg/kg BB. Infeksi dilakukan secara intraperitoneal dengan 10^6 parasit, dan perlakuan diberikan selama 4 hari mengikuti metode *four-day suppressive test*.

Hasil – Analisis One-way ANOVA menunjukkan perbedaan signifikan pada jumlah sel megakariosit ($p=0,001$) dan tingkat nekrosis ($p=0,001$) antar kelompok. Pada akumulasi hemozoin, uji Kruskal-Wallis juga menunjukkan perbedaan signifikan ($p=0,001$). Hasil post-hoc menunjukkan perbedaan spesifik sebagai berikut: pada sel megakariosit, kontrol positif berbeda signifikan dengan kelompok perlakuan 1 (50 mg/kg BB; $p=0,020$) dan kontrol negatif 2 ($p=0,002$); pada hemozoin, kontrol negatif 1 dan 2 berbeda signifikan dengan kontrol positif; sedangkan pada nekrosis, kontrol positif berbeda signifikan dengan kelompok perlakuan 2 (100 mg/kg BB; $p=0,010$) serta kontrol negatif 1 dan 2 ($p=0,001$).

Kesimpulan – Ekstrak kloroform daun adas (*Foeniculum vulgare* Mill.) dengan dosis 50 mg/kg BB, 100 mg/kg BB, 200 mg/kg BB, 400 mg/kg BB, dan 800 mg/kg BB dapat memengaruhi jumlah sel megakariosit, akumulasi hemozoin, dan tingkat nekrosis pada organ *lien* mencit yang diinfeksi dengan *Plasmodium berghei*.

Kata kunci: Ekstrak kloroform, *Foeniculum vulgare*, *Plasmodium berghei*, Sel megakariosit, Akumulasi hemozoin, Tingkat nekrosis

Effect of Chloroform Extract of Fennel Leaves (*Foeniculum vulgare* Mill.) on Histopathological Features of Spleen in Mice Infected with *Plasmodium berghei*

ABSTRACT

Background – Malaria was caused by *Plasmodium* spp. and had become a priority target of the 2030 Sustainable Development Goals, with Indonesia reporting 529,967 confirmed cases and 120 deaths in 2024. Increasing drug resistance had encouraged the exploration of herbal alternatives, such as chloroform extract of fennel leaves (*Foeniculum vulgare* Mill.), which contained phenolic compounds, alkaloids, terpenoids, and flavonoids. The *Plasmodium berghei* mouse model was considered ideal for splenic histopathological studies using parameters including megakaryocyte cells, hemozoin accumulation, and necrotic cells. This study was expected to contribute to the development of sustainable local antimalarial therapies.

Objective – This study aimed to determine the effect of chloroform extract of fennel leaves (*Foeniculum vulgare* Mill.) on histopathological features of the spleen in mice infected with *Plasmodium berghei*.

Method – An experimental study employed a post-test only control group design. Forty male mice were divided into eight groups: two negative controls (3% DMSO and 400 mg/kg BW fennel extract), one positive control (*Plasmodium berghei* infection without extract), and five treatment groups receiving chloroform extract of fennel leaves at doses of 50, 100, 200, 400, and 800 mg/kg BW. Infection was administered intraperitoneally with 10^6 parasites, and treatments were given for 4 days following the four-day suppressive test method. Spleen histopathological preparations were prepared on day 5, from fixation to staining.

Results – One-way ANOVA analysis shows significant differences in the number of megakaryocyte cells ($p = 0.001$) and the level of necrosis ($p = 0.001$) among groups. For hemozoin accumulation, the Kruskal–Wallis test also shows a significant difference ($p = 0.001$). Post-hoc analysis reveals specific differences as follows: for megakaryocyte cells, the positive control differs significantly from treatment group 1 (50 mg/kg BW; $p = 0.020$) and negative control 2 ($p = 0.002$). For hemozoin, negative controls 1 and 2 differ significantly from the positive control. Meanwhile, for necrosis, the positive control differs significantly from treatment group 2 (100 mg/kg BW; $p = 0.010$) as well as from negative controls 1 and 2 ($p = 0.001$).

Conclusion – Chloroform extract of fennel leaves (*Foeniculum vulgare* Mill.) at doses of 50 mg/kg BW, 100 mg/kg BW, 200 mg/kg BW, 400 mg/kg BW, and 800 mg/kg BW affects the number of megakaryocyte cells, hemozoin accumulation, and the level of necrosis in the spleen of mice infected with *Plasmodium berghei*.

Keywords: Chloroform extract, *Foeniculum vulgare*, *Plasmodium berghei*, Megakaryocytes, Hemozoin accumulation, Necrosis level.