ABSTRACT

Malaria remains a major health problem. The resistence of *Plasmodium* to antimalarial drugs is one of the obstacles in efforts to combat malaria. Therefore, development of new antimalaria drug is necessary, especially based on natural ingredient that able to increase immune respons against malaria, such as meniran (*Phyllanthus niruri* L). contains Flavonoids content of meniran, which have immunostimulatory effects on the immune response by increasing the activity of macrophages and T lymphocytes. The aims of this study is to find out the potential effect of meniran ethanol extract (MEE) as an immunostimulant against parasitemia, number of $CD4^+$ T cells and expression IFN-γ in mice infected malaaria parasite *P. berghei* ANKA. Fivety BALB/c mice were divided into 2 groups: group A (KA) were inoculated with $1x10^4$ infected erythrocytes (IE) and group B (KB) were inoculated with $1x10^6$ IE. The groups of KA and KB were then divided into 5 groups, namely KP, P1, P2, KN1 and KN2. KP is a positive control group, that were only infected with parasite without any MEE treatment. Group P1 and P2 recieved 40 mg/kg BW and 120mg/kg BW of MEE, respectively, for 7 days prior to parasite infection. Group KN is negative control that treated with MEE only without parasite infection, while KN1 and KN2 were KNs of P1 and P2, respectively. Observations of parasitemias were done every day during 4 day cours of infection on 10% Giemsa-stained thin blood smears. On day 4 post infection (day 12) mice were killed, and spleen was removed prior to spleen cells isolation to analyse the number of $CD4^+$ T lymphocytes and the expression of IFN-γ by using *flowcytometry*. The MEE treatment of mice before infection did not affect the increased of parasitemia during 4 day cours of

infection in all groups of mice. Parasitemia increased significantly, suggested that the MEE did not act as antiparasitisidal and due to the lethal virulence of parasites. MEE potential as immunostimulant in increasing the number of $CD4^+$ T lymphocytes as seen in KA group potentially and significantly (p=0.01). Nevertheles, insignificantly in KB group (p=0:14). Therefore, the increase of $CD4^+$ number depended on the number of EI inoculated. The potential immunostimulatory effect of MEE was seen also in increasing the expression of IFN-γ on KA and KB groups significantly (p=0.00) at the dosis of 40 mg/kg and 120 mg/kg. Overall, the increased of parasitemia, $CD4^+$ lymphocytes number and the expression of IFN-γ indicated that, MEE played a role as immunostimulator but not as antiparasitisidal in mice infected *P. berghei* ANKA.