In vivo antiplasmodial and toxicological effects of Goniothalamus lanceolatus crude extracts


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Abstract

This study is aimed at investigating the antiplasmodial activity and acute toxicity of the methanol (MeOH) extracts of the leaves and roots, and the dichloromethane (DCM) extracts of the stem bark, leaves, and roots of Goniothalamus lanceolatus. Phytochemical analysis was then carried out on the most active extract. In vivo antiplasmodial activity was assessed using the 4-day suppressive test against Plasmodium berghei ANKA (PbANKA) in mice. The plant extracts were administered intraperitoneally (i.p.) as a single dose (30 mg/kg) starting 4 h after infection. At a dose level of 30 mg/kg (i.p.), the DCM extracts of the stem bark and leaves, and the MeOH root extracts, prolonged the survival period of infected mice compared to that of the negative control. In addition, all crude extracts, except for the DCM root extract, exhibited parasitemia suppressive activity. The highest level of parasitemia suppression was recorded in mice treated with the DCM stem bark extract at 66.3%. No mortality was observed in mice treated with the DCM extracts of the stem bark and leaves, and the MeOH extract of the leaves, indicating that the LD$_{50}$ is greater than 300 mg/kg. On the other hand, both the MeOH and DCM extracts of the roots showed toxic effects at a dose of 300 mg/kg (i.p.) with an 88.3% mortality rate. The results obtained indicate that the stem bark of G. lanceolatus (DCM crude extract) possesses good antiplasmodial activity against PbANKA infected mice without causing acute toxicity. Five known styrlypyrone derivatives namely goniodiol 1, 8-epi-9-deoxygonopyrone 2, 9-deoxygonopyrone 3, digoniodiol 4 and goniothalamin 5 have been isolated from the bark of Goniothalamus lanceolatus (DCM crude extract). The structures and stereochemistry of all compounds were elucidated by interpretation of spectroscopic data. This study provides a scientific basis to support the traditional use of the plant as a remedy for malaria.