Antimalarial Activity of Bambusa vulgaris Leaf Extract and Artemisinin Combination

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Resistance to antimalarial drugs has increased the mortality rate in malaria cases globally. Artemisinin-based Combination Therapies (ACTs) are the first-line malaria treatment worldwide by combining artemisinin with other antimalarial drugs. According to the literature, Bambusa vulgaris leaf has been shown to have antimalarial potential. This study was intended to determine the compatibility of B. vulgaris leaf extract when combined with artemisinin in malaria control. In this study, donor animals were prepared by intra-peritoneal injection of Plasmodium berghei-infected red blood cells (IRBC) into albino BALB/c strain mice. When the quantity of parasitemia reached 2-3%, the entire infected blood was taken through the heart of the mice and treated by centrifugation to obtain IRBC. The IRBC was then treated with B. vulgaris leaf extract combined with artemisinin, and the results indicate that the treatment can inhibit the growth phase of P. berghei. Microscopic observation and calculation of percent parasitemia were carried out to analyze the inhibition of each group. Inhibition value was used to determine the IC50. The combined B. vulgaris leaf extract and artemisinin treatment exhibited 356 µL of IC50 whereas the B. vulgaris leaf extract treatment only exhibited 1196 µL of IC50. This means the compatibility of the combination contributes to higher antimalarial efficacy depicted by the smaller IC50. Complementary GC-MS and reverse molecular docking were utilized to elucidate the substance in B. vulgaris leaf extract. The 3-[4-(Pivaloyloxy)butyl]cyclohexanone was found to be responsible for the antimalarial activity based on the lowest binding affinity value and the best ligand-receptor interaction visualization.