DETERMINATION OF THE ANTIMALARIAL EFFICACY AND SAFETY OF JUSTICIA BETONICA, VERNONIA DUMICOLA AND CLERODENDRUM MYRICOIDES IN VITRO AND IN MICE

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ABSTRACT

Malaria is a disease caused by a protozoan parasite of the genus *Plasmodium*, transmitted by female *Anopheles* mosquitoes. It stands out as the leading cause of morbidity and mortality particularly in the tropical and sub-tropical countries of the world, with pregnant mothers and children under 5 years of age being the most vulnerable groups. Development of resistance to available drugs by the malaria parasites has always been a challenge in controlling the disease through chemotherapy, hence the continuous search for alternative antimalarial agents. The objective of the current study is to determine the efficacy and safety of *Justicia betonica* (L.), *Vernonia dumicola* (S. Moore) and *Clerodendrum myricoides* (Hochst) as alternative antimalarial therapy. *J. betonica*, *V. dumicola* and *C. myricoides* are some of the medicinal plants used to treat malaria in Gusiiland, among the many others not included in this study. The plants will be collected from Gucha region of Kisii County where there are known people who use them to treat malaria. The antimalarial activity of aqueous extracts of these plants shall be tested *in vitro* using *Plasmodium falciparum* and *in vivo* using mice inoculated with *Plasmodium berghei*. Chloroquine phosphate will be used as the control drug. The toxicity of the crude extracts will be evaluated on Vero cells using the microculture tetrazolium (MTT) assay. For the *in vivo* efficacy test, One-way ANOVA will be used for comparison of average parasitaemia of the treated groups and the two tailed student t-test for comparing the average parasitaemia of each treatment group with the untreated group. For the *in vitro* efficacy test, the EC$_{50}$ (the drug concentration required to suppress 50% of schizont development) will be determined from a dose-response curve by non-linear regression analysis at 95% confidence interval. For cytotoxicity tests, the IC$_{50}$ (50% inhibitory concentration) values will be calculated from a non-linear regression model (best-fit curve) of a sigmoid dose-response curve. The fight against malaria shall be enhanced if the plants shall be found to be effective and safe to use. Otherwise, people who use the plants will be advised to seek other alternatives. The results will also form the basis for further research in other aspects such as mutagenicity, age- and pregnancy-dependent effects and possible evolution of resistance.