

Results for Antiplasmodial Potential and Phytochemical Evaluation of Aqueous Root Extract of a Nigerian Medicinal Apocynaceae Plant

The result of the qualitative phytochemical analysis showed that tannin and phenol showed highest intensity of the characteristic colour and thus was the most abundant in the extract followed by flavonoids, steroids, alkaloid, saponin, glycoside and terpenoid showing the same colour intensities. The results of the qualitative phytochemical analysis of the extract is shown in Tables 1 below. In the quantitative analysis, phenol was the highest followed by tannin, flavonoid, terpenoid, glycoside, alkaloid, steroid and saponin. The result of the quantitative phytochemical analysis is shown in Figure 1 below.

Table1. Results of the qualitative phytochemical analysis of *A. boonei* aqueous root extract

Extract	Tannin	Flavonoid	Steroid	Phenol	Alkaloid	Saponin	Glycoside	Terpenoid
Root aqueous	++	+	+	++	+	+	+	+

Legend: + = Low; ++ = Moderate

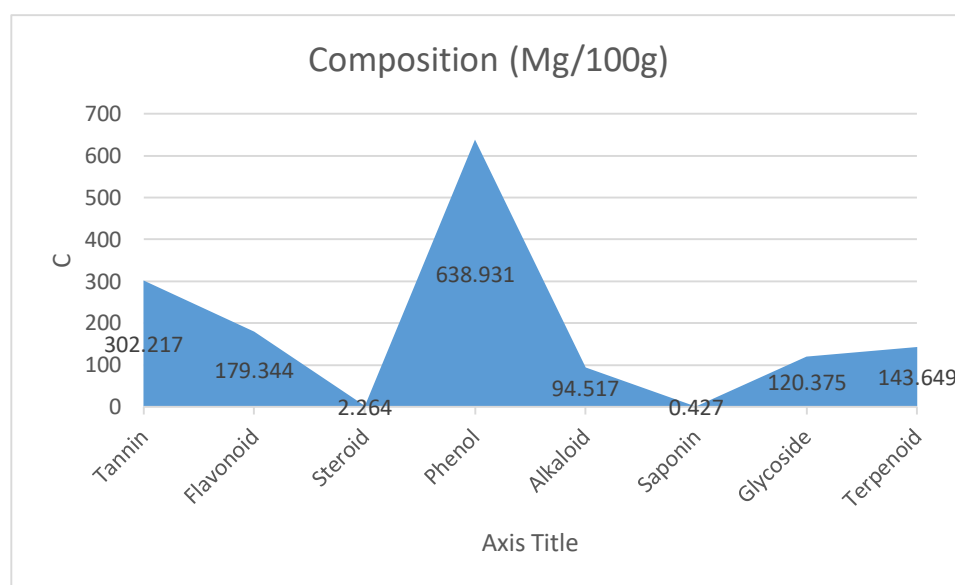


Figure 1. Results of the quantitative phytochemical analysis of *A. boonei* aqueous root extract

Acute Toxicity Studies

The LD50 of aqueous root extract of *A. boonei* was 5000mg/kg. The observed signs of toxicity in mice given 5000mg/kg and above include drowsiness, weakness, licking of paws and reduction in activity. No mortality was observed in mice after oral administration of the doses of aqueous root

extract of *A. boonei* up to 5000mg/kg indicating that the extract is not toxic with oral LD50 greater than 5000mg/kg.

Antimalarial tests

The suppressive test of aqueous root extract of *A. boonei* revealed a significant suppression, at $P < 0.05$, on the fourth day of the test by the extract. The suppressive activity was dose dependent with lowest suppression of 40.18% and highest suppression of 61.55%, as compared to the positive control, chloroquine, with a chemo suppression of 96.88% which was higher than the chemo suppression of the extracts. The results of the suppressive effect of the extract are shown in Figure 2 below.

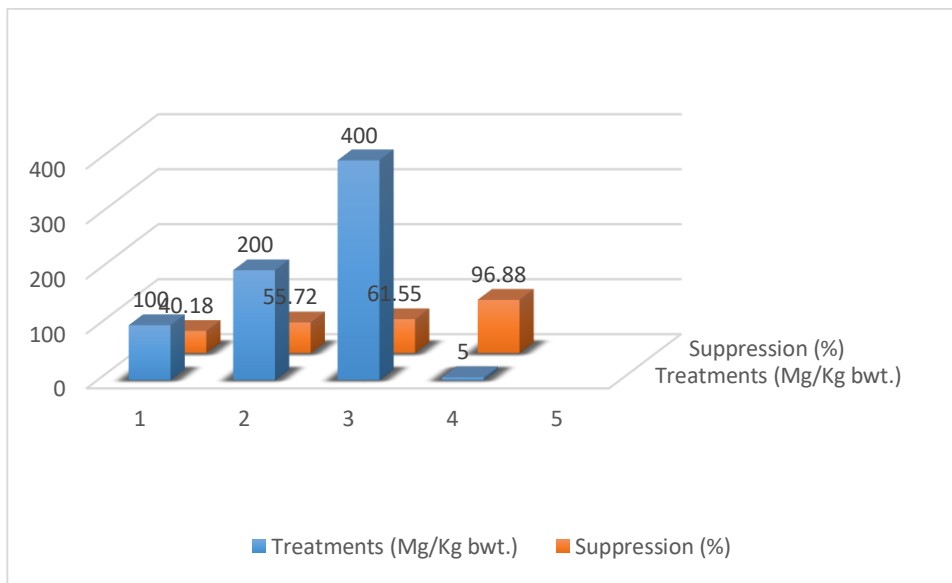


Figure 2. Suppressive effect of aqueous root extract of *A. boonei* and chloroquine in mice infected with *Plasmodium berghei*

The prophylactic test of the aqueous root extract of *A. boonei* produced a significant dose dependent reduction, at $P < 0.05$, in parasitaemia levels of 51.39%, 65.27% and 68.35% while 5mg chloroquine kg^{-1} body weight produced 97.95% reduction in levels of parasitaemia. The significant reduction in parasitaemia by the extract indicates that the extracts possess schizonticidal activity in blood. The results of the prophylactic effect of the extract are shown in Figure 3 below.

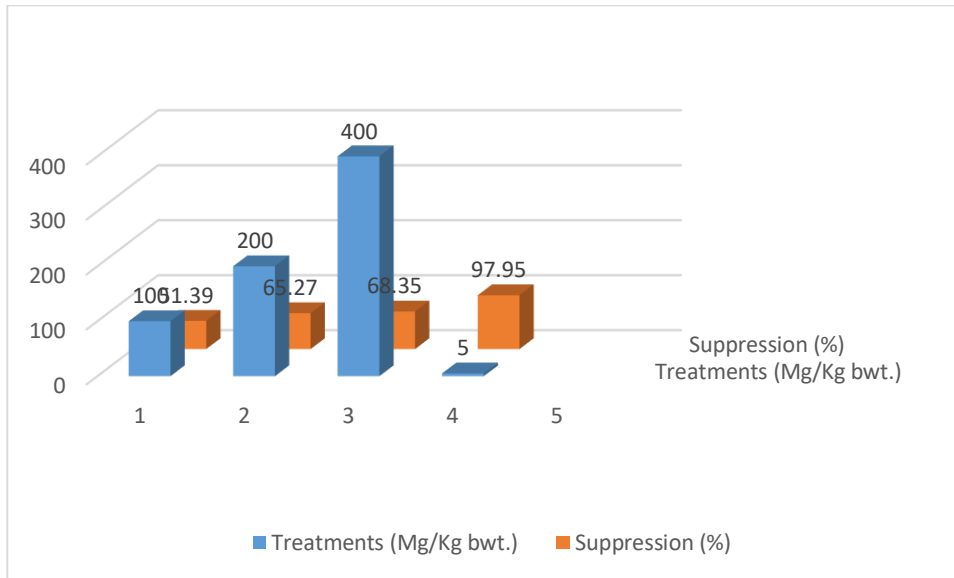


Figure 3. Prophylactic effect of aqueous root extract of *A. boonei* and chloroquine in mice infected with *Plasmodium berghei*

In the curative test of the aqueous root extract *A. boonei*, it was observed that the extract produced a dose dependent reduction in the levels of parasitaemia in the groups treated with the extracts. This result was also observed in the positive control group which were treated with chloroquine. On the seventh day of the curative test it was found that for the 100, 200 and 400mg/kg/day of the extract, the negative control group indicated an average percentage suppression of parasitaemia of 48.63%, 59.59% and 60.88% respectively while 5 mg of chloroquine kg^{-1} body weight produced a reduction in parasitaemia of 95.74%. The results of the curative effect of the extract are shown in Figure 4 below.

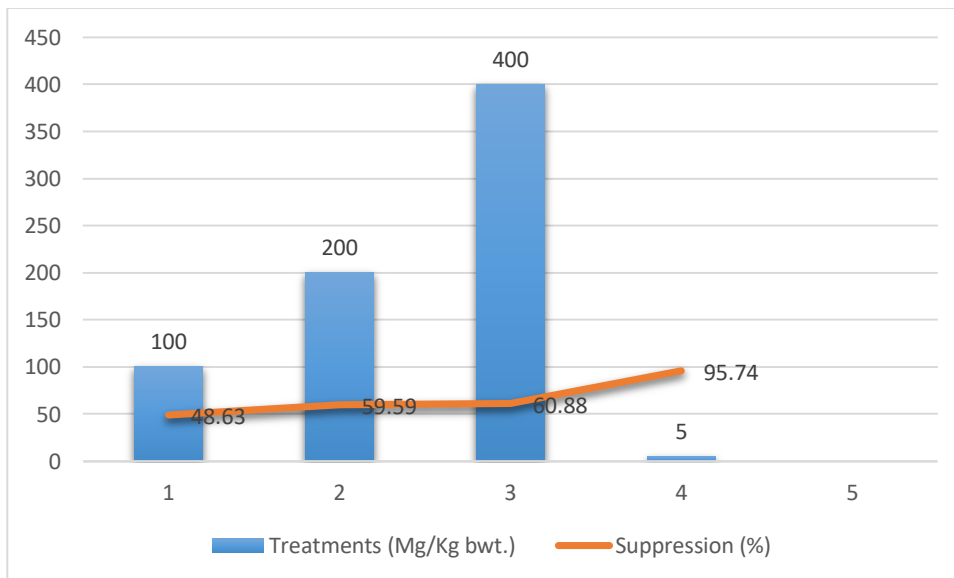


Figure 4. Curative effect of aqueous root extract of *A. boonei* and chloroquine

in mice infected with *Plasmodium berghei*

4. DISCUSSION AND CONCLUSION

From the results of the phytochemical analysis, the root aqueous extract of *A.boonei* was found to contain important compounds including tannins, flavonoids, steroids, phenols, alkaloids, saponins, glycosides and terpenoids.

From the acute toxicity test of this study, no mortality was recorded in all the doses used for the acute toxicity test which indicates that the extract is not toxic.

The suppressive test of the root aqueous extract revealed a significant suppression on the fourth day of the test. The suppressive activity was dose dependent. The prophylactic test of the aqueous root extract produced a significant dose dependent reduction in parasitaemia levels which is an indication that the extract exerts schizonticidal activity in blood. The curative test of the aqueous root extract also produced a dose dependent reduction in the levels of parasitaemia in the groups treated with the extract.

The results from this study revealed that the aqueous root extract of *Alstonia boonei* contain phytochemical compounds which are not toxic and exhibited significant antiplasmodial potential and thus should be further studied for antimalarial drug development.