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Evaluation of Antimalarial Activity of Various Fractions of *Morinda lucida* Leaf Extract and *Alstonia boonei* Stem Bark

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Abstract: Investigation into antimalaria activity of various fractions of *Morinda lucida* leaf extract and *Alstonia boonei* stem bark was conducted using standard techniques. The present study confirms the antimalarial activity of *Morinda lucida* and *Alstonia boonei. Morinda lucida* exhibited MIC of 0.6mg/ml and *Alstonia boonei* MIC 0.2mg/ml. The anti plasmodia activity of both plants were found to reside majorly in the N-Hexane and chloroform fractions.

Key words: Antimalarial activity · Fractions · *Morinda lucida* · *Alstonia boonei*

INTRODUCTION

A malarial-free world remains as much a distant vision as ever despite more than a century effort and early optimism. Multi-drug resistance is one of the most important problems in malaria control over the years. This has led scientists and physicians to finding other solutions, one of which is investigation of medicinal plants. Sourcing of *Artemisinin* from *Artemisia annua* has further encouraged malaria phytotherapist to revisit the medicinal plants frequently used in the traditional management of the disease [1].

Morinda lucida Benth (Rubiaceae) is a medium-sized tree about 15 m tall [2], it is called names in different countries. It is known as Sangogo or Bondoukou alongua in Cote d' Ivoire; Twi, kon kroma or Ewe amake in Ghana; Ewe amake or atak ake in Togo and Oruwo in South Western Nigeria [3]. Different parts of the plants are used in different ways in different countries. Cold decoction of the plant leaves is used for the treatment of fever in Cameroon; the bitter water decoction of the plant bark, root and leaf are used as bitter tonic and as astringent for dysentery, abdominal colic and intestinal worm infestation [3]. Oliver-Bever [4] reported the use of weak decoction of the stem bark in the treatment of jaundice. Koumaglo et al [5] and Obih et al [6] documented in vitro antimalarial activity of *Morinda lucida* leaf extract against *Plasmodium falciparum* and antimalarial activity of *Morinda lucida* against Plasmodium berghei *berghei* in mice. Methanolic extract of *Morinda lucida* leaf extract have been reported to possess trypanocidal activity [7].

Alstonia boonei De Wild belongs to the family called *Apocynaceaee* which consists of 50 species widely distributed in the continents of Africa, Asia and America [8-10]. *Alstonia boonei* is known as Ahun in Yoruba, Egbu-ora in Igbo, Ukhu in Edo and Ukpukunu in Urhobo, is widely distributed in the lowlands and rain-forest areas of Nigeria. Parts of the plant are employed for the treatment of a variety of ailments in Africa and the stem bark has been listed in the African Pharmacopoeia as an antimalarial drug. The stem bark of *Alstonia boonei* is

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used in traditional medicine to treat fever, painful micturition, insomnia, chronic diarrhea, rhematic pains as anti-venom for snake bites and in the treatment of arrow poisoning [4,11-13].

The antimalaria activities of the stem bark, the root bark and the leaves of *Morinda lucida* have been documented [6], the present study is designed to evaluate antimalarial activities of various fractions of *Morinda lucida* leaf extract and *Alstonia boonei* stem bark.

MATERIALS AND METHODS

Collection of Plant Materials: *Morinda lucida* leaves and stem bark of *Alstonia boonei* were obtained from a nearby village in Ile-Ife. The two plants were authenticated at the herbarium of the Botany department of the Obafemi Awolowo University, Ile-Ife, Nigeria. The herbarium number for *Morinda lucida* and *Alstonia boonei* are 14650 and 13827, respectively.

Method: Three Kilogram each of *Morinda lucida* leaves and *Alstonia boonei* stem bark were each extracted with 5 litres of ethanol. The ethanolic extract of each plant was concentrated to dryness on rotatory evaporator. 200 grams of each crude extract was suspended in distilled water and partitioned with N-hexane, chloroform, ethyl acetate and butanol successively, which were in turn concentrated to dryness in vacuo on a rotatory evaporator. The ethanolic extract of each of the fraction were tested for its invitro antimalarial activities on *Plasmodium falciparum* using the 96- well microlitre plate and the candle-jar method [14,15]. The results obtained from the ethanolic extract were compared with chloroquine sulphate. The *Plasmodium falciparum* were obtained from infected blood sample from the Microbiology and Parasitology department of the Obafemi Awolowo University Teaching Hospital, Ile-Ife. Blood sample with density of parasitemia of over 2000 was employed. Serial decreasing concentrations of the crude extract of N-hexane, chloroform, ethyl acetate and butanol fraction were tested for antimalarial activity. The following concentration were used; 5, 1.7, 0.6, 0.2, 0.07, 0.02, 0.01, 0 (mg/ml). The same value in µg/ml of chloroquine was used for comparison. Two replicate of the same concentration were prepared and tested for each of the plant. The plates were read and percentage inhibition determined. The mean score of percentage inhibition was computed for each partition.

RESULTS

The Crude Ethanolic extract of both plants inhibited the growth of schizont of Plasmodium falciparum. The Minimum inhibitory concentration (MIC) for crude extract of Morinda Lucida 0.6mg/ml while for Alstonia boonei 0.2 mg/ml. The detailed result for each of the partition is as shown in Table 1 and 2.

Table 1: Mean Percentage Inhibition±Standard Error of Mean (SEM) for Morinda Lucida

Conc. Mg/ml	Crude M Lucida	N-hexane M Lucida	CHCL3 M Lucida	EtAC M Lucida	Butanol M Lucida	CQ (µg/ml)
5	100±00	100±0.00	100±0.00	100±0.00	100±0.00	100±0.00
1.7	100±00	100±0.00	100±0.00	97.880.30	100±0.00	100±0.00
0.6	100±00	100±0.00	100±0.00	95.580.43	100±0.00	100±0.00
0.2	96.25±0.35	100±0.00	100±0.00	92.02±0.72	100±0.00	88.19±1.41
0.07	38.67±0.05	100±0.00	100±0.00	82.68±0.77	98.14±0.14	69.73±3.64
0.02	70.24±0.50	100±0.00	100±0.00	65.22±3.73	93.34±0.01	26.71±1.75
0.01	63.41±0.67	82.41±2.13	88.08±0.5	47.22±1.79	66.93±0.26	14.021±1.93
0	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00

Table 2:Mean Percentage Inhibition±Standard Error of Mean (SEM) for Alstonia Boonei

Conc. Mg/ml	Crude A. boonei	N-hexane A. boonei	CHCL3 A. boone	EtAC A. boonei	Butanol A. boonei	CQ (µg/ml)
5	100±0.00	100±0.00	100±0.00	100±0.00	100±0.00	100±0.00
1.7	100±0.00	100±0.00	100±0.00	100±0.00	100±0.00	100±0.00
0.6	100±0.00	100±0.00	100±0.00	96.22±0.32	100±0.00	100±0.00
0.2	100±0.00	100±0.00	100±0.00	93.68±0.30	98.56±0.05	88.19±1.41
0.07	98.14±0.14	100±0.00	100±0.00	84.24±0.64	94.94±0.22	69.73±3.64
0.02	93.34±0.01	53.13±2.70	91.05±1.06	64.88±1.04	89.07±0.61	26.71±1.75
0.01	66.93±0.26	46.74±2.04	56.73±1.75	30.04±5.28	52.08±0.08	14.021±1.93
0	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00

For Morinda Lucida, the MIC for the different partition are as follows; N-Hexane 0.02, Chloroform 0.02, Ethyl acetate 5.0 and Butanol 0.6 mg/ml. For Alstonia boonei; N-Hexane 0.07, Chloroform 0.07, Ethyl acetate 1.7 and Butanol 0.6 mg/ml. MIC for Chloroquine is 0.6µg/ml.

DISCUSSION AND CONCLUSION

The present study confirm the antimalarial activity of *Morinda lucida* and Alstonia boonei. Morinda lucida exhibited MIC of 0.6mg/ml and *Alstonia boonei* MIC 0.2mg/ml. The anti plasmodia activity of both plants were found to reside majorly in the N-Hexane and chloroform fractions. However, this study observed that the N-Hexane and Chloroform extract of Morinda Lucida exert a more antimalarial activity than the same concentration of Alstonia boonei. Our finding is similar to the finding of other workers on *Artemisia annua* shrub where the active ingredient artemisinin was found to concentrate in the N-Hexane fraction. Toxicity study in animals are already in progress.

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