



Phytochemical Screening of a Vended Antimalarial: Malatreat

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ABSTRACT: Malatreat is marketed by Paxherbals as a multi-component antimalarial preparation made from *Alstonia boonei*, *Sida acuta* and *Tridax procumbens*. Phytochemical screening of hexane and ethanol extracts obtained by infusion revealed the presence of alkaloids, saponins, tannins, anthraquinones, steroids, flavonoids, phlobatannins, glycosides and cardiac glycosides. These secondary metabolites are also known to be present in the constituent plants which are variously used in ethnomedicine for the treatment of malaria fever. This study reveals that qualitatively the formulation maintains the active metabolites present in the constituent plants. © 2011 IGJPS. All rights reserved.

KEYWORDS: Malatreat; Antimalarial; Phytochemical Screening; Hexane Extract; Ethanol Extract.

INTRODUCTION

Malaria has resurged in Africa and in some parts of Latin America and Asia. 300 million to 500 million episodes of malaria occur each year, with about 1.2 million deaths, mostly among children in Sub-Saharan Africa. In addition, non fatal cases pose an enormous economic burden in medical care and loss of productivity. About 80% deaths from malaria occur in Africa.

The methods available today to prevent and treat malaria are inadequate. Malaria parasites have become resistant to the commonly used, inexpensive drugs. The newer, more effective artemisinin drugs are prohibitively expensive for poor African patients. Consequently, the search for a cheaper, effective agent to prevent and treat malaria is continuing.

'Malatreat' is a multi-component antimalarial agent being marketed by Paxherbals, Ewu, Edo State. It is made from the bark of *Alstonia boonei*; leaves, stems and roots of *Sida acuta*; and leaves of *Tridax procumbens*. A literature search of these plants shows that *Alstonia boonei* contains echitamine [1]; *Sida acuta*: cryptolepine and quindoline [2], and *Tridax procumbens*: nitidine [3]. Nitidine is a benzo[c] phenanthridine alkaloid with anti-neoplastic, antifungal and antimalarial properties [4]. In addition, these plants also contain other minerals and compounds. For instance, *Alstonia boonei* contains important minerals like calcium. Phosphorus, iron, sodium, potassium and magnesium [5].

Alstonia boonei is a tree of the Apocyanaceae family, large, deciduous, up to 45m tall and 1.2 m in diameter. Bark is brownish, with milky latex that is dangerous to the eyes- capable of causing blindness. It is an aquatic specie, found in swampy areas

[1]. Stem bark is commonly used in the treatment of malaria and is listed in the African pharmacopoeia as an anti-malarial drug [5]. Decoction of bark is used as febrifuge and also given after childbirth to facilitate expulsion of placenta [6].

Sida acuta (Malvaceae) is a shrubby perennial and semi-woody herb up to 1m with pale yellow flowers found on roadsides, waste places and rough grazing land [6]. This plant is traditionally used in treatment of malaria and diarrhea. In Central America, it is used to treat renal inflammation, colds, fevers, headache, ulcers and worms [2].

A creeping annual herb of open waste places widely occurring in the tropics, *Tridax procumbens* is a weed of roadside and cultivation. The root stick is brittle making it troublesome to eradicate as it invades lawns. It belongs to the Compositae family. The leaves possess alkaloids that are effective in the treatment of malaria fever [7].

Patients and their relatives can use any agents available to them that has claims to ameliorate their sufferings. With so many chemotherapeutic agents coming up especially from natural sources, there is the growing need to ascertain some of these claims. There is also the problem of undocumented product quality, insufficient efficacy validation and safety verification. This prompted the phytochemical analysis of one of such drugs 'Malatreat' to determine its chemical constituents, potency, efficacy and safety and ascertain its claims as an effective antimalarial agent.

MATERIALS & METHODS

Collection and Preparation of Samples

Two (2) packs of 'Malatreat' containing 25 teabags each, with each bag weighing 2.2g, was purchased from a Pax Distributor in Makurdi, Benue State. The batch numbers of both packs were checked to be the same, and the expiry dates noted to make sure they are still very potent and unexpired.

Extraction

The directions for usage, of 'Malatreat' says pour boiling water on tea bags; and allow to infuse for 20 to 30 minutes. This method was adopted; 250ml of hexane was heated to its boiling point then poured on 25 teabags (a total mass of 55g). It was covered and allowed to infuse for 30 minutes, and then filtered, This process was repeated using a fresh 200ml of hexane. The filtrate was dried using water bath at 60°C. The dried extract was weighed and its mass noted. For extraction with ethanol, 250ml of 80% (v/v) ethanol was heated till small boiling bubbles appeared, then transferred immediately on the same sample (tea bags) used in the hexane extraction. The same procedure outlined in the hexane extraction was repeated.

Phytochemical Analysis

The extracts obtained were evaluated to detect the presence of different classes of compounds using standard procedures [8, 9].

RESULTS & DISCUSSION

Results of extraction as to weight and colour of extracts and yield are shown in Table 1. Tables 2 and 3 show the results of phytochemical screening of these extracts. For hexane extract, alkaloids and tannins were present while saponins, phlobatannins, anthraquinones, steroids, flavonoids, glycosides, cardiac glycosides, alkaloids and tannins were found present in ethanol extract. Cardenolides were however, absent.

Table 1 Weight, colour, % yield and nature of extracts

	Weight (g)	Colour	% Yield
Hexane	1.91	Green	3.4
Ethanol	5.64	Reddish-brown	10.2

Alkaloids, tannins, saponins, flavonoids and cardiac glycosides were among the phytochemicals detected together with the vitamin, ascorbic acid in *Alstonia boonei* [5]; whilst alkaloids and steroids are present in *Sida acuta* [2]. Ethanolic extracts of *S. acuta* have been shown to be active against *Plasmodium falciparum* strains [10]. The alkaloids present in this plant which are of the indoloquinoline family are reported to be responsible for its antimalarial activity [2]. *A. boonei*, apart from being listed in the African Pharmacopeia as an antimalarial drug, its stem bark has analgesic, antipyretic and anti-inflammatory properties [11]. These are symptoms that usually accompany feverish conditions.

Table 2 Phytochemical tests on hexane extract

Test	Observation	Inference
Test for Alkaloids		
a). Dragendorff's Test	Red Precipitate	Present
b). Mayer's Test	Immediate green precipitate	present
Frothing Test (Saponins)	No foaming	Absent
Test for Tannins		
a). Emulsion Test	Stable emulsion	Present
b). Ferrous Chloride Test	Green precipitate	Present
Test for Phlobatannins	Green precipitate	Absent
Borntrager's Test (Anthraquinones)	Two immiscible layers (green and clear)	Absent
Salkowski's Test (Steroids)	Red precipitate	Absent
Shinoda's Test (Flavonoids)	Green precipitate	Absent
Fehling's Test (Glycosides)	Brown precipitate	Absent
Keller-Killani Test (Cardiac Glycosides)	Brown precipitate	Absent
Legal Test (Cardenolides)	Deep red colouration	Absent

The ethanolic extract is shown to contain more metabolites (Table 3). This implies that ethanol being of high polarity than hexane but similar to that of water (solvent commonly used traditionally), phytochemical profile of ethanol extract will be similar to that of water, especially as hydroethanol (80% v/v) was used in extraction.

Table 3 Phytochemical tests on ethanol extract

Test	Observation	Inference
Test for Alkaloids		
a). Dragendorff's Test	Immediate red precipitate	Present
b). Mayer's Test	Immediate green precipitate	Present
Frothing Test (Saponins)	Foaming	Present
Test for Tannins		
a). Emulsion Test	Stable emulsion	Present
b). Ferrous Chloride Test	Dirty green precipitate	Present
Test for Phlobatannins	Red precipitate	Present
Borntrager's Test (Anthraquinones)	Pink precipitate	Present
Salkowski's Test (Steroids)	Reddish-brown ring	Present
Shinoda's Test (Flavonoids)	Red colouration	Present
Fehling's Test (Glycosides)	Brick-red precipitate	Present
Keller-Killani Test (Cardiac Glycosides)	Brown ring	Present
Legal Test (Cardenolides)	No colour change	Absent

Phytochemical screening of 'Malatreat' shows the presence of alkaloids and other secondary metabolite in this formulation, which are present in the constituent plants. These plants are traditionally used in the treatment of malaria fever as a decoction alone and/or in association with other plants. Other secondary metabolites present in this formulation as in Tables 2 and 3 are known to elicit a number of pharmacological responses [5] and justifies why these plants are used traditionally in combating malaria. Some of these metabolites, though not present in the parent plants might be likely due to the formulation and these perhaps add some synergic effect or palatability to the drug.

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