



Short communication

Afr. J. Traditional,  
Complementary and Alternative  
Medicines  
[www.africanethnomedicines.net](http://www.africanethnomedicines.net)

## SOME MEDICINAL PLANTS USED IN YEMENI HERBAL MEDICINE TO TREAT MALARIA

Awadh A. N. Ali\*<sup>2, 1</sup>, K. Al-rahwi<sup>1</sup> and U. Lindequist<sup>3</sup>

Pharmacognosy Department, Faculty of Medicine and Health Sciences , Sana'a University<sup>1</sup>, and Aden University<sup>2</sup> Yemen, Department of Pharmaceutical Biology, Institute of Pharmacy, Ernst-Moritz-Arndt- University, Germany<sup>3</sup>

\* corresponding author: email : [biniali@y.net.ye](mailto:biniali@y.net.ye)

### Abstract

This pilot study examined the extent and the type of medicinal plants used for treating malaria. 492 informants were interviewed in 13 villages located on the coastal plain of four provinces. Nineteen plants belonging to fourteen families were recorded each with local names, methods of preparation and parts used. The antimalarial traditional uses of *Dodonaea viscosa*, *Plantago major*, *Cissus rotundifolia*, *Citrullus colocynthis*, *Anisotes trisulcus*, and *Tamarindus indica* had been reported for the first time.

**Key words:** antimalarial uses; traditional medicine, Yemen

### Introduction:

Malaria is an endemic disease particularly in regions of Africa, Asia and South America, where it is distributed widely. Mainly due to the multidrug resistance developed by *Plasmodium falciparum*, malaria remains the leading cause of death due to parasitic diseases with approximately 300 million clinical cases annually resulting in an estimated 2.300.000 deaths, primarily in children.(WHO-report 1996)

This spread of drug-resistance increases the need for new antimalarial drugs with novel mechanisms of pharmacological action. The success of artemisinin, isolated from *Artemisia.annua*, and its derivatives for the treatment of resistant malaria has focused attention on the plants, as a source of antimalarial drugs (Tan, R., et al 1998). Ethnobotanical information about antimalarial plants, used in traditional herbal medicine, is essential for the further evaluation of the efficacy of plant antimalarial remedies and for isolating and identifying of new antimalarial drugs.

Most of the Yemeni people living in rural areas depends on traditional herbal medicine for

the treatment of many infectious diseases such as malaria (Ali et al 1999). In this study, we document some ethnomedical information of medicinal plants, used as antimalarial remedies in rural areas in Yemen.

## **Subjects and methods**

### **Study area and population.**

The present study is dealing with 13 villages scattered on the coastal plain of four provinces Hudaidah, Taiz, Abyan, and Hadramout, with approx. 11,000 inhabitants, mostly living on agriculture (55%) and fishing (25 %). The surveyed areas lie between 13° 8' – 14°2' North latitude and 45° 22' – 47° 39' East longitude. About 65% of the territory is exploited for producing cereals, banana, and papaya. It is almost entirely flat, rising from the sea level to 100-200 m. The weather is uniformly hot and humid, temperature rarely falling below 10° C at night and rising to 35° C during the day, little variations between summer and winter.

### **Methodology:**

Field trips (5-8 days each) on the surveyed 13 villages were conducted during Spring in 1998-1999. The ethnobotanical data was collected through interviews held with 492 informants [25 traditional healers, 365 old (male and female) and 49 young farmers, 53 fishermen] and recorded on field note books. Photos and herbarium dried specimens of the used medicinal plants were prepared. All vouchers were taxonomically identified by A. Alkhulidi, Agricultural Research Center in Dhamar, and deposited in the Herbarium of the Pharmacognosy Department, Sana'a University.

## **Results and Discussions**

Traditional medicine and ethnobotanical information play an important role today as subject for scientific research, particularly when the literature and field work data have been properly evaluated. The result of such assessment can provide a number of plants which can claim priority to be investigated for a selected biological activity or efficacy against a selected disorder or disease. This pilot study includes the traditional uses of 19 plants, collected from four provinces, Hudaidah, Taiz, Abyan, and Hadramout which are used in the Yemeni herbal medicine for treating of malaria (Table 1).

Most of the remedies have been taken orally in form of decoction or infusion and paste.

No reports regarding antimalarial traditional local uses of the reported plants have been found in previous recorded literature (Schoppen A, 1983, Fleurentin, J, 1982, 1983a and 1983b). The antimalarial activity of the diluted latex obtained from *A. vera* and the infusion of the *C. italica* leaves may be explained on the light of the presence of anthraquinones and other quinoid compounds which exert good activity against *P. falciparum* (Sittie A. A. et al 1999). Antimalarial activity of *C. rotundus* was reported (Thebtaranonth, C et al 1995).

The presence of triterpenoids, limonoids, in *A. indica* may take part in the antimalarial activity of the traditional herbal medicines. It is known that the limonoid gedunin (MacKinnon, S., 1997), isolated from *A. indica*, exerts antimalarial effect in vitro. The antimalarial uses of *Dodonaea viscosa*, *Ruta chalepensis*, *Plantago major*, *Cissus*

Table 1: Plants used in treatment of malaria in some rural areas of Yemen <sup>a</sup>

Botanical name and voucher specimen number	Local names	Parts used	Preparations	Modes of use	Citations (n)	Citations (%)
<i>Aloe vera</i> L. (Liliaceae), MPY201	Sabir	J	Juice diluted with water (1:2), sweetened with honey	One tsp, b.i.d. for 3-4 days	65	13.2
<i>Anisotes triculius</i> (Forssk) Nees (Acanthaceae), MPY202	Mudhidh	L	Infusion of dried or fresh leaves	One cup, b.i.d. for 5 days	102	20.7
<i>Artemisia abyssinica</i> Sch.Bip. ex Olive et Hiern (Asteraceae), MPY203	Alsheh or Boitharan	L	infusion of dried leaves, cooled and drunk	2-3 cups, daily	148	30.1
<i>Azadiractha indica</i> A. Juss. (Meliaceae), MPY204	Mariamer	L	Infusion of the dried or fresh tender leaves	One cup, b.i.d. or t.i.d. for 5 days	104	21
<i>Cadaba rotundifolia</i> Forssk (Capparidaceae) Cadab MPY 205	Cadab	L	Decoction of fresh leaves ( about 15 leaves in 1/2 liter water)	( about 15 leaves in 1/2 liter water	123	25
<i>Cassia italica</i> (Mill.) Lamk ex Andrew (Caesalpiniaceae), MPY 206	Ashraq	L	Decoction of the dried leaves	One cup, b.i.d. for 3-5 days	80	16.3
<i>Cissus rotundifolia</i> (Forssk.) Vahl(Vitaceae) MPY207	Halas	L	Boiled leaves mixed with garlic	Eaten during meals	187	38
<i>Citrullus colocynthis</i> (L.) Schrad. (Cucurbitaceae), MPY208	Handal	S	Pulp of seeds	Eaten for 2-4 days	143	29
<i>Citrus limon</i> (L.) Burm. f (Rutaceae) MPY209	limun	P, L	Decoction of dried chopped peel or infusion of the fresh leaves	drunk during the day (2-3 handful of leaves in one liter water)	155	31.5
<i>Cyperus rotundus</i> L. (Cyperaceae ), MPY210	Sa'adh	T	Paste of tubers mixed with garlic	Eaten during meals	179	36
<i>Dodonaea viscosa</i> (L.) Jacq. (Sapindaceae), MPY211	Shahs	L	infusion of fresh leaves	Two cups, daily for 7 days	162	32.9

Table 1 continued: Plants used in treatment of malaria in some rural areas of Yemen <sup>a</sup>

<i>Eucalyptus globulus</i> Labill. (Myrtaceae), MPY212	Kafoor	L	infusion of fresh leaves, (2 handful of the fresh leaves in 1, 5 litre water)	drunk during the day in portions	103	20
<i>Lawsonia inermis</i> L. (Lythraceae) Henna, MPY213	Henna	Fl	Infusion of the dried flowers , 2tsp of crushed flowers into two cupful of water	Bid daily	75	15.2
<i>Momordica balsamina</i> L. (Cucurbitaceae) MPY 214	Gomiem	Fr	Paste of the ripe fruits mixed with garlic ( about 4 fruits and 3 cloves )	taken with meals	95	19.3
<i>Plantago major</i> L. (Plantaginaceae), MPY215	Lissan Alhamal	L	Cleaned dried leaves (1.5 handful) macerated for 24 h into 2 l of water	Cupful of macerate, t.i.d. for 3-5 days	112	22.8
<i>Prosopis juliflora</i> (Caesalpinaceae) MPY216	Saisaban	Fr	A paste of the ripe fruit (yellow color) mixed with honey	tid taken with meals	123	25
<i>Pulicaria crispa</i> , (Asteraceae), MPY 217	Ansief	ap	dried aerial parts crushed and mixed with milk and taken with meals	2-3 times taken with meals	101	20.5
<i>Ruta chalepensis</i> L. (Rutaceae), MPY218	Shadhab	L	fresh leaves (8-10) chewed without swallowing	B.i.d. for 5 days	135	27.4
<i>Tamarindus indica</i> L. (Caesalpinaceae), MPY219	Humar	Fr	Fruit juice, mixed with honey	Drunk after meals	187	38

<sup>a</sup> L, leaves; Fr, fruits; S, seeds; T, tubers; J, juice; ap, aerial parts tsp, teaspoonful; b.i.d., twice in a day; t.i.d., thrice in a day. Total citations: 492.

*rotundifolia*, *Citrullus colocynthis*, *Anisotes trisulcus*, and *Tamarindus indica* have not been reported so far. Therefore we recommend that screening of the above mentioned plants for antimalarial activity should be carried out on one hand in order to justify the local traditional uses and on the other hand to isolate and identify the active compounds, which may be regarded as future promising phytotherapeutics in the treatment of malaria.

## Acknowledgment

The authors are grateful to WHO-office in Yemen for the kind support offered to this study.

## References

- Ali, Awadh A. N., Attif, O. A. and Mohammed, M. I. (1999). Herbal medicine in two Yemeni provinces -ethnobotanical study. *Yemeni Medical J.* **3**:13-23
- Fleurentin, J., Mazars, G. and Pelt, J.-M. (1983a) Additional information for a repertory of drugs and medicinal plants of Yemen. *J. Ethnopharmacol.* **8**: 237-243.
- Fleurentin, J. and Pelt, J.-M. (1983b). Additional information on the cultural background of drugs and medicinal plants of Yemen. *J. Ethnopharmacol.* **8**: 335-344.
- Fleurentin, J. and Pelt, J.-M., (1982). Repertory of drugs and medicinal plants of Yemen. *J. Ethnopharmacol.* **6**: 85-108
- MacKinnon, S., Durst, T.; Arnason, J. T., Angerhofer, C., Pezzuto, J., Sanchez-Vindas, P. E.; Poveda, L. J., Gbeassor, M. J. (1997) Antimalarial activity of tropical Meliaceae extracts and gedunin derivatives. *J. Nat. Prod.* **60**: 336-341
- Schoppen A. 1983. Traditionelle Heilmittel in Jemen. Franz Steiner Verlag GMBH.
- Sittie, A. A., Lemmich, E., Olsen, C. E., Hviid, L., Kharazmi, A., Nkrumah, F. K. and Brogger Christensen, S. (1999). Structure –activity studies: in vitro antileishmanial and antimalarial activities of anthraquinone from *Morinda lucida*. *Planta medica* **65**: 259-261
- Tan, R. X., Zheng, W.F. and Tang, H. Q. (1998). Biologically active substances from the genus *Artemisia*. *Planta medica* **64**: 295-302
- Thebtaranonth, C., Thebtaranonth, Y., Wanauppathamkul, S. and Yuthavong, Y. (1995). Antimalarial sesquiterpenes from tubers of *Cyperus rotundus*. *Phytochemistry* **40**:125-128.
- Wood, J. R. I. (1997). A handbook of the Yemen Flora, Whitstable Litho Printers Ltd, UK.
- World Health Organization,(1996). Malaria distribution. A weekly epidemiological record. **71 (3)**: 17 -24