Credibility of Folklore Claims on the Treatment of Malaria in North-East India with Special Reference to Corroboration of their Biological Activities

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Abstract

Malaria is one of the major causes of mortality and morbidity throughout the developing countries. In spite of considerable advances made in the development of anti-malarial drugs to combat the disease, appearance of the malaria parasite resistance to the drugs one after another, has triggered the researchers to search for alternative agents of better quality. In view of the fact that plant folk medicines have immense value in providing clue for development of drug, an ethnobotanic survey of medicinal plants practiced for the treatment of malaria in North-East India, followed by the validity of folklore claims of the plant species was conducted based on the review of reported literatures. Seventy four plant species under 67 genera and 41 families used for the preparation of recipes to treat the disease were included in this communication. For each plant species, botanical and vernacular name, part(s) used, method of preparation and mode of administration of the herbal remedies were provided. Biological activities corroborative of folklore medicinal claims of the plant species were also indicated for the credibility of these folklore claims.

Keywords: Biological Activities, Folk Medicine, Malaria, North East India, Review, Validation

1. Introduction

Malaria, caused by Plasmodium species is one of the most severe diseases in the world that kills over 1 million people every year with some 3.2 billion people living in 107 countries or territories currently at risk4. The main reasons that explain this worsening situation are resistance to the current anti-malarial drugs by Plasmodium strains2, lack of new therapeutic targets3 and unavailability and un-affordability of anti-malarial drugs4, 5. The North-East India has been described and classified as a highly endemic region of the world for malaria, claiming an estimated 500 lives annually1, 6. Drug discovery from plants involves a multidisciplinary

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approach combining botanical, ethnobotanical, phytochemical and biological techniques. Plants continue to provide us new chemical entities (lead molecules) for the development of drugs against various pharmacological targets, including malaria. Since the discovery of quinine, a number of anti-malarial agents both of plant origin and synthetic have been developed. However, appearance of Plasmodium strains, resistance to these drugs one after another, has made the problem most critical one and triggered intensive efforts on the part of researcher world over to search for alternative agents of better quality on one hand, and to develop potentiating combinations of the currently used drugs, to prevent the situation from further deterioration, on the other. At the same time the ethnopharmacology approach used in search for new anti-malarial compounds appears to be predictive.

The North-East region of India situated between 21°34’ N to 29°50’ N latitude and 87°32’ E to 97°52’ E longitudes and covers an area of about 262060 sq km. The area known for its rich flora comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim which includes hills and plains and extends from sea level to snow line, holds approximately 50 percent of the total flora of India with the number of species ranging from 6000-7000. This area of India is also homeland of people belonging to more than 150 ethnic groups (tribal or tribal in origin), including 22 percent aboriginal people. About 90 percent of the total population of the region has a rural background and most of them still live in remote, isolated areas, maintaining individual identities and a primitive economic life. Traditional agriculture is the primary live hood of these people and these people depend mostly upon surrounding plant resources for day to day needs including medicaments.

Over the last few decades, a large number of ethno-medico-botanical explorations has been conducted in the region and information has been collected on the local use of a large number of plants for the treatments of a large number of diseases including malaria. Unfortunately the information has been scattered in a wide range of professional journals and periodicals, making the data mostly not easily accessible to researchers. The present communication is a review based on the plant species from Northeastern India used for the treatment of malaria and related diseases reported from the region.

2. Materials and Methods

Ethno-medico-botanical case studies reported from North-East India up to the year 2008 were reviewed and the reports on prescriptions using plant species for the treatment of malaria were collected. These references are critically examined for the prescriptions referred for the treatment of malaria and not to include general antipyretic plants. A review of literatures pertaining to biological activities of these the plant species was also conducted to verify the validity of the folklore claims and to find out direct or indirect corroboration with the biological activities; so that pharmacological evaluation of those plant species against Plasmodium strains may be prioritized, for which no direct corroboration was found and for which reports are scarcely available.

3. Results

The plant species with their ethnic uses are arranged prescription wise. For each plant species described, the botanical name followed by family, vernacular name and the name of ethnic community who uses the plant species are provided. Parts of the plant used, method of preparation or formulation and mode of administration along with dosage of folk medicines are listed in Table 1 with their respective references. In Table 2, corroborative biological activities i.e., anti-malarial activity of the cited medicinal plant species available are also given. The table includes only those species whose anti-malarial activity was reported.

4. Discussion and Conclusion

The present study has brought into light 64 prescriptions of plant folk medicines represented by 74 plant species under 67 genera and 42 families, which have been in use among the ethnic communities in North-East India, for the treatment of malaria and related diseases. Most of the drugs (87.5%) are prepared using single plant species; however, plant species used in combinations are also accounted for 12.5% of the formulations. Most of the preparations are orally administered either as extract, juice and decoction or infusion.
Table 1: Ethno-medico-botanic prescriptions for treatment of Malaria in North-East India

| Sl. No. | Plants used with local name | Parts used | Method of preparation or Formulation | Mode of administration | Tribe involved; Area of Report |
|---------|-----------------------------|------------|--------------------------------------|------------------------|--------------------------------|
| 1       | *Acacia concina* DC. (Mimosaceae); Khangthur | Leaves     | Leaves are soaked in water for overnight and made infusion | 5-15 ml is taken orally 4-5 times a day | Mizo; Mizoram22 |
| 2       | *Acorus calamus* Linn. (Araceae); Bet, Krah-Phiang | Roots      | Roots are pounded to make juice | 2-3 teaspoonfuls are given orally 3-4 times a day | Garo and Khasi; Meghalaya23,24 |
| 3       | *Adhatoda vasica* Nees. (Acanthaceae); Kawldawi, Teise | Leaves and roots | Leaves and roots are taken together in equal amounts and boiled in water to make decoction | 5-15 ml is taken orally 2-3 times a day | Mizo; Mizoram22 and Angami Naga; Nagaland25 |
| 4 *     | *Ageratum conyzoides* L. (Asteraceae); Bormadari | Tender roots | Extracted tender roots of *Ageratum conyzoides* L. and *Momordica charantia* L. are mixed with 50 gm of dried powdered stem bark of *Alstonia scholaris*. (L.) R. Br. in 200 ml of warm water | Two teaspoonfuls of the filtrate are given twice a day for 10 days | Bodo; Assam19 |
| 5 *     | *Alstonia scholaris* R.Br. (Apocynaceae); Thuamriet, Chhatton | Bark | Decoction of the bark | 10 ml is given orally in 2-4 times a day | Mizo; Mizoram22 and Plain tribe; Assam26 |
| 6 *     | *Andrographis paniculata* Nees. (Acanthaceae); Chirata, Kalmegh | Leaves | Leaves are made into paste and 2-3 gm of the paste mixed with water | Given orally once or twice a day | Plain tribe; Assam27 |
| 7       | *Artemisia nilagirica* Clarke (Asteraceae); Sai | Leaves | Decoction of the leaves | 5-10 ml is given orally 3-4 times a day | Mizo; Mizoram22 |
| 8 *     | *Azadirachta indica* A. Juss. (Meliaceae); Dieng-ja-rasang | Leaves and fruits | Leaves and fruits either singly or in combination are ground to fine paste and 2-3 gm of the paste mixed with water | Orally twice a day | Khasi; Meghalaya28 |
| 9       | *Begonia inflata* Clarke (Begoniaceae); Sekhupthur | Rhizome | Decoction of the rhizome | 5-10 ml is prescribed orally 2-3 times a day | Mizo; Mizoram22 |
| 10      | *Brucea mollis* (Simroubaceae); Kaunine | Seed powder | Seed powder (50 gm) mixed with a cup of water | Orally once or twice a day | Khasi; Assam29,30 |
| 11 *    | *Caesalpinia bonduc* L. (Caesalpiniaceae); Leta guti | Tender twigs and seeds | Tender twigs and seeds either singly or in combination are ground to paste and made into small pills of about 1 to 2gm each | Two pills twice a day are prescribed orally for 3-5 days | Dimasa; Meghalaya31 |
| 12      | *Calotropis gigantea* (L.) R. Br. ex Ait. (Asclepiadaceae); Akom-aring | Fresh leaves | Fresh leaves are pounded | One teaspoonful of extract is given orally thrice a day | Garo; Meghalaya32 |
| 13      | *Cardiospermum halicacabum* L. (Sapindaceae); Kopal-phuta | Leaves | Leaves are made in to paste adding a pinch of salt and about 10 mg of the paste mixed with water | Given orally once a day | Mahahi; Assam33 |

(Continue)
14 * Cassia occidentalis L. (Caesalpiniaceae); Herashi Roots Roots are pounded adding little amount of water a tea cup of extracted juice is given orally once a day Rajbanshi; Assam

15 Cissampelos pareira L. (Menispermaceae); Ranchsang-sata-phumru Leaves Decoction of the leaves prescribed orally twice a day Naga; Arunachal Pradesh

16 Citrus medica L. (Rutaceae); Chufu Fruit Fruit juice mixed with powder of a kind of sea shell (locally known as 'kechu') taken orally once or twice a day Angami Naga; Nagaland

17 Clerodendrum colebrookianum Walp. (Verbenaceae); Oremoatong Bark and leaves Bark and leaves in the form of decoction given orally 2-3 times a day Naga; Nagaland

18 * Clerodendrum infortunatum L. (Verbenaceae); Mukhnilai, Sakai-yu-fa Tender shoots Fresh juice of the crushed tender shoots given orally one teaspoonful twice a day Bodo and Dimasa; Assam

19 * Coptis teeta Wall (Ranunculaceae); Aru, Rinko Rhizome Rhizome is cut into 2 mm thick slices and three slices are soaked in water overnight and made infusion given orally once in the morning Mishimi and Adi; Arunachal Pradesh

20 Cy clea peltata Hook.f. & Thoms. (Menispermaceae); Rekong-bong-long Leaves Leaves are pounded a tea cup of extract is given orally once or twice a day Karbi; Assam

21 * Cy perus rotundus L. (Cyperaceae); Mutha Holarrhena pubescens (Buch.-Ham.) Wall. ex G.Don. (Apocynaceae); Doukhr Stem juice Stem juice of the discount of seed is prescribed orally thrice a day for 10 days Bodo; Assam

22 Dicentra scandens (D.Don) Walp. (Fumaraceae); Rhoodo Fresh leaves or tender stem Decoction is prepared from fresh leaves or tender stem About 3 teaspoonsfuls of decoction are taken orally thrice a day Chakhesang; Nagaland

23 * Dichroa febrifuga Lour. (Sexifragaceae); Khawsik-damdawi Roots Decoction of the roots prescribed orally 2-5 times a day Mizro; Mizoram

24 Emilia sonchifolia DC. (Asteraceae); Sher-ja mento Roots Roots are pounded adding little amount of water a tea cup of the extract is given orally once a day Mon; Arunachal Pradesh

25 * Eucalyptus globulus Labill. (Myrtaceae); Tephisei Leaves and bark Decoction of the leaves and bark given orally once or twice a day. The decoction is also used by the patients for bath Angami Naga; Nagaland

(Continue)
| No. | Common Name | Family | Part(s) Used | Preparation | Dosage | Location(s) |
|-----|-------------|-------|-------------|-------------|--------|-------------|
| 26  | *Eupatorium adenophorum* | Asteraceae | Leaves | Infusion of the leaves | prescribed orally once a day | Naga; Nagaland |
| 27  | *Exacum tetragonum* | Gentianaceae | Whole plant | Whole plant is boiled in water to prepare decoction | given orally once or twice a day | Angami Naga; Nagaland |
| 28  | *Helianthus annuus* L. | Asteraceae | Leaves and flowers | Leaves and flowers are boiled in water and the decoction mixed with honey | given orally 2-3 times a day | Manipuri; Manipur |
| 29  | *Impatiens racemosa* Hook.f. | Balsaminaceae | Whole plant | Decoction of the whole plant | taken orally 2-3 times a day | Mon; Arunachal Pradesh |
| 30  | *Lactuca serriola* L. | Asteraceae | Leaves | Leaf juice | orally as tonic after malarial fever | Apatani; Arunachal Pradesh |
| 31  | *Lantana camara* L. | Verbenaceae | Bark or whole plant | Either barks or whole plant are boiled in water to prepare decoction | A tea cup of the decoction is given orally 2-5 times a day | Karbi; Assam and Mizoram |
| 32  | *Leonotis nepetifolia* R. Br. | Lamiaceae | Seed powder | A teaspoonful of seed powder is mixed with water | given orally once or twice a day | Monpa; Arunachal Pradesh |
| 33  | *Lepionurus sylvestris* Blume | Opiliaceae | Leaves | Leaves are mixed with ginger are made into paste | 2-3 gm of the paste mixed with water is prescribed orally once a day | Karbi; Assam |
| 34  | *Leucas zeylanica* Br. | Lamiaceae | Young leaves | Young leaves are pounded adding some amount of water | a tea cup of extract is given orally once a day for one month | Karbi, Angami Naga; Nagaland |
| 35  | *Mentha arvensis* L. | Lamiaceae | Herb | About 100 gm fresh herb of *Mentha arvensis* L. are pounded with equal amount of the fresh leaves of *Ocimum tenuiflorum* (L.) Burm.f. The extracted juice mixed with 25 ml. of the fruit juice of *Citrus limon* L. | prescribed orally once a day | Bodo; Assam |
| 36  | *Mesua indica* Wall. | Clusiaceae | Leaves | Leaves are crushed, ground and the paste (3-5 gm) is mixed with water | prescribed orally once or twice a day | Garo; Meghalaya |
| 37  | *Mikania micrantha* H.B.K. | Asteraceae | Leaf | Leaf juice | given orally 2-4 times a day | Mizo; Mizoram |
| 38  | *Murraya koenigii* (L.) Spreng. | Rutaceae | Leaves | Leaves are crushed and soaked in water for 3-4 hr and made infusion | given orally 2-3 times a day | Dimasa; Meghalaya |
| 39  | *Myrica esculenta* Buch.-Ham. | Myricaceae | Bark | Bark is cut into pieces and boiled in water to make decoction | given orally 2-3 times a day | Angami Naga; Nagaland |
| 40  | *Nyctanthes arbor-tristis* L. | Oleaceae | Leaves | About 250 ml of decoction obtained by boiling the leaves (200 gm) in one liter of water, is stored in a bottle. One tea cup of the decoction mixed with ½ to 1 teaspoonful of sugar | given orally once a day in the morning on empty stomach | Dimasa; Assam |

(Continue)
| No. | Species | Part of Plant | Preparation | Administration | Region |
|-----|---------|---------------|-------------|---------------|--------|
| 41  | Ocimum tenuiflorum L. (Lamiaceae); Thulsi | Leaves | A decoction prepared by boiling the leaves of Ocimum tenuiflorum L., Nyctanthes arbor-tristis L. and Ananas comosus (L.) Merill in 250 gm, 150 gm and 100 gm quantities respectively in one liter of water for half an hour adding bulbs (8-10 nos) of Allium sativum L., seed powder (10 gm) of Piper nigrum L. and rhizome (4 thin slices of Zingiber officinale Rosc.) | Prescribed orally one tea cup a day on empty stomach | Tiwa; Assam |
| 42  | Passiflora nepalensis Wall. (Passifloraceae); Nau-awimu | Roots | Decoction of root | Taken orally 2-3 times a day | Mizo; Mizoram |
| 43  | Phlogacanthus tubiflorus Nees. (Acanthaceae); Titaphul | Leaves | Leaf extract | Taken orally 2-3 times a day | Karbi; Assam |
| 44  | Piper longum L. (Piperaceae); Voko-hrui | Fruits | Decoction (10-20 ml) of the fruits obtained with a small amount of ginger | Is given orally with sugar 3-4 times a day | Mizo; Mizoram |
| 45  | Plantago major L. (Plantaginaceae); Kelbe-an | Roots | Decoction (20 ml.) of the roots | Given orally thrice a day | Mizo; Mizoram |
| 46  | Pogostemon benghalense (Burm.f.) Kuntze (Lamiaceae); Suklati | Leaves | Infusion (100 ml) of the leaves | Given orally twice a day | Deori; Assam |
| 47  | Polygala parsicariaefolia Candolle (Polygalaceae); Sherita | Whole plant | Whole plant is boiled with water and made decoction | Prescribed orally 2-3 times a day | Khasi; Meghalaya |
| 48  | Potentilla albiloba Wall. (Rosaceae); Lo-li | Roots | Roots either alone or mixed with other herb in warm water | Prescribed orally 2-3 times a day | Mon; Arunachal Pradesh |
| 49  | Prunus serotina D. Don. (Rosaceae); Tlaizang | Bark | Decoction of the bark | Taken 2-3 times a day | Mizo; Mizoram |
| 50  | Prunus communis Hudson (Rosaceae); Ahom-bogori | Root bark | Infusion (200 ml) of the root-bark of Prunus communis Hudson and the leaves of Stereospermum chelonioides (L. f.) DC. either singly or in combination of both in equal proportions | Given orally twice a day | Tangsa; Arunachal Pradesh |
| 51  | Rauvolfia serpentina (Apocynaceae); Sarpagandha | Roots | Decoction of roots | Given orally 2-3 times a day | Plain tribe; Assam |
| 52  | Rubus ellipticus Sm. (Rosaceae); Mydyha | Roots | Decoction is prepared by boiling the roots of both the plants | Prescribed orally 2-3 times a day | Angami Naga; Nagaland |
| 53  | Semecarpus anacardium L. f. (Anacardiaceae); Bholagutia | Seeds | Seed oil | Is applied on the nail tip to prevent the disease | Mizo; Mizoram |

(Continue)
54. *Scutellaria glandulosa* Coleb. (Lamiaceae); Seikkhana

- **Parts Used:** Leaves
- **Preparation:** Decoction of leaves
- **Usage:** Given orally 2-3 times a day
- **Location:** Angami Naga; Nagaland

55. *Solanum anguivi* Lamk. (Solanaceae); Thesokeeu

- **Parts Used:** Seeds
- **Preparation:** Raw seeds
- **Usage:** is eaten raw
- **Location:** Karbi; Assam

56. *Solanum kurzii* Brace ex Prain (Solanaceae); Longkoks

- **Parts Used:** Fruits
- **Preparation:** Infusion is prepared from fresh fruits
- **Usage:** Taken once a day
- **Location:** Naga; Nagaland

57. *Stereospermum chelonoides* DC. (Bignoniaceae); Longkoks

- **Parts Used:** Bark
- **Preparation:** Bark is ground and mixed with water
- **Usage:** given orally once a day
- **Location:** Naga; Nagaland

58. *Terminalia bellera* (Gaertn.) Roxb. (Combretaceae); Baora

- **Parts Used:** Fruits
- **Preparation:** 5-6 fresh fruits of *Terminalia bellera* (Gaertn.) Roxb. mixed with 10-12 fresh fruits each of *Terminalia chebula* Retz. and *Phyllanthus emblica* L. and 15-20 fresh shoots of *Phyllanthus fraternus* Webster. are ground together and the extracted juice mixed with 250 ml of water is boiled for few minutes and then allowed to cool
- **Usage:** Two teaspoonful of mixture is prescribed thrice a day for 15 days
- **Location:** Bodo; Assam

59. *Tinospora cordifolia* (L.) Miers. (Menispermaceae); Amar

- **Parts Used:** Stem
- **Preparation:** Infusion of about 50 gm. each of the dried stem of *Tinospora cordifolia* (L.) Miers. and the dried leaves and stem of *Andrographis paniculata* (Burn.f) Wall. ex Nees. soaked overnight in a glass of water
- **Usage:** given alternately on empty stomach in morning
- **Location:** Bodo; Assam

60. *Toddalia asiatica* (L.) Lam. (Rutaceae); Soh-sat-khlaw

- **Parts Used:** Decoction of the root bark
- **Preparation:**
- **Usage:** given orally once a day
- **Location:** Khasi; Meghalaya

61. *Vandellia sessiliflora* Benth. (Scrophulariaceae); Nyons-shu

- **Parts Used:** Whole plant
- **Preparation:** Decoction of the whole plant
- **Usage:** given orally twice a day
- **Location:** Mon; Arunachal Pradesh

62. *Verbena officinalis* L. (Verbenaceae); Shunutamtsu

- **Parts Used:** Herb
- **Preparation:** An amount of 5-10 gm herb is macerated with approximately 50 ml of water, strained extract is given orally once a day
- **Usage:**
- **Location:** Naga; Nagaland

63. *Vitex peduncularis* Wall. ex Schauer (Verbenaceae); Thingkhawi-hlu

- **Parts Used:** Leaves, root and bark
- **Preparation:** Decoction of the leaves, root and bark is prepared 10-15 ml is given orally 2-3 times a day
- **Usage:**
- **Location:** Mizo; Mizoram

64. *Zanthoxylum hamiltonium* Wall. (Rubiaceae); Ombeng

- **Parts Used:** Roots and stem bark
- **Preparation:** Decoction of the root and stem bark
- **Usage:** given orally twice a day
- **Location:** Adi; Arunachal Pradesh

N.B. * in the serial no. of prescription indicates having direct or indirect corroboration with reported biological activities

Parts of the species such as roots and bark are generally prescribed in the form of a decoction. Among the total plant species enumerated in this communication, positive correlation between folklore use and biological activities has been recorded for 18 plant species, although ethnic use of plant parts and parts possessing corroborative biological activities are different for a few species like *Cassia occidentalis*, *Azadirachta indica* and *Clerodendrum infortunatum*. In *Cassia occidentalis* folk claim is obtained for roots only having antimalarial activity in leaves or in combination with other plant species. In *Azadirachta indica* leaves have antimalarial properties, but folk claim is obtained for fruits also along with leaves. Likewise in *Clerodendrum infortunatum* tender shoots are used by the folk healers, but only leaf extract is reported to possess antimalarial activity.
### Table 2: Corroborative Biological activities of folk claimed plant species

| Plant species                  | Parts used in folk claims | Reported Biological activities                                                                                                                                 |
|--------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *Momordica charantia*          | Tender roots              | Extract of the entire plant of shows antimalarial action against in vitro cultured *Plasmodium falciparum*                                                              |
| *Alstonia scholaris*           | Stem bark                 | Echitamine chloride isolated from bark exhibits antimalarial activity in a rodent system infected with *Plasmodium berghei*. Methanolic extracts of the plant parts also shows pronounced antiplasmodial activity |
| *Andrographis paniculata*      | Leaves                    | Leaf extracts possess antimalarial activity. The most potent dose has been reported to be 150mg/kg bw                                                                 |
| *Azadirachta indica*           | Leaves and fruits         | Leaf extracts possess antimalarial activity. Both stem and roots possess antimalarial activity. Berberine isolated from the rhizome also possess antimalarial activity |
| *Caesalpinia bonduc*           | Tender twigs and seeds    | Leaf extract found to have antimalarial activity. Oral administrations of 0.1 and 0.2 gm/kg of the water extracts of leaves in albino mice are also reportedly found active against acute *Plasmodium yoelli nigeriensis* infection |
| *Cassia occidentalis*          | Roots                     | Mixture of five plants of a traditional antimalarial formulation including roots of *Cassia occidentalis* exhibits antimalarial activity. The ethanolic extracts of leaves of *C. occidentalis* also exhibit antimalarial activity |
| *Clerodendrum infortunatum*    | Tender shoots             | Leaf extracts possess antimalarial activity. The most potent dose has been reported to be 150mg/kg bw                                                                 |
| *Coptis teeta*                 | Rhizomes                  | Rhizome extract shows antimalarial activity. Berberine isolated from the rhizome also possess antimalarial activity                                                   |
| *Cyperus rotundus*             | Tuber                     | Tuber extract possesses antimalarial activity                                                                                                                      |
| *Tinospora cordifolia*         | Stem juice                | Both stem and roots possess antimalarial activity. Berberine isolated from aerial parts of the plants also exhibits antiprotozoal activity                           |
| *Dichroa febrifuga*            | Roots                     | The alkaloid, febrifugin isolated from the root and leaves shows 100 times as active as compared to quinine, against *Plasmodium lophurae*.                        |
| *Eucalyptus globulus*          | Leaves and stem bark      | Essential oil possesses in vitro antimalarial activity on two strains of *Plasmodium falciparum*                                                                   |
| *Lantana camara*               | Bark or whole plant       | Extract exhibits antimalarial activity                                                                                                                          |
| *Ocimum tenuiflorum*           | Leaves                    | Aqueous extracts of the leaves tested in vivo against *Plasmodium berghei* show antimalarial activity. Inhalation therapy to cure *Plasmodium vivax* and *Plasmodium falciparum* infections has also been suggested |
| *Nyctanthes arbor-tristis*     | Leaves                    | Ethanolic extracts of aerial parts shows antimalarial activity                                                                                                     |
| *Terminalia bellerica*         | Fruits                    | A bioactivity - guided fractionation of an extract of fruit rind led to the isolation of two new lignans named termilignan and thannilignan, together with 7-hydroxy-3′,4′-(methylenedioxy) flavan and anolignan B. These compounds possess antimalarial activity in vitro |
| *Phyllanthus fraternus*        | Shoots                    | Aqueous extracts of whole plant was tested in vivo against *Plasmodium berghei* following Perter’s 4 day test. It shows antimalarial activity                          |
| *Toddalia asiatica*            | Root bark                 | A coumarin (5, 7-dimethoxy -8-(3′-hydroxy-3′-methyl-1-butene)-coumerin) isolated from the roots shows antimalosomal activity                                         |
These shows indirect close correlation with the claims. Further, reports on related biological activities of some important plant species like **Begonia inflata**, **Dicentra scandens**, **Impatiens racemosa**, **Lepionurus sylvestris**, **Passiflora nepalensis**, **Phlogacanthus tubeflorus**, **Polygala parscariaefolia**, **Potentilla albilflora** and **Solanum kurzii** are scarcely available and their correlation with the folk claims could not be ascertained in the present study and hence, pharmacological evaluation of these plant species against *Plasmodium* strains may be prioritized.

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