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## Document heading

# Traditional use of medicinal plants for anti-ringworm therapy in some parts of Kamrup District of Assam, a North Eastern State of India

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## ABSTRACT

**Objective:** To survey traditional use of medicinal plants for anti-ringworm therapy from December 2007 to January 2009 in some parts of Kamrup district of Assam, a North Eastern State of India. **Methods:** Based on a standard questionnaire, local inhabitants were interviewed for their knowledge of medicinal plants used against ringworm. Each entry includes the botanical and prevalent local name(s), part(s) used, and mode of use against the diseases. **Results:** This report deals with 46 plant species belonging to 30 different families used as herbal remedies for the treatment of Dermatophytosis. **Conclusions:** The study reveals several medicinal plants used by the local people for the treatment of cutaneous infections caused by dermatophytes. Such study may lead to the discovery of new antifungal agents from natural sources.

## 1. Introduction

The incidence of fungal diseases are predominated in North–East India, accounting for almost 50% of the total infectious skin diseases[1]. Among these dermatophytosis, also known as ‘ringworm’ or ‘tinea’ caused by a group of keratinophilic fungi ‘dermatophytes’ pose a serious concern[2].

The climate of Assam, a North Eastern State of India is characterized by extreme humidity ( $\geq 90\%$ ) and heavy rainfall. This tropical humid climate facilitates the occurrences of many skin infections and other diseases. In a study it revealed that skin diseases in Assam constituted 6.3% of the total number of the patients who attended medical care[3]. Skin diseases in this part of India include several conditions like eczema, leucoderma, ringworm, scabies and many others.

The people of the North East region of India are rich in ethno–medical tradition and use many herbal preparations to cure skin infections and other diseases instead of conventional synthetic drugs[4]. The region is considered as

one of the ecological hot spots of the world[5]. The tribals and the local people of this region use various plants either in crude form or as decoctions, poultices *etc.* against a variety of dermatological disorders. With this view an attempt has been made to identify a few such plants and ongoing practices of the region applied against dermatophytosis, a prevailing common skin disease of the region.

## 2. Materials and methods

The study area, some parts of Kamrup district, Assam, is situated in between 25° 43′–26° 53′ North latitude and 90° 39′–92° 11′ East longitude[6]. The local herbal/traditional practitioners (a total number of 45 individuals) were approached and interviewed about the common plants used by them for curing dermatophytosis. In this case, particularly, the help of the Village–Gaon–Burahs (Village–Heads) were taken. Each entry included the botanical name of the ethno–medicinal plant, prevalent local name(s), their part(s) used, method of preparation and also modes of administration. Some patients were also interviewed to know about the truth of the claims of the practitioners. The plants (only the uncommon ones) were collected with the help of the practitioners from natural sources. The plants were identified with the help published records/floras[7,8] and also by an experienced taxonomist Dr. Gajen Chandra

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Sarma, Botany Department of Gauhati University, Assam, India. Voucher specimen, which are not available in the Institute, were deposited in the Division of Life Sciences, IASST for future references.

### 3. Results

Medicinal plant species, which are used against ringworm are documented in the results including their botanical name, family and voucher specimen number (within brackets), local name(s), parts used, percentage of citation, followed by mode of use, which are identified scientifically. The paper reports selected species of plants used in their preparations/formulations by these people for the treatment of dermatophytosis (Table 1).

**Table 1.**  
Medicinal plants used against ringworm infection.

Plant (Family)(Voucher specimen)	Local names	Citation %	Parts used	Mode of use
<i>Adhatoda vesica</i> Nees (Acanthaceae) (JK–25/98)	Bahka/Bahak	35.6%	Leaves	Leaves macerated with turmeric and cow's urine into a paste and applied topically in the infected parts.
<i>Allamanda cathartica</i> Linn. (Apocynaceae) (IASST/MEP/H No. 27/08)	Allamanda	13.3%	Aerial parts	Pounded into a paste with water and applied topically in the infected area.
<i>Allium sativum</i> Linn. (Liliaceae)(IASST/MEP/H No 2/08)	Rahun/Naharu	64.4 %	Cloves	Cloves minced and macerated into a paste along with mustard oil and applied topically.
<i>Amaranthus spinosus</i> Linn. (Amaranthaceae) (IASST/MEP/H No 13/08)	Katakhtura	31.1%	Root	Grinded in to a paste with water and applied topically to the infected portion.
<i>Aquilaria agallocha</i> Roxb. (Thymelaeaceae) (IASST/MEP/H No 16/08)	Agaru	33.3%	Bark, oil	Bark is powdered and pounded with water into a paste and applied topically. Also, the oil extracted from the plant is applied on the infected skin.
<i>Argemone mexicana</i> Linn. (Papaveraceae) (IASST/MEP/H No 11/07)	Kuhumkata	26.7%	Roots	Root decoction is taken internally. Also seed oil is mixed with mustard oil and applied topically.
<i>Artocarpus heterophyllus</i> Lam. (Moraceae) (IASST/MEP/H No 43/08)	Kathal	48.9%	Leaves	Fresh leaves pounded and made a paste and applied externally.
<i>Azadirachta indica</i> . A. Juss. (Meliaceae) (IASST/MEP/H No 1/08)	Mahanim	97.8%	Leaves, seeds	Leaves minced in to a paste with mustard oil and applied topically. Seed oil is also applied topically.
<i>Barringtonia acutangula</i> Gaertn. (Lecythidaceae) (IASST/MEP/H No 25/08)	Hidol	24.4%	Leaves	Minced into a paste with honey and applied topically.
<i>Calotropis gigantea</i> (Linn.) R. Br. ex Ait. (Asclepiadaceae) (IASST/MEP/H No 29/07)	Akan	35.6%	Leaves	Finely crushed leaves are layered over the infected areas.
<i>Carica papaya</i> Linn. (Caricaceae) (IASST/MEP/H No 6/07)	Amita	22.2%	Latex	The latex is applied topically to the infected parts and the infected areas are covered with a muslin cloth.
<i>Cassia alata</i> Linn. (Caesalpinaceae) (IASST/MEP/H No 9/08)	Kharpat	84.4%	Leaves	Minced and grinded into a paste with sesame oil and applied topically.
<i>Cassia sophora</i> Linn. (Caesalpinaceae) (IASST/MEP/H No 45/08)	Medelua	66.7%	Leaves	Tender leaves are grinded into a paste and applied topically.
<i>Cassia tora</i> Linn. (Caesalpinaceae) (IASST/MEP/H No 55/08)	Sarudadigdiga	57.8%	Leaves and seeds	Leaves and seeds are macerated with lemon juice and applied topically.
<i>Centella asiatica</i> (Linn.) Urban. (Apiaceae) (IASST/MEP/H No 30/07)	Barmanimuni	40%	Leaves	Laves are squeezed to take out the juice which is applied topically on the affected surface. and also given internally fresh juice at empty stomach.
<i>Cinnamomum camphora</i> (Linn.) Nees (Lauraceae) (IASST/MEP/H No 57/08)	Karpur	26.7%	Leaves	Oil from leaves applied topically.
<i>Cinnamomum porrectum</i> (Roxb) Kosterm (Lauraceae) (IASST/MEP/H No 17/08)	Gondhsoroi	33.3%	Leaves and bark	Decoctions are prepared, concentrated and applied topically.
<i>Clerodendrum infortunatum</i> Linn. (Verbenaceae) (IASST/MEP/H No 11/06)	Vetetita	17.8%	Roots	Roots pounded into a paste with water and applied topically.
<i>Commelina benghalensis</i> Linn. (Commelinaceae) (IASST/MEP/H No 52/08)	Kanashimalu	11.1%	Leaves	Mixed with common salt and water into a paste and applied topically.
<i>Costus speciosus</i> (Koenig) Sm. (Zingiberaceae) (IASST/MEP/H No 34/08)	Devitokan	22.2%	Rhizome	Pounded into paste with water and applied topically.
<i>Curcuma longa</i> Linn. (Zingiberaceae) (IASST/MEP/H No 3/08)	Haladhi	80.0%	Rhizome	Fresh paste or juice of rhizome applied directly in the infected areas.
<i>Cynodon dactylon</i> Pers. (Poaceae) (IASST/MEP/H No 38/08)	Dubariban	8.9%	Leaves	Mixed with sugar and turmeric and made a paste and applied externally in the infected areas.

<i>Eclipta alba</i> (Linn.) Hassk.(Asteraceae) (JK–05/98)	Keharaj	40.0%	Leaves	Leaf juice applied directly to the infected areas.
<i>Elephantopus scaber</i> Linn. (Asteraceae) (IASST/MEP/H No 53/08)	Bon–lai	26.7%	Leaves	Bruised leaves boiled in coconut oil and applied topically.
<i>Euphorbia thymifolia</i> Linn. (Euphorbiaceae) (IASST/MEP/H No 39/08)	Gakhirati ban	28.9%	Aerial part	Juice of aerial part is applied directly to the affected areas.
<i>Gloriosa superba</i> Linn. (Liliaceae) (IASST/MEP/H No 48/08)	Nangalbhangra	13.3%	Tubers	Paste of tuber with water is applied topically in the infected areas.
<i>Glycosmis pentaphylla</i> (Retz.) Correa (Rutaceae) (JK–09/98)	Chouldhuwa	24.4%	Leaves	Pounded into a paste with ginger and common salt and applied topically over infected areas.
<i>Ichnocarpus frutescens</i> R. Br. (Apocynaceae) (IASST/MEP/H No 32/08)	Anantamul	31.1%	Roots	Root decoction is taken internally.
<i>Jatropha curcas</i> Linn. (Euphorbiaceae) (IASST/MEP/H No 18/08)	Bhatora	57.8%	Aerial parts	Juice of aerial part applied topically in the infected areas.
<i>Justicia gendarussa</i> Burm.f. (Acanthaceae) (IASST/MEP/H No. 35/07)	Jatrasiddhi, Tita bahak	17.8%	Leaves	Juice of leaves applied directly to infected portion.
<i>Lawsonia inermis</i> Linn. (Lythraceae) (IASST/MEP/H No. 24/07)	Jetuka	68.9%	Leaves	Grinded into paste and applied externally to the infected portion.
<i>Leucas lavandulaefolia</i> Rees. (Lamiaceae) (JK–02/95)	Dron	28.9%	Aerial parts	Mixed with equal amounts with garlic and coconut oil and applied externally in the infected area.
<i>Naravelia zeylanica</i> DC. (Ranunculaceae) (IASST/MEP/H No. 36/07)	Gorap choi	26.7%	Leaves	Mixed with water or coconut oil and applied externally over infected areas.
<i>Oscimum sanctum</i> Linn. (Lamiaceae) (IASST/MEP/H No 5/08)	Tulashi	68.9%	Leaves	Juice of leaves mixed with small amount of lime and common salt and applied topically.
<i>Oscimum basilicum</i> Linn. (Lamiaceae) (IASST/MEP/H No 7/08)	Bontulashi	80.0%	Leaves	Mixed with one day old shocked rice into a paste and applied externally in the infected areas.
<i>Piper betle</i> Linn. (Piperaceae) (IASST/MEP/H No.19/07)	Pan	57.8%	Leaves	Leaves are boiled in coconut/mustard oil, and filtered. Filtration is applied topically and the fresh leaf juice is also used.
<i>Piper nigrum</i> Linn. (Piperaceae) (IASST/MEP/H No 12/08)	Jaluk	51.1%	Fruits/seeds	Seed paste with water applied topically.
<i>Pistia stratiotes</i> Linn. (Araceae)( IASST/MEP/H No 44/08)	Barpuni	37.8%	Leaves	Leaves are burnt and ashes are applied topically.
<i>Plumbago zeylanica</i> Linn. (Plumbaginaceae) (IASST/MEP/H No 26/08)	Boga agyachit	44.4%	Roots	Roots pounded into paste with vinegar/milk, salt/sugar and water and applied topically.
<i>Pongamia pinnata</i> (L.) Pierre (Fabaceae) (IASST/MEP/H No 22/07)	Korach	42.2%	Leaves and seed oil	Applied topically over the infected areas.
<i>Punica granatum</i> Linn. (Punicaceae) (JK–30/99)	Dalim	31.1%	Leaves	Leaves pounded into a paste with water and applied topically.
<i>Semecarpus anacardium</i> Linn. f. (Anacardiaceae)(IASST/MEP/H No 40/08)	Bhela	24.4%	Fruits/seeds	Seed oil is applied topically in the infected parts.
<i>Solanum indicum</i> Linn. (Solanaceae) (IASST/MEP/H No.50/07)	Tit bhekuri	42.2%	Leaves and fruits	Mixed with honey and lemon into a paste and layered over infected areas.
<i>Solanum melongena</i> Linn. (Solanaceae) (IASST/MEP/H No. 10/07)	Bengena	22.0%	Leaves	Leaves minced and mixed with lemon peel and cream and applied topically.
<i>Xanthium strumarium</i> Linn. (Asteraceae) (IASST/MEP/H No. 31/08)	Agra/agara	24.4%	Leaves	Leaves are burnt; ash is powdered and layered over infected areas.
<i>Xyris indica</i> Linn. (Xyridaceae)(IASST/MEP/H No 37/08)	Kharnashi	33.3%	Aerial part	Pounded and applied topically.

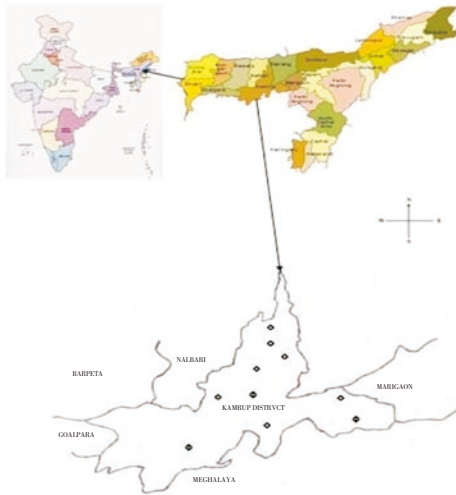


Figure 1. The study area.

#### 4. Discussion

By area, the Kamrup district is the largest district in Assam and being so it is inhabited by a large number of people pertaining to many tribal ethnic and non ethnic communities. Use of medicinal plants against various bodily ailments is a common practice here mainly by those residing in the hilly and rural areas, having easy access to these natural products. A total of 46 species of plants belonging to 30 different families were documented for their use against dermatophytosis.

The plant parts used includes leaves, bark, seeds, shoots, latex, roots and in many cases the whole aerial parts together. In particular cases two to three plants are mixed together in equal proportion in the preparations and given to the patients. The commonest methods of preparing skin ethnotherapeutics in this region was direct topical applications of the leaf juice, latex or macerated parts of the medicinal plants confined to the affected part of the body. In most of the cases, herbal medications applied were freshly prepared. The uses of the plant were found to be single or mixture of plants and/or with other components like water, honey, lemon juice, milk, cow's urine, coconut, mustard and sesame oil *etc.* These supplement ingredients may be used to enhance the effect of the herbal preparations or are simply used to make the preparations penetrable, adherable or palatable. In many cases decoctions and poultices of the plant materials were prepared while in many instances, fresh juice of the plant part was used.

The interviewed traditional practitioners include Bej, Hakims, Ayurvedic practitioners, aged villagers and local users. Many of them have inherited this knowledge from their forefathers, while some has started practicing herbal medications with their own efforts by reading various testimonials and old related books on Ayurveda. The traditional practitioners were generally of 50 years and above in age, while there were some exceptions also.

The indigenous knowledge system, traditional

technologies and resource management practices of different ethnic communities of North–Eastern India provide ample opportunities as source of herbal medicines to be used against a number of diseases. However, due to indiscriminate exploitation, destruction of forest and modern industrialization, changing scenario of rural life style, many of these plants are at the verge of extinction and many are already in Red Data book. Also, the valuable traditional knowledge and practices are in the process of degeneration and extinction due to the lack of interest of the present generations and support from the concerned agencies. Therefore, it is important to study and document the available information urgently for a wider application in future. The present study may yield good knowledge of medicinal plants that can be useful in developing new antifungal agents.

#### Conflict of Interest Statement

We declare that we have no conflict of interest.

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#### References

- [1] Jaiswal AK. Ecologic perspective of dermatologic problems in North Eastern India. *Indian J Dermatol, Venereol Leprol* 2002; **68**: 206–207.
- [2] Das J, Lahon JP, Srivastava RB. *Solanum melongena*: A potential source of antifungal agent. *Ind J Microbiol* 2010; **50**: 1–8.
- [3] Das KK. Pattern of dermatological diseases in Gauhati medical college and hospital Guwahati, *Ind J Dermatol Venereol Leprol* 2003; **69**: 16–18.
- [4] Sharma KK, Saikia R, Kotoky J, Kalita JC, Das J. Evaluation of antidermatophytic activity of *Piper betle*, *Allamanda cathartica* and their combination: an *in vitro* and *in vivo* study. *Intl J PharmTech Res* 2011; **3** (2): 644–651.
- [5] Myers N, Mittermeier RA, Mittermeier CG, da Fonseca GAB, Kent J. Biodiversity hotspots for conservation priorities. *Nature* 2000; **403**: 853–858.
- [6] Kotoky J, Das PN. Medicinal plants used for liver diseases in some parts of Kamrup district of Assam, a North Eastern State of India. *Fitoterapia* 2008; **79**: 384–387.
- [7] Patwari B. A Glossary of medicinal plants of Assam and Meghalaya. M.N. Printers; 1992.
- [8] Ambasta SP. *The useful plant of India*. Publications and Information Directorate. New Delhi: Council of Scientific & Industrial Research; 1992.