Folklore Plants from Kamakhya Hills Reserve Forest of Assam, India with their Ayurvedic Indications and Corroborated Pharmacological Activities

ABSTRACT

Aim: The present communication deals with the report of Medico-ethnobotanical claims and folklore medicinal plants documented during the survey made to Kamakhya Hills Reserve Forest of Nagaon Forest Division situated in Central Assam region in South bank of the mighty river Brahmaputra.

Materials and methods: Field surveys were conducted in the study area where four folk healers were interviewed for documentation of Medico-ethnobotanical information. The reported folklore plant specimens are collected, identified and preserved.

Results: The reported folk claims involve 18 medicinal plants under 18 genera represented by 15 families. Corroborative Ayurvedic indications and reported pharmacological activities have been reviewed against documented folklore medicinal plants for further validation of folk claims. From the review, it is evident that there are total four plant species reported as the folk medicine of the region are not mentioned in any classical Ayurvedic texts as well as in Ayurvedic Pharmacopoeia of India (API). Among these, one plant species have come up with novel disease indications without having corroborative disease indications in Ayurvedic system of medicine as well as in reported pharmacological activities.

Conclusion: Novel folklore plants are suggested for further validation and screening.

Significance: Corroboration with Ayurvedic indication and reported pharmacological activities will validate the use of the folklore plant.

Keywords: Assam, Ayurvedic indications, Ethnobotanical claims, Folklore plants, Medico-pharmacological activities,

INTRODUCTION

Assam is centrally located in the Brahmaputra valley which is a part of one of the biodiversity hotspots, occupies a special place in North-Eastern India represents 2.4% of India's total geographical area. The annual rainfall of the area starts from minimum 178 cm. to maximum of 305 cm. and temperature ranges between 18 to 37°C, with 83.00% of average humidity. Many folklore medicinal plants are used by different tribes and rural people of Assam as a part of their folklife, scattered in various pockets normally neighboring some forest localities. All the folklore and traditional knowledge are transmitted from one generation to next generation which were elsewhere published in different headings like ethnobotanical studies or folklore practices of Assam among which no article is available focusing Kamakhya Hills Reserve Forest area situated in Nagaon Forest Division in Central Assam. A sincere attempt is being made to present a Medico-ethnobotanical report of recent survey made in this particular forest during June 2015 to document various folklore medicinal plants used for various disease conditions by the folk healers of the region to cater the medical needs of the folk.

Study Area

Kamakhya Hills Reserve Forest is situated in between 26°35.9’ to 26°37.2’ N and 92°56.1’ to 92°59.8’ E (Fig. 1) with a minimum altitude of 250 feet above sea level covering an area of approximately 518 hector area surrounded by the mighty river Brahmaputra in the North, Silghat village in West, Silikhaguri, Kamakhyagaon and Sonarigaon village in the South and Hatimura forest and village in the East. The reserve forest is situated in the extreme North part of Nagaon Forest Division situated in Koliabor subdivision of Nagaon district in Central Assam. A famous temple of Ma Kamakhya is situated within the forest range which was established in 1745 AD having patronage from then Ahom King Swargadeo Pramatta Singha made of stone
and brick of that time. Pre-communication links of Central Assam across the Brahmaputra are maintained through a port town named Silghat is situated near to this forest range.

MATERIALS AND METHODS

During June 2015 field survey was conducted by the survey team in different localities in and around the Kamakhya Hills Reserve Forest covering Sonari Gaon and Nam Kamakhya villages where folk healers were interviewed for documentation of Medico-ethnobotanical information like local name, parts used, mode of preparation and administration, any other precaution, etc. in respect to the folklore plants used against various disease conditions. The plants were collected by the help of folk healers and preserved properly as herbarium and museum sample which were identified by local flora and by matching the specimens with the standard pre-identified specimens of the herbarium of the survey of medicinal plants unit, Regional Ayurveda Research Institute for Gastro-Intestinal Disorder (RARIGID), Guwahati (Assam) where voucher specimens were finally deposited for further reference.

RESULTS

Results of the Medico-ethnobotanical survey are enumerated below where folklore medicinal plants are arranged against disease conditions with scientific name, family, habit, Sanskrit name (S), local name (A), parts used and voucher numbers respectively in parenthesis with details of the mode of administration along with the amount of ingredients and doses.

Udarashula (Abdominal Pain)

One to two cm rhizome of *Acorus calamus* L. (Araceae; herb; Vachaa; Boch; Rhizome; AC4585) is crushed with one bulb of *Allium sativum* L. [Liliaceae; Lashuna (S); Naharu (A); Bulb; RD50] and a little amount of kitchen salt to prepare a paste. Three tablets are prepared from this paste and given one tablet orally in empty stomach for 3 days for relief. If the condition is associated with inflammation, 1 cm rhizome of *Zingiber zerumbet* Rosc. ex Sm. [Zingiberaceae; herb; Mahaabhi-vachaa (S); Barahu (A); Rhizome; AC6573] is mixed with the mixture and administered accordingly.

Pravahika (Dysentery)

Stem juice of *Saccharum officinarum* L. [Poaceae; herb; Ikshu (S); Kuhiyar (A); Stem; FB287] and fruit juice of *Citrus medica* L. [Rutaceae; shrub; Maatulunga (S); Nemu (A); Fruit; AC5712] is mixed in 40:1 ratio and A 1 to 2 tablespoon full of the mixture is given orally daily for 2 to 3 times.

Raktaja Pravahika (Blood dysentery)

Twenty to 25 mL leaf juice of *Curcuma longa* L. [Zingiberaceae; herb; Haridra (S); Halodhi (A); Leaf; AC6285] is mixed with sugar and mixture is given in an empty stomach daily for 3 days.

Kamla (Jaundice)

Half spoon leaf juice of *Artocarpus heterophyllus* Lam. [Moraceae; tree; Panasa (S); Kathal (A); Leaf; AC6165] is mixed with the powder of 3 grains of *Oryza sativa* L. [Poaceae; herb; Sali (S); Dhan (A); grains; AC5330] and one cup of cow milk. The mixture is given orally in empty stomach at morning time daily for 3 days.

Kashtartava (Dysmenorrhea)

A single spoon juice of apical branch of *Leucas aspera* Spreng. [Lamiaceae; herb; Dronapushpi (S); Durun (A); Apical branch; AC5878] is given orally daily from 1st to 3rd day of menstruation period in empty stomach.

Nine to eleven nos. leaves of *Achyranthes aspersa* L. [Amaranthaceae; herb; Apaamaarga (S); Uvata bon (A); Leaf; AC6092] are crushed with 3 to 5 nos. fruits of *Piper nigrum* L. [Piperaceae; climber; Maricha (S); Jaluk (A); Fruit; AC6207] and grains of *Oryza sativa* L. [Poaceae; herb; Sali (S); Dhan (A); Grain; AC5330]. The paste is given orally in
empty stomach at morning time daily for 3 days from 1st to 3rd day of menstruation period.

**Apsmara (Epilepsy)**
Sprout of Curcuma longa L. [Zingiberaceae; herb; Haridra (S); Halodhi (A); Sprout and Rhizome; AC6285] is burn daily and prescribed for deep inhalation at morning time and one pea mortar sized tablet prepared from rhizome is given orally for 8 to 9 days.

**Pada Shwayathu/Shotha (Swelling of Leg)**
Five to six cm root of each Achyranthes aspera L. [Amaranthaceae; herb; Aparamaarga (S); Uvata bon (A); Root; AC6092], Cassia tora L. [Caesalpiniaaceae; herb; Chakramarda (S); Medelua (A); Root; AC5249] and Urena lobata L. [Malvaceae; herb; Naagabalaa (S); Root; AC6131] are crushed together, and about 5 gm paste is given orally daily in empty stomach at morning time for 3 days.

**Stana-arbuda (Breast Tumor)**
Paste of Drymaria cordata Willd. [Caryophyllaceae; herb; Lajabori (A); Whole plant; AC4504] is given daily to apply locally on the breast to allay the tumor.

**Pratishyaya/Jwara (Cold Fever)**
One to two nos. mud daubers (insect) are crushed finely with 10-15 ml leaf juice of Ocimum sanctum L. [Lamiaceae; herb; Tulasi (S); Toloshi (A); Leaf; AC5076]. About 1 to 2 spoon of the mixture juice is given orally daily to cure the disease.

**Netra-abhighata (Eye Injury)**
One to two drops juice of Oldenlandia corymbosa L. [Rubiaceae; herb; Kshetraparpata (S); Bon jaluk (A); Whole plant; AC6433] is given locally during eye injury.

**Shalyapaharana (Extraction of Foreign Body/Thorn)**
One to two nos. leaves of Argyreia nervosa (Burm.f.) Boj. [Convolvulaceae; climber; Vriddhadaaruka (S); Takoria alu (A); Leaf; AC5534] is crushed with 15 to 20 nos. leaves of Ziziphus jujuba mill. [Rhamnaceae; shrub; Badar (S), Kola(s); Bogori (A); Leaf; AC5224] and paste is applied on injured area and bind with cotton cloth for a day to remove the thorn.

**DISCUSSION**
The present Medico-ethnobotanical survey results into report of 18 medicinal plants under 18 genera represented by 15 families. These plants are sporadic in the area and are collected by the healers as and when required. Many of the reported plants are indicated for specific disease conditions in Ayurvedic Pharmacopoeia of India as well as in different Ayurvedic classics which are tabulated in Table 1 along with respective Ayurvedic indications and reported corroborative pharmacological activities of the medicinal plants. From the table, it is evident that there are total four plant species reported as folk medicine of the region are not mentioned in any classical Ayurvedic texts as well as in Ayurvedic Pharmacopoeia of India, viz., Drymaria cordata Willd., Oldenlandia corymbosa L., Urena lobata L. and Zingiber zerumbet Rosc. ex Sm. Many related plant species of the same genus have found a place in Ayurvedic Pharmacopoeia of India as well as in classics, but the respective species which are found in the region are lacking. Among these, one plant species have come up with new disease indications without having corroborative disease indications in Ayurvedic system of medicine which is juice of the whole plant of Oldenlandia corymbosa L. reported to be used against eye injury. Reported pharmacological activities suggested that Oldenlandia corymbosa L. have other pharmacological activities without having similarities with Ayurvedic indications. Also, leaves of Artocarpus heterophyllus Lam. have been reported to be used against Jaundice where no corresponding Ayurvedic indications (indication for other diseases in API are available), as well as pharmacological activities, have been found.

**CONCLUSION**
The study results in eight non Ayurvedic folklore medicinal plants used by Assamese plain tribes and Nepali community residing in the study area. The folklore plants which are not in classical Ayurvedic texts as well as in Ayurvedic Pharmacopoeia of India and data deficient with regards to their pharmacological activities may be planned for with detail literature review and screening in the line of folklore use for further validation.

**ACKNOWLEDGEMENTS**
Authors are thankful to the Director General, Central Council for Research in Ayurvedic Sciences, New Delhi for his encouragement and financial support during the survey. Authors are also indebted to folk healers namely, Sh. Liladhar Hazarika (Age 77) and Sh. Pulin Hazarika (Age 60) of Sonari Gaon; Sh. Phani Gowala (Age 80) and Sh. Gobinda Bhuyan (Age 30) of Nam Kamakhya for providing important information related to the medicinal plants and practices of the area.
### Table 1: Reported Folklore medicinal plants with Ayurvedic indications and corroborated pharmacological activities

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Medicinal plants as reported in folk claims</th>
<th>Part used</th>
<th>Dosage form</th>
<th>Reported disease condition</th>
<th>Ayurvedic indications</th>
<th>Corroborated pharmacological activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Acorus calamus</em> L.</td>
<td>Rhizome</td>
<td>Paste form made into tablet</td>
<td>Abdominal pain</td>
<td>Shula, Apasmara, Svasa, Kasa, Vibandha, Unnada, Adhmana, Karna Srava⁴</td>
<td>Plant extract shows antispasmodic⁴ and antimicrobial⁶ activities</td>
</tr>
<tr>
<td>2.</td>
<td><em>Achyrantas aspera</em> L.</td>
<td>Leaf</td>
<td>Leaf paste and root as paste</td>
<td>Dysmenorrhoea, Swelling</td>
<td>Udara Roga, Arsha, Kandu, Medoroga⁶</td>
<td>Atrial parts shows analgesic and central nervous system depressant activity.⁷ Root extract shows anti-inflammatory activity.⁸</td>
</tr>
<tr>
<td>3.</td>
<td><em>Allium sativum</em> L.</td>
<td>Bulb</td>
<td>Paste made into tablet</td>
<td>Abdominal pain</td>
<td>Jvara, Krimiroga, Gulma, Kustha, Kshaya, Svasa, Vrana, Krami etc.⁹</td>
<td>Bulb Powders shows analgesic and anti-nociceptive activity.¹⁰ It has also antimicrobial activities.¹¹</td>
</tr>
<tr>
<td>4.</td>
<td><em>Argyriea nervosa</em> (Burm.f.) Boj.</td>
<td>Leaf</td>
<td>Crushed leaves as paste</td>
<td>To remove penetrated thorn from skin</td>
<td>Sula, Sopha, Apasmara, Arsha, Aruchi, Amavata, Anaha, Kasa etc.¹²</td>
<td>Plant is hypoglycaemic¹³ and leaf extract shows wound healing activity¹⁴</td>
</tr>
<tr>
<td>5.</td>
<td><em>Artocarpus heterophyllus</em> Lam.</td>
<td>Leaf</td>
<td>Juice form with rice grain powder</td>
<td>Jaundice</td>
<td>Atisara, Daha, Rakta-pitta, Sotha, Tvakroga¹⁵</td>
<td>Data deficient with regards to treatment of jaundice but having antibacterial, antiinflammatory and antifungal activities¹⁶</td>
</tr>
<tr>
<td>6.</td>
<td><em>Cassia tora</em> L.</td>
<td>Root</td>
<td>Crushed root as paste</td>
<td>Swelling</td>
<td>Kapha-vatajanyaVikara, Kustha, Vrana, Dadru, Pakshaghata, Vibandha, Gulma, Krimi, Parmi¹⁷</td>
<td>Leaf extract shows anti-inflammatory effect¹⁸</td>
</tr>
<tr>
<td>7.</td>
<td><em>Citrus medica</em> L.</td>
<td>Fruit</td>
<td>Juice in mixture</td>
<td>Dysentery</td>
<td>Rakta-pitta, Svasa, Kasa, Aruchi, UdaraRoga, Vibandha, Madatayaya¹⁹</td>
<td>Fruit is antimicrobial²⁰ and peels/leaf extract shows antiparasitic and antiprotozoal activity²¹</td>
</tr>
<tr>
<td>8.</td>
<td><em>Curcuma longa</em> L.</td>
<td>Leaf, sprout</td>
<td>Juice of leaf and inhalation by burning of sprout</td>
<td>Blood dysentery, Epilepsy</td>
<td>Pandu, Prameha, Vrana, Vis-vikara, Kustha, Tvakroga, Sitapitta, Pinasa²²</td>
<td>Anti-microbial²³ Rhizome shows anti-inflammatory²⁴ and anticonvulsant activity²⁵</td>
</tr>
<tr>
<td>11.</td>
<td><em>Ocimum sanctum</em> L.</td>
<td>Leaf</td>
<td>Juice</td>
<td>Cold fever</td>
<td>Ashmari, Svasa, Chardi, Hikka, Kasa, Krimiroga, Kustha, Netra-roga²⁹</td>
<td>Leaf extract shows anti-inflammatory, analgesic and antipyretic activity²⁰; antifungal, immunomodulatory, and antiviral¹³¹</td>
</tr>
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<td>12.</td>
<td><em>Oldenlandia corymbosa</em> L.</td>
<td>Whole Plant</td>
<td>Juice</td>
<td>Eye injury</td>
<td>Not in Classical Ayurvedic texts</td>
<td>Data deficient with regards to treatment of eye injury but having hepatoprotective, cytotoxic anti-oxidant, oxytocic and anti-malarial activities³²</td>
</tr>
<tr>
<td>13.</td>
<td><em>Oryza sativa</em> L.</td>
<td>Grains</td>
<td>Powder form</td>
<td>Jaundice</td>
<td>Stanya-kshaya, Mutrakriconcha³³</td>
<td>Anthocyanin-rich extract shows hepatoprotective and anti-oxidant action³⁴,³⁵</td>
</tr>
<tr>
<td>14.</td>
<td><em>Piper nigrum</em> L.</td>
<td>Fruits</td>
<td>Crushed with other ingredients</td>
<td>Dysmenorrhoea</td>
<td>Anaha, Gulma, Krimi-roga, Udara-roga, Vata-roga³⁶</td>
<td>Fruit extract shows antisiasmodic effect³⁷ and an Alkaloid (Piperine) shows anti-inflammatory and antiarthritic effects³⁸</td>
</tr>
<tr>
<td>15.</td>
<td><em>Saccharum officinarum</em> L.</td>
<td>Stem</td>
<td>Juice form in the mixture</td>
<td>Dysentery</td>
<td>Rakta-pitta, Visarpa, Mutrakriconcha, Opokshaya, Raktsarasa, Grahani, Pandu³⁹</td>
<td>Cane extract shows antibiotic activity⁴⁰ along with antioxidant and anti-inflammatory activities⁴¹</td>
</tr>
</tbody>
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### REFERENCES


हिन्दी सारांश
असम (भारत) के कामाख्या हिल्स संरक्षित वन से लोकदर्शी पादपों के साथ उनके आयुर्वैदिक लक्षण और संप्रृचित फार्माकोलाजिकल गतिविधियाँ

उद्देश्य: वार्षिक सूचना गय असम क्षेत्र में प्रदान नहीं की दक्षिणी किनारे पर चिकित्सक नव किनारे के कामाख्या हिल्स संरक्षित वन में सर्वांगे के दौरान चिकित्सक-प्रजातीय वानस्पतिक दायी और लोकदर्शी चिकित्सक पादप पर रिपोर्ट से सीखत है।

सामग्री और पद्धति: अध्ययन क्षेत्र में क्षेत्र सर्वांगे किया गया जहाँ चार लोक चिकित्सकों का चिकित्सक-प्रजातीय वानस्पतिक सुचना के बेहतरीन लि एह साक्षात्कार लिया गया। प्रतिवेदित लोकदर्शी पादप के नवम्बर का जोड़ किया गया उनकी पहचान की गई एवं उनका संरक्षण किया गया।

परिणाम: प्रतिवेदित लोक दायी के 15 संरक्षि की 18 जाति के अंतर्गत 18 चिकित्सक दायीं का समाहित किया गया है। संप्रृचित आयुर्वैदिक लक्षण और प्रतिवेदित फार्माकोलाजिकल गतिविधियों की समीक्षा लोक दायी के अग्रणी विधिमानकरण के लिए प्रशंसित लोकदर्शी चिकित्सक पादपों के लिए की गई। समीक्षा से, यह स्पष्ट है कि दक्षिण की लोक चिकित्सा में तुल 4 पादप प्रजाति को प्रतिवेदित किया गया विशाल भारतीय आयुर्वैदिक फार्माकोपिया के साथ-साथ किसी शास्त्रीय आयुर्वैदिक मूल्यांकन में वर्णन नहीं है। इसमें से, 1 पादप प्रजातियों नांवेल लोग लक्षण के रूप में है जिसमें फार्माकोलाजिकल गतिविधियों और आयुर्वैदिक औषधि पद्धति में संप्रृचित लोग लक्षण नहीं है।

निष्कर्ष: नांवेल लोकदर्शी पादपों को अग्रणी विधिमानकरण और जैव के लिए सुझाव गया है।

महत्व: आयुर्वैदिक लक्षण और प्रतिवेदित फार्माकोलाजिकल गतिविधियों के साथ संप्रृचित लोकदर्शी पादपों के प्रयोग का विधिमानकरण करें।

मुख्य संदर्भ: असम, आयुर्वैदिक लक्षण, चिकित्सक-प्रजातीय वानस्पतिक दाय, लोकदर्शी पादप, चिकित्सक-फार्माकोलाजिकल गतिविधियों।