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## Credibility of medico-ethnobotanical uses of members of Aroid family in Assam (India)

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#### Abstract

Aroids or the members of Araceae Family are distributed worldwide with 117 genera and 3790 species. In India including North east India though various floristic works has been carried out very few records of ethnobotanical works can be found which are scattered in various journals and periodicals, making the data mostly not easily accessible to researchers. Cross cultural ethno-botany is essential not only in authenticating and assessing the values of plant lore's but also in credibility testing of folklore claims and also finding out the new and less known use of plants. Ethno-Pharmacology has become a scientific backbone in the development of active therapeutics based upon traditional medicine of various ethnic groups. The present communication is a review based on the reported folklore medicinal claims involving members of the Aroid family used by different tribes in Assam for various disease conditions. The present study has brought into light 82 prescriptions of plant folk medicines covering more than 60 disease conditions represented by 14 aroid species and 10 genera. Among the total plant species enumerated in this communication, positive correlation between folklore use and biological activities has been recorded in preliminary review for only 4 plant species. Here an attempt has been made to test the credibility of the folklore claims by cross cultural studies among different tribes and to corroborate the claims with reported biological activities of the species in due course for scientific validation.

**Keywords:** Aroids, medico-ethnobotany, credibility, Assam

#### 1. Introduction

Aroids or the members of the Family Araceae are known for ornamental, edible as well as for medicinal uses which are distributed worldwide [1] chiefly in tropical and subtropical regions; except at the polar regions and deserts, Aroids are found in various natural habitats such as swamps, ponds, lakes, canals, rivers to rice fields, climbers and as well as epiphytes. Some species thrive well in forest floors with good canopy coverage. This family is grouped into nine subfamilies, 117 genera and 3790 species [2]. Members of this family are herbs, perennial, they are climbers, floating aquatics, helophytes, and geophytes. Underground stems are absent and if present, they are in the form rhizome or tuber; with definite node and internode regions; aerial stems are evergreen; leaves alternate or apparently basal, usually petiolate with sheathing bases. Spadix bears bisexual or unisexual flowers and sometimes with a sterile, terminal appendix. Fruit usually a head of 1-to several-seeded and commonly red, green, white, or yellow, rarely blue. They also possess crystals of calcium oxalate or raphides in the tissues [3].

In India though various floristic works has been carried out but the total reported number of distributed species varies greatly and very few records of ethno botanical works can be found which are scattered in different region of reporting. According to the Flora of British India by Hooker there are 228 species and 31 genera of Indian aroids [4]. Karthikeyan [5] reported 25 genera and 138 species in India and Yadav [6] has reported 29 genera and 150 species. In North east India and Assam, after Flora of British India and other different works in the region, 18 genera and 27 species are recorded from upper Assam area recently [7]. Many Ethnobotanical works have been conducted in entire North east India and reported 7 species from Assam [8-16], 5 species from Arunachal Pradesh [17-19], 4 species from Tripura [20-22], 3 species from Nagaland [23], 3 species from Meghalaya [24], 2 species from Manipur [25, 26] and only 1 species from Mizoram [27]. Unfortunately much other information has also been scattered in various journals and periodicals, making the data mostly not easily accessible to researchers. Cross cultural ethno-botany is the comparative study of man plant relationship among different societies. The role of cross-cultural ethno-botanical study is prominent not only in authenticating and

assessing the values of plant lore's but also in credibility testing of folklore claims and also finding out the new and less known use of plants.

Traditional medicine is a powerful source of biologically active compounds. Ethno-Pharmacology has become a scientific backbone in the development of active therapeutics based upon traditional medicine of various ethnic groups. Screening program based on Ethno-Pharmacological information has more success rate than random screening [28]. The anticestodal efficacy of nine plants that are used in indigenous system of medicine by Naga tribes in North East India to cure intestinal helminthes parasitic infections was tested employing *Raillietina echinobothrida*, a tape worm of poultry as a model test parasite. The study revealed that the stalks of *Lasia spinosa* (L.) Thw. possess a profound anticestodal efficacy as evident by the mean mortality time of *R. echinobothrida* which ranged from 1-3.66 hrs, following exposure to 40mg/ml concentration of plant extracts [29]. *Acorus calamus* L., popularly known as Sweet flag, thought to be indigenous to India, has been valued for its rhizome and fragrant essence in perfumes & oils and for insecticidal properties. Current research investigates Sweet flag's value as an insecticidal, antibacterial and antifungal agent [30]. There are many other reported species for medico-folklore use, but no attempt has been made so far to validate those claims.

The present communication is a review based on the reported folklore medicinal claims involving members of the Aroid family used by different tribes in Assam for various disease conditions. Here an attempt has been made to test the credibility of the folklore claims by cross cultural studies

among different tribes and to corroborate the claims with reported biological activities of the species in due course for scientific validation.

## 2. Material & Method

For the purpose of present review, important publications both tribe and area wise of the region have been taken into account. Folklore medicinal information reported in the literatures by different ethnic groups of the region were collected and compared. Corroboration study of the identified folklore medicinal claims of the plant species with available reported biological activities is being initiated as preliminary review of reported literatures to verify the validity of the folklore claims and to find out direct or indirect corroboration with the biological activities. Further critical review will be done in next phase of study.

## 3. Results

The result of cross cultural studies on medico-ethno-botanic use of Aroids is represented in Table 1 where name of the tribe using the plant as medicine and reported area of Assam with local names are tabulated against part(s) used for specific ailments along with mode of administration and corresponding references. Preliminary review of literatures pertaining to biological activities of the claimed plant parts for medico-ethno botanical use (Table 2) were conducted based on Chemical Abstract, Biological Abstract and other treaties of medicinal plants which needs more critical review in due course for scientific validation.

**Table 1:** Reported medico-folklore use of members of Araceae in Assam

Plant species	Common Name	Parts used	Disease condition	Reported Area/tribe	Formulation	References
<i>Acorus calamus</i> L.	Bos gach	Leaves, Flower, Root	Cough & cold, Diarrhoea, Indigestion, Tuberculosis	Sonitpur District	Oral	31
		Leaves	Cold	Nagaon district	Leaf aroma is inhaled	32
			Gout and Rheumatism	Assam	Crushed leaves with other compound preparation	33
		Rhizome	Lumbago	Assam	As poultice	33
			Arthritis	Boro tribe in Kamrup district	Paste locally	34
			Leucorrhoea	Boro tribe of Kamrup district	Paste with other compound formulation and milk	34
			Malaria	Boro tribe in Kamrup district	Decoction of crush rhizome	34
			Bronchitis, Diarrhoea, Ear problem, Epilepsy, Inflammation, Fever, Rat biting	Nagaon district	Rhizome juice orally	32
			Carminative, Child bronchitis, Child diarrhea, Child dysentery, as laxative, Child fever and Aphrodisiac	Kamrup district	Oral	35
			Chronic Liver disorder, Hepatitis	Assam	Juice with a little sugar or honey and black pepper	36
			Cough and cold	Assamese	Put around the neck	37
			Cuts	Mishing	Locally	38
			Dyspepsia, flatulence, loss of appetite & dysentery Flatulence	Bodo, Koch-Rajbangshi & Rangia tribe of Kamrup district	Powdered rhizome orally	8
			Prevention of food allergy	North Cachar Hills	A small piece of the rhizome is eaten before food	39
			Skin disease	Assam	Paste locally	16
		Stimulant	Barak valley	Dried powder mixed	40	

					with honey	
			Stomach pain	Gohpur of Sonitpur district	Juice orally	41
			Painful menses	Assam	Paste orally	42
<i>Alocasia acuminata</i> Schott		Shoots, leaves, tubers	Malaria	Mishing Tribe of Kaziranga National Park of Assam.	Orally	43
		Shoots, leaves, tubers	Blood purification	Mishing Tribe of Kaziranga National Park of Assam.	Orally	43
<i>Alocasia fornicata</i> (Roxb.) Schott.		Rhizome	Cut injury	Mishing Tribe	Rhizome paste locally	44
		Petiole	Ear problem	Nagaon district	Externally	32
<i>Alocasia indica</i> (Lour) Kour.		Rhizome	Liver disease	Kamrup district	Rhizome paste with molasses as pills	12
		Rhizome	Diabetes	Southern Assa	Orally	45
		Tuber	Jaundice	Chorei tribe of Southern Assam	Boiled tuber as food	46
		Root Bark	Fertility promoter	Assam	Fresh bark	47
		Stem	Oedema	Sonapur, Kamrup District	Orally	48
		Stem	Blood purifier	Sonapur, Kamrup District	Orally	48
		Stem	Hypolactemia	Madahi tribe of Nalbari district	Decoction taken internally	49
		Rhizome	Liver diseases	Kamrup district	Paste given in the form of pills	12
		Petiole	Jaundice	Deories of Assam	Infusion orally	50
<i>Amorphophallus bulbifer</i> Blume.	Ol Kachu	Rhizome	Piles	Nalbari district	Fresh rhizome pieces are taken	51
		Rhizome	Piles	Mishing tribes	Paste with other leaves applied outside the paining portion	38
<i>Amorphophallus campanulatus</i> (Roxb.) Bl. ex Decne	Ol Kachu	Corm	Piles	Assam	The inner soft part of cooked corm is taken orally	52
		Leaves	Piles	Lakhimpur District	Crushed leaves are given orally	11
<i>Amorphophallus paeonifolius</i> (Dennst.) Nicolson	Ol Kachu	Dried corms	Piles	Assamese people of Barpeta district	In powder form	13
<i>Arisaema tortuosum</i> (Wall.) Schott		Leaves	Abscess	Cachar District	Applied locally	53
<i>Arum dioscoridis</i> Sibth. & Sm.		Stem	Boils	Jaintia tribes of NC Hills district	Crushed and applied locally	14
<i>Colocasia esculenta</i> (L.) Schott		Corms and runners	Piles and tonsillitis	Koch-Rajbangsi, Bodo, Rangia & Rabha tribes of Kamrup district	In curry form	8
		Leaves	Small injuries	Nath people	Used for blood coagulation	9
		Roots	Pharyngitis	Nath people	Used for blood coagulation	9
		Petiole	Minor cuts	Bodo tribes in Gohpur, Sonitpur District	Heated over flame and juice is given	15
		Petiole	As styptic to stop bleeding from wounds	Assamese people of Barpeta district	Juice is given	13
		Rhizome	Cuts	Disoi Valley Reserve Forest of Jorhat District	Paste applied locally	54
		Rhizome	Burns	Disoi Valley Reserve Forest of Jorhat District	Paste applied locally	54
		Rhizome	Scorpion sting.	Disoi Valley Reserve Forest of Jorhat District	Paste applied locally	54
		Leaves	Malaria	Mishing Tribe	Oral	43
		Leaves	Blood purification	Mishing Tribe	Oral	43
		Petiole	Rheumatism & Lumbago	Deories	Roasted petiole is applied locally	50
		Petiole	Lactagogue	Boro	Paste with other plants and given	34

					orally	
<i>Homalomena aromatica</i> Schott.	Gandh kachu	Rhizome	Clear white spot in eye	Disoi Valley Reserve Forest of Jorhat District	Fresh rhizome juice used as eye drop	54
		Rhizome	Influenza	Tribes of Karbi-Anglong district	The aroma of the rhizome is inhaled	55
		Rhizome	Itching	Tribes of Karbi-Anglong district	Applied locally	55
<i>Lasia spinosa</i> (Linn.) Thumb.	Cengmora	Rhizome	irregular menstruation and leucorrhoea	Tinsukia district	As boiled vegetable	10
		Rhizome	Piles	Dibru-Saikhowa Biosphere Reserve	Decoction	16
		Rhizome	Rheumatic pain and Arthritis	Chorei tribe of Southern Assam	Boiled with water and garlic, applied locally	46
<i>Pistia stratiotes</i> Linn.	Punni	Young vegetable shoots	Body pain	Dibrugarh District, Assam	Making fish curry with other vegetables	56
		Leaves	Skin diseases	Assamese and Bengali of Kamrup district	Leaf juice boiled in coconut oil applied locally	8
		Leaves	Asthma and cough	Assamese and Bengali of Kamrup district	Leaf juice with sugar	8
		Leaves	Ring worm	Assamese and Bengali of Kamrup district	Ashes applied to the ring worm of the scalp	8
<i>Pothos scandens</i> L.		Whole Plant	Bone fracture	Different tribes of Cachar district	Paste as plaster	8

Table 2: Biological activities of reported plant species

Plant species	Part (s)	Reported biological activities (References)
<i>Acorus calamus</i> L.	Rhizome	Effective in epilepsy <sup>[57]</sup> , diarrhea <sup>[58]</sup> , shows activity like anthelmintic <sup>[59]</sup> , antiulcer, antisecretagogue, cryptoprotective <sup>[60]</sup> , antioxidant <sup>[61]</sup> , anti-inflammatory <sup>[62]</sup> , sedative & analgesic <sup>[63]</sup> , antiseptic & antispasmodic <sup>[64]</sup> , antifungal and antibacterial <sup>[65]</sup>
<i>Alocasia indica</i> (Roxb.)	Rhizome	Rhizome shows Antioxidant <sup>[66]</sup> ; analgesic and anti-inflammatory <sup>[67]</sup> ; Anthelmintic <sup>[68]</sup> ; Antidiarrheal, Antiprotozoal <sup>[69]</sup> ; Antimicrobial <sup>[70]</sup> and Antifungal <sup>[71]</sup> activities
<i>Amorphophallus campanulatus</i> (Roxb.) Bl.	Tuber	Tubers are lipolytic <sup>[72]</sup> , antioxidant, hepatoprotective <sup>[73]</sup> , analgesic <sup>[74]</sup> , antibacterial, antifungal and cytotoxic <sup>[75]</sup>
<i>Colocasia esculenta</i> (L.) Schott	Leaves	Leaves are antibacterial <sup>[76]</sup> ; inflammatory <sup>[77]</sup> and antifungal <sup>[78]</sup>

#### 4. Discussion and Conclusion

The present study has brought into light 82 prescriptions of plant folk medicines covering more than 60 disease conditions represented by 14 aroid species and 10 genera, which have been in use among the ethnic communities in Assam, for various disease conditions. Most of the drugs (72%) are prepared using single plant species; however, plant species used in combinations are also accounted for 28% of the formulations. Most of the preparations are orally administered either as extract, juice and decoction or infusion. Among the total plant species enumerated in this communication, positive correlation between folklore use and biological activities has been recorded in preliminary review for only 4 plant species. Further, reports on related biological activities of other important and highly used plant species 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 may be prioritized.

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