



## Research Article

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### AN ETHNO-MEDICINAL REPORT ON *ARISTOLOCHIA INDICA* L. (ISHWARI) USED IN UDALGURI DISTRICT, ASSAM, INDIA

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#### ABSTRACT

Background: Ethnomedicine allows medicinal plants to cure disease combined with traditional health medicine (*Ayurveda*) for better healthcare worldwide. *Ayurveda*, the ancient traditional system of medicine in India, focuses on the natural way of managing and preventing diseases. Similarly, ethnic communities depend highly on medicinal plants in their vicinity for healthcare. Folk medicine and *Ayurveda* are being imbricated to each other regarding treating ailments. Objectives: The study aimed to explore and document a new claim in Udalguri district, Assam. Material and Methods: An ethnomedicinal study was carried out in September 2022 among the local inhabitants of the study area. Traditional healers and local people practising folk medicine were approached for documentation of folk uses. Result: A new ethnomedicinal report of *Aristolochia indica* L. (Aristolochiaceae) used by the Bodo community from Udalguri district in Assam against insect bites is reported in the present communication. The use of leaf in this claim has not been previously reported from Assam. Conclusion: Comprehensive justification with the help of *Ayurveda* and ethnopharmacology has been given to verify the efficacy of the plant and the folk claim against insect bites.

**Keywords:** Ethnomedicine, *Ayurveda*, *Aristolochia indica* L., folk medicine, Bodo community, insect bite

#### INTRODUCTION

Plants are important sources of medicine in traditional and modern methods of treatment. According to WHO, about 80% of the population in developing countries still rely on traditional medicine for their primary healthcare needs. Nearly 8000 plants have been identified as Medicinal Plants by the Botanical Survey of India (BSI)<sup>1</sup>. Being the largest producer of medicinal herbs, India is known as the botanical garden of the world, catering to the needs for herbal medicine. India is rich in the repository of information on traditional uses of plant resources owing to its rich cultural and floristic diversity. This has been amply proved by the multitude of studies reported on this aspect from the country. The tribal and indigenous communities of India were found to be using more than 10,000 species of wild plants for various purposes, which includes about 8000 species for medicinal uses<sup>2</sup>.

People, especially the ethnic communities of India, traditionally use plant resources for their food, shelter and health care as medicinal uses<sup>3</sup>. Even after the identification of many plants used in the Indian System of Medicine, a large number of plants or uses of plants are yet to be analysed, mainly confined among people of rural areas, forests, hills and according to the availability of the plants, the use of them varies.

*Ayurveda* approaches holistic management, which destroys disease from the root. It enormously aims at healing based on plant origin. There are still several plants that remain unidentified as medicinal. In *Ayurveda*, *Aristolochia indica* L. is called *Ishwari* with various synonyms. *Ayurveda*, or traditional Indian medicine,

is based on a Traditional Medical System, in the same way as Traditional Chinese Medicine, with both being developed in their respective geographic regions<sup>4</sup>.

The northeast region of India is ethnobotanically and anthropologically a paradise. More than 90% of the reports are traditional ethnobotany where only the plant uses are listed<sup>5</sup>. According to the recent 2022 BSI report, as per data available from different sources, there are more than 2800 species of medicinal plants used in other traditional systems of Indian Medicine<sup>1</sup>. Assam hosts a total of six species of *Aristolochia*. Approximately a total of 200 bioactive compounds have been isolated from these species<sup>6</sup>. The genus *Aristolochia* (*Aristolochiaceae*) is widely distributed in tropical to temperate regions throughout the world<sup>7</sup>. It is the largest genus in the family, accounting for about 534 accepted species<sup>8</sup> of which India is represented by 20 species only<sup>9</sup>.

#### Distribution

In India, it is distributed in lower hills, the plain regions, Bengal and Assam<sup>9</sup>. The plant is native to Andaman Island, Assam, Bangladesh, East Himalaya, India, Myanmar, Nepal, Sri Lanka and Vietnam<sup>8</sup>.

Among the 20 species of *Aristolochia* distributed in the country, 6 are presently reported growing wild in Assam, among which *Aristolochia indica* is reportedly distributed in lower Assam only<sup>9</sup>.

## Morphology

The plant is a perennial climber with branchlets slender and fusiform rhizomes<sup>7</sup>; leaves are variable, in the broad form 10-12.5 cm by 7.5 cm, from linear-oblong to obovate-oblong, usually obtusely acuminate, glabrous, entire with somewhat undulate margins; flowers are few-flowered axillary racemes greenish white about 4.5 cm long with globose inflated base; seeds are deltoid-ovate, flat and winged<sup>10</sup>.

Flowering occurs from December- February, and fruiting throughout the year<sup>11</sup>.

## Cultivation

It grows in warm and moist climates, with temperatures ranging from 20 °C to 33 °C and annual rainfall ranging from 100-150 cm and spread out to a greater part of the year. It can also be cultivated over well-drained sandy-loam soil rich in organic matter. Its propagation material is seed<sup>12</sup>.

## Phytochemistry

The phytochemistry of *Aristolochia indica* has been discussed in Table 1.

## Ishwari in Ayurveda

*Ishwari (Aristolochia indica)* is one of the potent herbs in *Ayurveda* with multiple uses. In some texts and samhitas, it is also known as *Ishwarmula*, *Nakuli*, *Gandhanakuli* and *Nagadamani*<sup>19</sup>.

### Properties of *Ishwari*

*Rasa: Katu, tikta, Kashaya*

*Guna: Laghu, Ruksha*

*Virya: Ushna*

*Vipaka: Katu*

*Karma: Kapha-vata samak*<sup>20</sup>

*Ishwari* has been mentioned in different Ayurvedic classics for various therapeutic uses (Table 2).

## Pharmacological Activity

1. Aristolactam I and (-) Hinokinin isolated from *Aristolochia indica* also exerted anti-inflammatory effects and inhibited the production of IL-6 and cytokines TNF-alpha in LPS-stimulated THP-1 cells<sup>27</sup>.
2. Screening of *Aristolochia indica* plant extract against snake (*Dabsia russelli*) venom<sup>28</sup> and scorpion (*Mesobuthus tamulus*) venom<sup>29</sup> showed potent venom neutralising capacity.
3. Apart from other activities, the aerial parts of *Aristolochia indica* were also studied by disc diffusion method against *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Bacillus sphaericus*, *Salmonella typhimurium*. The extracts showed moderate antibacterial activity<sup>30</sup>. Aqueous stem extract of *Aristolochia indica* showed higher scavenging activity of 66.66±4.67% compared to chloroform leaf extract of 48.33±3.38% in the DPPH method<sup>31</sup>.
4. A compound 48/80 induced scratched behaviour model was used to evaluate the scratching response of *Aristolochia indica* root. The ethanolic plant extract at the 150 g/kg dose

showed a significant effect and decreased the scratching incidence. This proves the antipruritic activity of plant<sup>32</sup>.

## Folk Uses in Assam

The roots of *Aristolochia indica* are used to heal wounds and to enhance fertility in males by the traditional healers of the Dhemaji district of Assam<sup>33</sup>. It has also been reported to be used by the people of Dibru-Saikhowa biosphere reserve to treat some asthmatic issues and skin diseases such as leukoderma<sup>34,35</sup>. The Deori, Muttak and Nepalese communities residing in the Dibrugarh district of Assam reported using the decoction of the leaves of *Aristolochia indica* to treat dysentery, diarrhoea and melena<sup>36</sup>.

## MATERIALS AND METHODS

### Study area

Udalguri is a town under the jurisdiction of the Bodoland Territorial Council (BTC), which controls the Bodoland Territorial Area District (BTAD) in Assam. Bhutan and Arunachal Pradesh surround it in the North, Sonitpur district in the east, Baksa district in the west and Darrang district in the south between latitude 26° 45' 13.21" north and longitude 92° 06' 7.74" east<sup>37</sup>. Bhairabkunda village is situated near Assam-Bhutan border and lies between 26° 53' 24.00" north latitude and 92° 06' 54.00" east longitude covering a total geographical area of 231.24 hectares<sup>38</sup> (Figure 1).

The climate is usually hot, oppressive and partly cloudy in the wet season, and it is warm and clear in the dry season. Over the course of the year, the temperature typically varies from 56 °F to 89 °F and is rarely below 52 °F or above 94 °F. The district enjoys a tropical rainforest climate without a dry, hot summer season. Temperature ranges between 17.5 °C minimum in December-January and 28.5 °C maximum in July-August<sup>39</sup>. The district is mainly an alluvial tract. The forests are primarily tropical evergreen in nature. Terraced alluvial deposits are characterised by the conspicuous occurrence of buried channels, back swamps, etc<sup>40</sup>.

### Local People Study/ Ethnographic Study

The field trip was carried out in September of 2022. The survey was conducted by adopting the guidelines of CCRAS, New Delhi<sup>41</sup>, like the characteristic features of the collected plant materials, including habit, habitat, flower colour, fruiting distribution and occurrence. Moreover, the collected data were recorded in the field book with proper photographs and exemplary records.

### Collection, Identification and Hebraization of Medicinal Plant Information

The medico-ethnobotanical information was collected by interviewing the local herbal practitioners from their residences and nearby forest area. Data collection has been done in the prescribed format<sup>41</sup>. The voucher specimens were collected from the study area, and herbarium specimens were prepared using the standard method of Jain and Rao<sup>42</sup> and a voucher specimen (Accession ID: NEHAR/AS/000050) was deposited at Northeast Herbarium of Ayurveda Research (NEHAR) for future reference.

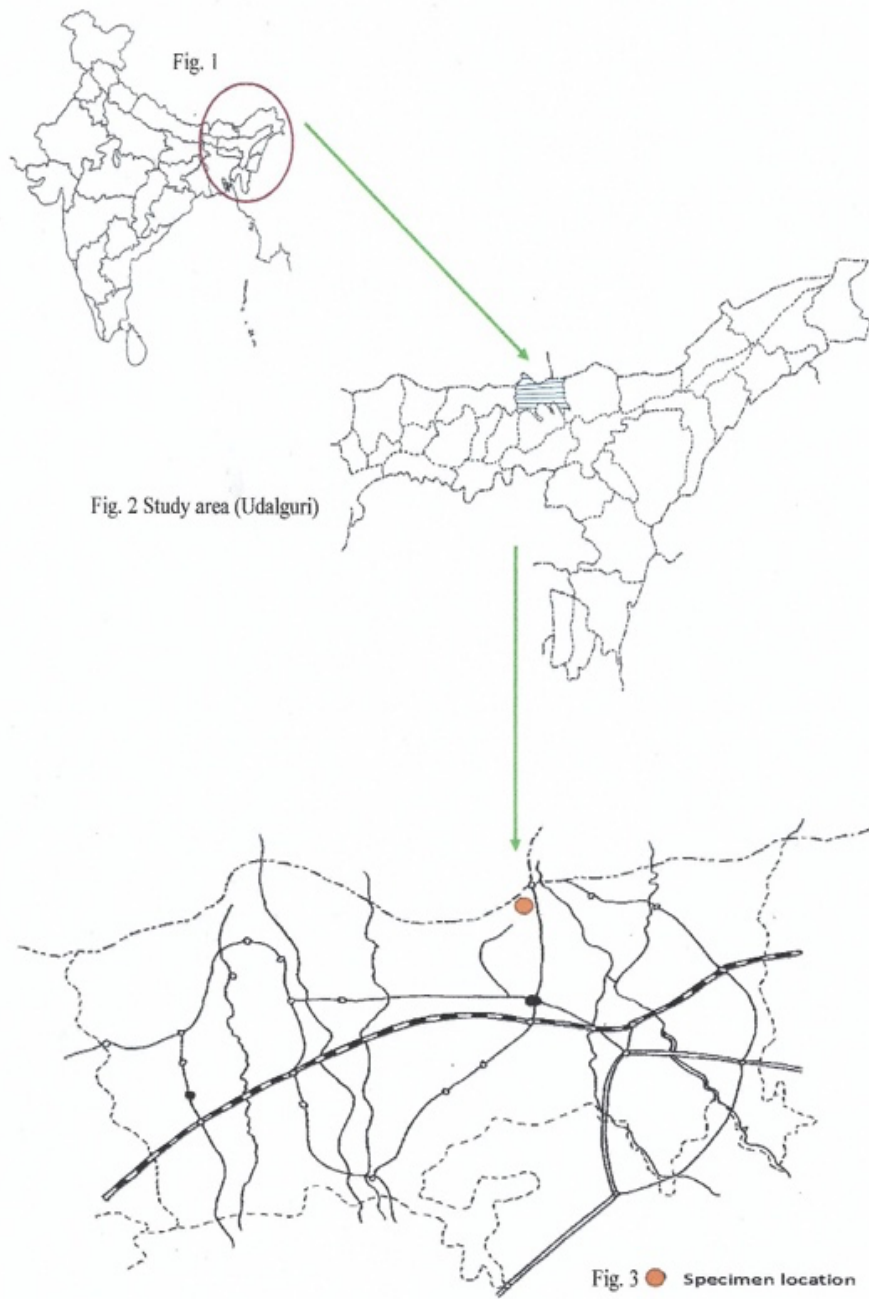


Figure 1: Map of Udalguri with specimen location (26.83N/92.07E) in Bhairavkunda (Figure not to scale)



Figure 2: Folk healer with the reported plant *Aristolochia indica*

Table 1: Phytoconstituents of *Aristolochia indica*

Parts Used	Phytoconstituents
Aerial part <sup>13,14</sup>	a) $\beta$ -Caryophyllene, $\alpha$ -Humulene, Ishwarone, Caryophyllene oxide I, Ishwarol, Linalool, $\alpha$ -Terpinolene, Ishwarane, Aristolochene, Cis-3-Hexenol, Germacrene D, Octen-3-ol, 3-Hexenyl acetate, Camphor, Nonanol, Humulene oxide, Nerolidol, $\beta$ -Farnesene, $\beta$ Bisabolene, Pinocarveol, $\delta$ -Cadinol, $\beta$ -Elemene, $\alpha$ -Terpineol, $\beta$ -Farnesol, Octanol, Caryophyllene oxide II, $\alpha$ -Bisabolol, Germacrene A, Ledol, 2-Octanol, Hexyl acetate, Thymol, Indole, $\beta$ -Phellandrene, Tetradecanol, 5 $\beta$ H,7 $\beta$ ,10 $\alpha$ -selina4(14),11-diene, $\beta$ -Pinene, Borneol, Terpinene-4-ol, $\beta$ -Selinene, Hexanol, (12S)-7, 12-Secoishwaran-12-ol, Camphene, Tricyclene <sup>13</sup> . b) Astragalol, (-) hinokinin, Aristolochic acid I, Aristolactam I, Aristolochic acid II <sup>14</sup> .
Root <sup>15,16</sup>	a) Aristolactam N- $\beta$ -D-glucoside, 3 $\beta$ -hydroxy-stigmast-5-en-7-one, 6 $\beta$ -hydroxy-stigmast-4-en-3-one <sup>15</sup> . b) Aristolochic acid I, Aristolochic acid-D, Methyl Aristolochate, Aristolactam-A II, Aristolactam I, Aristolactam, Aristolactam-C N- $\beta$ -D Glucoside, Aristolactam $\beta$ -D Glucoside <sup>16</sup> .
Stem <sup>17</sup>	$\alpha$ -pinene, Camphene, $\beta$ -pinene, p-cymene, Limonene, trans-pinocarveol, Pinocarvone, Terpinen-4-ol, Myrtenol, Myrtenal, Carvone, $\alpha$ -terpinyl acetate, Aromadendrene, (E)- $\beta$ ionone, $\alpha$ -cadinol <sup>17</sup> .
Stem and leaf <sup>18</sup>	Aristolochic acid I, Aristolochic acid II, Aristolochic acid IV, Aristolochic acid D, Aristolochic acid IIIa, Aristolochic acid Ia, Cepharadione A, Aristolactam I; N- $\beta$ -Dglucopyranoside, Aristolactam AII, Aristolactam III, Aristolactam I, Aristolactam IVa, Aristolactam AIII, Aristolactam II, Aristolactam II; N- $\beta$ -D-glucoopyranoside, Aristolactam IIIa; N- $\beta$ -D-glucoopyranoside, Aristolactam Ia; N- $\beta$ -D-glucoopyranoside, Aristoloterpenate I, Ariskanin B, 9-Methoxyaristolactam II, Norcepharadione A <sup>18</sup> .

Table 2: *Ishwari* in different *Samhita* and *Nighantu*

References	Uses
<i>Ch/Chi</i> /3/263 <sup>21</sup>	Used in the preparation of <i>Agurvadi Taila</i> for <i>Sheeta Jwara</i> .
<i>Su/Ka</i> /5/84-86 <sup>22</sup>	Used as one of the ingredients of <i>lepa</i> in <i>Sarpa visha</i> (Snake poison).
<i>AH/Chi</i> /1/7/25-27 <sup>23</sup>	Used as <i>lepa</i> with other ingredients in <i>Ekanga Sopa</i> .
<i>BP</i> /2/165-166 <sup>24</sup>	Used in <i>Sarpa visha</i> (Snake poison), <i>Luta visha</i> (Spider poison), <i>Vrishchik visha</i> (Scorpion poison), <i>Akhu visha</i> (Rat poison), <i>Jwara</i> (Fever), <i>Krimi</i> (Worm infestation), <i>Vrana</i> (Ulcer)
<i>KN</i> /1/775-778 <sup>25</sup>	Indicated in <i>Vrana</i> (Ulcer), <i>Krimi</i> (Worm infestation), <i>Sarpa visha</i> (Snake poison), <i>Luta Visha</i> (Spider poison), <i>Vrishchika visha</i> (Scorpion poison), <i>Akhu visha</i> (Rat poison) and <i>Gara visha</i> (Artificial poison)
<i>RN</i> /7/96 <sup>26</sup>	<i>Anekavisha vidhwamsi</i> (used in all poison)

[\**Ch-Charaka, Su- Sushruta, AH-Ashtanga Hridaya, BP-Bhavprakash, KN- Kaideva Nighantu, RN- Raj Nighantu, Chi-Chikitsa, Ka-Kalpa*]

Table 3: Mode of preparation and administration of the reported claim

Reported disease	Name of Claim plant	Sanskrit Name	Local name	Parts used	Preparation and mode of administration	Mode of Administration
Insect bite	<i>Aristolochia indica</i> L. (Aristolochiaceae)	<i>Ishwari</i>	Ishwari mula (Assamese), Somaina (Bodo)	Leaf	5 fresh leaves for the male and 7 fresh green leaves for the female patient are made into a fine paste.	I. Orally; consumed twice daily for 3-4 days. II. Locally; applied 3-4 times per day over the affected area for 3-4 days.

Table 4: Traditional Uses of leaves of *Aristolochia indica* outside North-east region

Method of preparation (leaf)	Reference
Leaf paste is applied over the affected area of the bite.	Yesodharan K <i>et al.</i> , 2007 <sup>46</sup>
Leaf juice is extracted and made to drink it.	Mishra S, 2008 <sup>47</sup>
Leaf paste is applied over the affected area.	Yesodharan K <i>et al.</i> , 2009 <sup>48</sup>

## RESULT AND DISCUSSION

A new report on the ethnomedicine of *Aristolochia indica* prescribed and used by women of the Bodo community of Udalguri district is presented. This report was verified by consulting people who have taken the treatment from the local healer. The local herbal practitioner, Mrs Akani Daimari, 41 years, female, village Kachubeel, P.O Bhairavkunda, District Udalguri of Bodo community, has informed the report against insect bite. The report is enumerated in Table 3 with the drug's mode of preparation and administration.

### Ayurveda

The folk claim has been reported for the insect bite. According to *Ayurveda*, insect bites can be correlated with *Keeta visha* (insect poison)<sup>43</sup>. According to Sushruta, it is one of the *Janghama visha* (animal poison)<sup>44</sup>. According to the *Samhitas* and *Nighantus*, *Ishwari* (*Aristolochia indica*) has been used both externally and internally as a medicine for *sarpa* (snake), *luta* (spider), *vrishchika*

(scorpion) and *akhu* (rat) *visha* (poison) but not in *keeta visha* (insect poison)<sup>22-25</sup>.

However, in *Raj nighantu*, it has been mentioned that it can be used in all types of *visha*. So, an inference can be drawn that it can also be helpful in *keeta visha* (insect poison) as it is also one of the types of *janghama visha* (animal poison)<sup>26</sup>.

### Ethnobotany

Outside the north-east region, the other reported traditional uses of leaves of *Aristolochia indica* are discussed in Table 4.

According to recent and previous reports, traditional medicinal use of *Aristolochia indica* leaves against insect bites has been reported in Kerala and Madhya Pradesh<sup>45-48</sup>.

However, the present study is the first report of the use of *Aristolochia indica* leaves against insect bites from the north-eastern region of India, the state of Assam.

## Pharmacology

Ethanol extract of leaves of *Aristolochia indica* has moderately significant antibacterial and antifungal activity. Ethanol extract showed more potent antifungal activity than antibacterial<sup>49</sup>. Though it has antimicrobial efficacy but antivenom effect, the antipruritic effect has still not been tested and needs further evaluation.

## CONCLUSION

In the present manuscript, a detailed study of *Ayurveda* aspects, ethnomedicinal uses and pharmacological activities of *Aristolochia indica* has been carried out. However, a detailed phytochemical analysis is needed to validate the present claim of using *Aristolochia indica* leaves against insect bites and explore its synergistic effects.

## REFERENCES

1. Botanical Survey of India. Steps taken to farming conservation, processing and promotion of medicinal plants. Available from: <https://pib.gov.in/PressReleaseDetail.aspx?PRID=1810916> [Accessed on 24/11/2022].
2. Pushpangadan P, George V. Ethnomedical practices of rural and tribal populations of India with special reference to the mother and childcare. *Indian J Tradit Knowl* 2010;9 (1):9-17.
3. Pattanayak S, Dutta MK, Debnath PK, Bandyopadhyay SK, Saha B, Maity D. A study on ethnomedicinal use of some commonly available plants for wound healing and related activities in three southern districts of West Bengal. *India Explor Anim Med Res* 2012; 2(2):97-110.
4. Kumar S, Dobos GJ, Rampp T. The significance of Ayurvedic Medicinal Plants. *J Evid Based Complementary Altern Med* 2017;22(3):494-501.
5. Mao AA, Roy DK. Ethnobotanical studies in Northeast India: A review. *Indian Ethnobotany: Emerging Trends*. In: Jain AK, Editor. New Delhi: Scientific Publishers (India); 2016. p. 99-112.
6. Borah PJ, Borah D, Das U, Das TJ. A review on ethnopharmacological utility, traditional knowledge and phytochemistry of *Aristolochia* species in Assam. *India. Not Sci Biol* 2021;13(3).
7. Hwang SM, Kelly LM, Gilbert MG. *Aristolochiaceae*. In: Wu Z, Peter HR, Hong D, Editors. *St. Lois: Flora of China*. Science Press, Beijing and Missouri Botanical Garden Press; 2003. p. 246-269.
8. POWO 2022. Genus *Aristolochia*. Available from: <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:330834-2#source-KB> [Accessed on 24/11/2022].
9. Borah D, Taram M, Das AP, Tangiang S, Do TV. *Aristolochia assamica* (Aristolochiaceae) a new species from the East Himalayas. *Annales Botanica Fennici* 2019; 56:253-257.
10. Sati B, Sati H, Saklani S, Bhatt PK, Mishra AP. Phytochemical and Pharmacological Potential of *Aristolochia Indica*: A Review. *Res J Pharm Biol Chem Sci* 2011; 2(4): 647-654.
11. India Biodiversity Portal. *Aristolochia indica* L. <https://indiabiodiversity.org/species/show/228798> [Accessed on 24/11/2022].
12. National Medicinal Plants Board. echarak. *Aristolochia indica* L. <https://echarak.in/echarak/templates/Aristolochia%20indica%20Linn.%20.pdf> [Accessed on 24/11/2022].
13. Jirovetz L, Buchbauer G, Puschmann C, Fleischhacker W, Shafi PM, Rosamma MK. Analysis of the essential oil of the aerial parts of the medicinal plant *Aristolochia indica* Linn. (*Aristolochiaceae*) from South India. *Sci Pharm* 2000; 68:309-316.
14. Desai DC, Jacob J, Almeida A, Kshirsagar R, Manju SL. Isolation, structural elucidation and anti-inflammatory activity of astragalol, (-) hinokinin, aristolactam I and aristolochic acids (I & II) from *Aristolochia indica*. *Nat Prod Res* 2014; 28(17):1413-1417.
15. Achari B, Chakraborty S, Pakrashi SC. An N-glycoside and steroids from *Aristolochia indica*. *Phytochemistry* 1981; 20(6):1444-1445.
16. Mix DB, Guinaudeau H, Shamma M. The aristolochic acids and aristolactams. *J Nat Prod* 1982; 45(6):657-666.
17. Kanjilal PB, Kotoky R, Couladis M. Chemical composition of the stem oil of *Aristolochia indica* L. *J Essent Oil Res* 2009; 21(1):24-25.
18. Michl J, Jennings HM, Kite GC, Ingrouille MJ, Simmonds MSJ, Heinrich M. Is aristolochic acid nephropathy a widespread problem in developing countries? A case study of *Aristolochia indica* L. in Bangladesh using an ethnobotanical-phytochemical approach. *J Ethnopharmacol* 2013; 149(1):235-244.
19. Anonymous. The Ayurvedic Pharmacopoeia, Part-I, Volume- III, first ed. Government of India, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga-Naturopathy, Unani, Siddha & Homeopathy, New Delhi. 2006. p 69-70.
20. Sharma PV. *Dravyaguna Vigyanam*. Chaukhamba Prakashana, Varanasi; 2011. Volume 2. p. 594-596.
21. Dwivedi L, editor, (3<sup>rd</sup> ed.). *Charaka Samhita* of Charaka, *Chikitsa sthan; Jwara chikitsaadhyaya*: Chapter 3, Verse 263. Varanasi: Chaukhamba Prakashana, 2014.
22. Shastri A, editor. *Sushruta Samhita* of Sushruta, *Kalpa sthan: Sarpa dashta visha Chikitsa Kalpa*: Chapter 5, Verse 84-86. Varanasi: Chaukhamba Prakashana, 2014.
23. Gupta A, editor. *Ashtanga Hridaya* of Vagbhata, *Chikitsa sthan; Syavathu chikitsa adhyay*, Chapter 17, Verse 25-27. Varanasi: Chaukhamba Orientalia, 1999.
24. Misra B, Vaishya R, editors. *Bhavaprakasa (Nighantu yukt)* of Bhavamisra, *Haritakyadi varga*: Verse 165-166. Varanasi: Chaukhamba Prakashana, 2001.
25. Sharma PV, Sharma G, editors. *Kaiyadeva Nighantu, Oushadhi varga*: Verse 775-778. Varanasi: Chaukhamba Prakashana, 2014.
26. Tripathi I, editor. *Raj Nighantu, Mulakadi varga*: Verse 96. Varanasi: Chaukhamba Prakashana, 2014.
27. Desai DC, Jacob J, Almeida A, Kshirsagar R, Manju SL. Isolation, structural elucidation and anti-inflammatory activity of astragalol, (-) hinokinin, aristolactam I and aristolochic acids (I & II) from *Aristolochia indica*. *Nat Prod Res* 2014; 28(17):1413-1417.
28. Meenatchisundaram S, Parameswari G, Michael A. Studies on antivenom activity of *Andrographis paniculata* and *Aristolochia indica* plant extracts against *Daboia russelli* venom by *in vivo* and *in vitro* methods. *Indian J Sci Technol* 2009; 2(4): 76-79.
29. Attarde S, Apte K. Studies on antivenom activity of *Aristolochia indica* plant extract against red scorpion venom by *in vivo* and *in vitro* methods. *Int J Pharmacogn Phytochem Res* 2013; 5(3):168-172.
30. Shafi PM, Rosamma MK, Jamil K, Reddy PS. Antibacterial activity of the essential oil from *Aristolochia indica*. *Fitoterapia* 2002;73(5):439-441.
31. Subramaniyan V, Saravanan R, Baskaran D, Ramalingam S. *In vitro* free radical scavenging and anticancer potential of *Aristolochia indica* L. against MCF-7 cell line. *Int J PharmPharm* 2015;7(6):392-396.
32. Mathew JE, Kaitheri SK, Dinakaranvachala S, Jose Magi. Anti-inflammatory, antipruritic and mast cell stabilising

- activity of *Aristolochia indica*. Iran J Basic Med Sci 2011; 14(5): 422-427.
33. Taid TC, Rajkhowa RC, Kalita JC. A study on the medicinal plants used by the local traditional healers of Dhemaji district, Assam, India, for curing reproductive health-related disorders. Adv Appl Sci Res 2014;5(1):296-301.
  34. Nath KK, Deka P, Borkataki S, Borthakur SK. Traditional remedies of respiratory disorders from Assam, India. Pleione 2008;2(2):211-216.
  35. Purkayastha J, Dutta M, Nath SC. Ethnomedicinal plants from Dibru-Saikhowa biosphere reserve, Assam. Indian J Tradit Knowl 2007;6(3):477-480.
  36. Borah PK, Gogoi P, Phukan AC, Mahanta J. Traditional medicine in the treatment of gastrointestinal diseases in upper Assam. Indian J Tradit Knowl 2006; 5(4):510-512.
  37. Latitude. Udalguri, Assam. Available from: <https://latitude.to/madhya-pradesh> [Accessed on 24/11/2022].
  38. Latitude. Bhairabkunda, Udalguri, Assam. Available from: <https://latitude.to/articles-by-country/in/india/182577/bhairabkunda> [Accessed on 24/11/2022].
  39. Weatherspark. Weather in Udalguri. Available from: <https://weatherspark.com/y/112082/Average-Weather-in-Udalguri-India-Year-Round> [Accessed on 24/11/2022].
  40. Anonymous. Groundwater Information Booklet, Udalguri District, Assam. Central Ground Water Board North-eastern Region, Ministry of Water Resources, Guwahati; 2013. p 1-10.
  41. Rath C, Sushmitha B, Tripathi AK, Chincholikar MB, Mangal AK, Srikanth N. Medico-Ethno Botanical Survey: An Overview of CCRAS Contributions. J Drug Res Ayurvedic Sci 2017; 2(3):188-240.
  42. Jain SK, Rao RR. A Handbook of Field and Herbarium Methods, 1977. Today and Tomorrow's Printers and Publishers, New Delhi.
  43. Shastri A, editor. *Sushruta Samhita* of Sushruta, *Kalpa sthan: Keeta kalpa*: Chapter 8. Varanasi: Chaukhamba Prakashana, 2014.
  44. Shastri A, editor. *Sushruta Samhita* of Sushruta, *Kalpa sthan: Janghama Vishavigyaniya kalpa*: Chapter 3, Verse 5. Varanasi: Chaukhamba Prakashana, 2014.
  45. Jain V, Jain S.K. Compendium of Indian Folk Medicine and Ethnobotany (1991-2015). 1<sup>st</sup> ed. Deep Publications; 2016. P 40.
  46. Yesodharan K, Sujana KA. Ethnomedicinal plants used by the tribals of Parambikulam wildlife sanctuary in Palakkad district, Kerala State, India. J Econ Taxon Bot 2009; 33:5-18.
  47. Mishra S. Ethnomedicinal studies of Korku tribe, with Gotra names derived from plant names, from Khandwa district in Madhya Pradesh. Ethnobotany 2008; 20:122-127.
  48. Yesodharan K, Sujana KA. Ethnomedicinal knowledge among Malamalar tribe of Parambikulam wildlife sanctuary, Kerala. Indian J Tradit Knowl 2007; 6(3):481-485.
  49. Kumar SM., Rajeswari R, Astalakshmi N. Evaluation of antimicrobial activities of *Aristolochia indica* (Linn). Int J Pharm 2011; 3(4). 271-272.

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