

ETHNOMEDICINAL POTENTIAL OF *SARCOSTEMMA ACIDUM* IN DIFFERENT REGIONS IN INDIA

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Received: 22 January 2018, Revised and Accepted: 21 February 2018

ABSTRACT

Objective: The aim of this study is to collect and enumerate the uses of *Sarcostemma acidum* (Somlata) in the treatments of various diseases and to evaluate knowledgeable information on traditional practitioners among different communities in India.

Methods: This was an extensive survey of literature on ethnopharmacological uses of *S. acidum* in Indian system of traditional medicine (TM), and the collected information documented in tabular form.

Results: The collected literature reveals that the plant is used as TM by the indigenous community in states such as Madhya Pradesh, Gujarat, Telangana, Karnataka, Andhra Pradesh, Tamil Nadu, Rajasthan, Maharashtra, Uttaranchal, West Bengal, Uttar Pradesh, and Andaman and Nicobar Islands. These communities are using the whole plant in 29%, stem 15%, latex 24%, roots 10%, leaves 17%, and flowers in 5% of cases for treating 40 different types of ailments important being ear ache, snake bite, rheumatism, dog bite, emetic, chronic ulcer, and bone fracture.

Conclusions: Due to insufficient knowledge, lack of information and overexploitation has made the plant species under threat. The present survey provides proper documentation of ethnomedicinal uses of the plant and provides a valuable source of information for traditional practitioners and researchers with a special emphasis on developing policies for conservation and sustainable use of this species.

Keywords: Traditional medicines, *Sarcostemma acidum*, Ethnomedicinal uses.

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INTRODUCTION

Traditional medicine (TM) also termed, complementary medicine, an important part of health care with a long history of use in health maintenance and in disease prevention and treatment, is widely used in most countries, and its use is increasing rapidly in other countries. There is a growing interest in TM extending beyond products as they are cost savings. Special focus should be paid to their best use, for health and protect users of these products, and also to promote practices and practitioners [1]. Today, the TMs provide health service to 80% of the world's population. In India, a total of 427 Ethnic Communities [2], majority of which still rely on the traditional system of medicine to treat various disorders and their daily needs [3-7], are practicing this age-old tradition. They have invaluable knowledge about the medicinal properties of plants growing in their vicinity and their various miscellaneous uses [8-12].

Sarcostemma acidum Wight. & Arn. commonly known as "Somlata," is an important member of family Asclepiadaceae. According to mythological belief the plant was a source of "Soma" that was used to prepare a rejuvenating drink "Somras," although this belief is still debated by scholars [13]. The plant is a part of traditional medicine among aboriginal communities in India since time immemorial. The plant is known to exist mainly in warmer part of India and generally prefers dry or semi-dried rocky places with low rainfall, shade, and moisture conditions. The plant is a perennial jointed shrub, with fleshy glabrous twig having milky white latex (Fig. 1a). Leaves are opposite mainly reduced to scales (Fig. 1b) [14]; roots are brownish, and flowers actinomorphic, with pale green or white in colour. The plant is bitter, cooling, narcotic, acrid, emetic, and rejuvenating [15] containing carbohydrate terpenes, phytosterols, saponins, and lignin [16]. The plant possesses antimicrobial, anti-inflammatory, antifertility, anti-ulcer, anxiolytic, antipsychotic, and central nervous system inhibitory property [17-21].

Due to the diverse presence of the plant in Euro-Asian region and warmer part of India, unique medicinal properties, and uses by the Ethnic Communities in India [14], it becomes necessary to assess pharmacognostic details of the plant for evaluation and formulation of a suitable dosage of bioactive compounds for the preparation of effective drugs and their application in treating various diseases and sharing information with the rest of the world. Moreover, the documentation of indigenous knowledge on the use of plants helps in gathering information about the geographical distribution of the plant and to forward suggestions for its sustainable use and conservation and to preserve the unrecorded information [22] which may either be lost forever. Therefore, there is an urgent need to record this precious ethnomedicinal knowledge about the plant so that in future it could aid in drug discovery and development of affordable health care for poor and rural people. Keeping the aforesaid facts in view,



Fig. 1: (a) *Sarcostemma acidum* Wight. and Arn. (b) Closer view of the plant bearing opposite scale leaves

the present study was made to record the use of *S. acidum* herbal preparations used by different indigenous communities in various regions of India.

METHODS

An extensive literature on ethnopharmacological uses of *S. acidum* in Indian system of TM was surveyed. The relevant literature sources were shown in table form, including the name of indigenous groups, locality, the ailment treated, the plant part used, and mode of preparations. The plant sample was also collected and identified from the study area in the Rewa district (24' 18 and 25' 12 N and 81' 2 and 82' 18 E), Madhya Pradesh. The information gathered was further discussed with subject experts to validate the claims about the plant material and its uses.

RESULTS AND DISCUSSION

Literature surveys on ethnomedicinal uses of *S. acidum* for treating various disorders by local or indigenous communities in different regions in India were reviewed. Ethnomedicinal uses of the plant to remedy various diseases are summarized in Table 1 with the indigenous group using them, region/state, disease treated, part(s) used, method, and sources. According to the research survey, the plant is used as TM by the indigenous community in treating ailments in the Indian states, Madhya Pradesh, Gujarat, Telangana, Karnataka, Andhra Pradesh, Tamil Nadu, Rajasthan, Maharashtra, Uttaranchal, West Bengal, Uttar Pradesh, and Andaman and the Nicobar Islands. The collected information reveals that plant is an important aspect of TM among tribal communities, mainly in Andhra Pradesh, followed by Tamil Nadu and Telangana. As a matter of fact, it is interested to be noted that indigenous communities are using the whole plant in 29%, stem 15%, latex 24%, roots 10%, leaves 17%, and flowers in 5% of cases for treating various diseases (Fig. 2).

Altogether, these communities are using the plant for treating 40 unique types of ailments, namely, an earache (8%), snake bite (7%), rheumatism, dog bite and emetic (6% each), bone fracture (5%) mental disease, lactation, allergic rhinitis, and chronic ulcer (4% each), cold, cooling effect, lotion, swelling, infection, inflammation, whooping cough and bronchitis, burning micturition, cow skin parasites, hemorrhagic septicemia, and wound and burns (2% each), and sinusitis and allergy, cough, asthma, epilepsy, cataract, gastric problem, rejuvenation, ocular infection, boils, skin disease, hypodermis disease, dipsia, viral infection, hydrophobia, insecticides, psychopathy, scabies, cow lactation, and antifertility (1% each) (Fig. 3).

It is important to note that the indigenous communities of a different geographical region have their own mode of the use of plant parts to treat an ailment. The tribal community of Mandla, Bhopal, and Malwa region in Madhya Pradesh uses whole plant infusion or root twice a day for treating asthma [23], whereas in Dhinodhar hill Nakhatrana taluka, Kutch Gujarat, only the plant decoction is consumed for treating this disorder [24]. In Mandla, Bhopal, and Malwa region of Madhya Pradesh, the juice of the whole plant and roots is used as a remedy for cold [23], whereas in Sriharikota, Andhra Pradesh, the stem juice is used to treat cold [28]. The whole plant part is used to remedy inflammation and infection in Mandla, Bhopal, and the Malwa region of Madhya Pradesh [23], and in Walayar Valley, the Western Ghats, Tamil Nadu, only leaves are used as ailment to treat the disease [29]. Knickers tribes of Kalkulam Taluk, Tamil Nadu, use gently warm soft stem juice, while the Ethnic Communities of Krishna district, Andhra Pradesh, use leaf juice [34], in Purulia, West Bengal, dry powder decoction of the whole plant [35], and in Rayalaseema, Andhra Pradesh, plant root [36] as an ear drops for treating earache. Tribal communities in Barmer, Rajasthan, use the whole plant [22] and Yerukala tribes from Warangal, Telangana, applies latex [38] on joints to treat rheumatism, arthritis, and joint pain.

To treat snake bites, the rural people in Thar, Rajasthan, uses the extract of root, stem, and neem bark [32], the local community in Uttaranchal

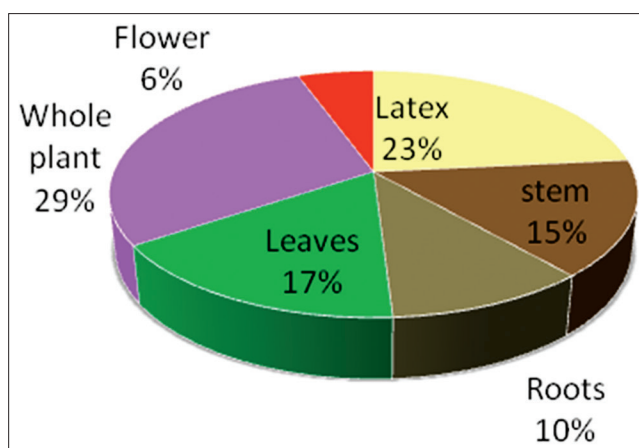


Fig. 2: The percentage of different plant parts used in treating ailments

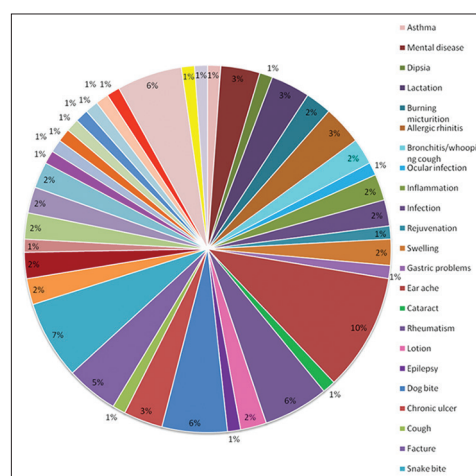


Fig. 3: Various ailments cured using *Sarcostemma acidum* plant

uses leaves, latex, and flower [39], and rural tribes of Madurai use plant root and neem bark [9]. The dog bite is cured using leaf powder and mustard oil by local tribes in Madurai, Tamil Nadu [9], mixture of root, stem extract, and neem bark is used by rural people in Thar, Rajasthan [32], and mixture of stem extract, *Cynodon dactylon* grass, and turmeric are applied on the bitten area for 2 weeks by Ethnic Community in Krishna, Andhra Pradesh [34], for treating this disorder. In Thoppampatti, Dindigul, Tamil Nadu, entire plant is consumed orally [46], Bhongir, Nalgonda, Telangana, latex is used [25], and in Madurai, Tamil Nadu, stem and root extract [9] are administered for emetic diseases. The local community in Sonbhadra, Uttar Pradesh, uses the whole plant [48], whereas in Uttaranchal, leaves, latex, and flower [39] are used in curing bone fracture. In case of wounds and burns, the tribes of Prakasam district apply latex externally [50], and on the contrary, fresh leaves are chewed with rock salt for the same disorder in the Eastern Ghats, Andhra Pradesh [51]. For sinusitis and allergy, the tribes of Paderu, Vishakhapatnam, Andhra Pradesh, utilize the whole plant [45], whereas Kani tribes in Keeriparai, Kanyakumari, Tamil Nadu, use roots and leaves to cure the disorder [10]. Local people in Dhinodhar hill, Nakhatrana Taluka, Kutch, Gujarat, applies latex to the cattles to kill skin parasites [24], but the tribes of Andaman and Nicobar Islands use all parts either administered orally or applied externally to eliminate the bugs [54]. The local community in Purulia, West Bengal, uses latex [35], and North Warangal and South Nalgonda, Telangana, use bark [40], whereas in Mandla, Bhopal, and Malwa, Madhya Pradesh, the infusion of crushed plant and water is taken twice a day [23] to increase lactation in women.

Table 1: Ethnomedicinal uses of *S. acidum* for various ailments in India

Communities	Region	Ailment	Part used	Method	References
Rural people, traditional practitioners	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Mental disease, Allergic rhinitis	Whole plant	Plant crushed and made infusion with the water and taken twice a day	[23]
Local inhabitants	Dhinodhar hill, Nakhatrana taluka, Kutch (Gujarat)			Plant decoction	[24]
Local people	Sri Pancha Narasimha Swamy and Sri Matsyagiri			Administered orally	[25]
Yanadis tribe	Narasimha Swamy Sacred grooves, Bhongir, Nalgonda (Telangana)	Burning micturition	Whole plant	One teaspoonful of plant powder consumed with two cups of toddy	[26,27]
Ethnic community	Medak (Andhra Pradesh)				
Local inhabitants	Jadura, Bharapar, Sanatorium, Sedata, Tapkeshwari hill, Bhuj Taluka, Kutch (Gujarat)	Swelling	Whole plant	Decoction+boiling water	[8]
Rural people, traditional practitioners	Mandla, Bhopal. and Malwa (Madhya Pradesh)			Plant crushed and made infusion with water and taken twice a day	[23]
Local inhabitants	Jadura, Bharapar, Sanatorium, Sedata, Tapkeshwari hill, Bhuj Taluka, Kutch (Gujarat)	Bronchitis, Whooping cough	Whole plant	Decoction	[8]
Local inhabitants	Dhinodhar hill, Nakhatrana taluka, Kutch (Gujarat)				[24]
Rural people, traditional practitioners	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Cold	Whole part of plant	Given to children	[23]
Yanadi tribes	Sriharikota Island (Andhra Pradesh)		juice, root Stem	10–15 ml slightly warm juice given orally for 4–5 days	[28]
Local people	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Inflammation, Infection	Whole plant	Thick paste applied in the swelling area	[23]
Irula tribe	Walayar valley, Western Ghats (Tamil Nadu)		Leaf	Decoction taken orally	[29]
Local people	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Rejuvenation	Juice of whole plant, root	Taken orally with other herbal medicine	[23]
Local people	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Dipsia	Whole plant	Plant powder given twice a day with cow milk or luke water	[23]
Local people	Mandla, Bhopal, and Malwa (Madhya Pradesh)	Gastric problems	Whole plant powder	Given empty stomach	[23]
Kanikkars tribes	Pechiparai forest range, Kalkulam Taluk (Tamil Nadu)	Earache	Stem	Soft-stem juice gently heated used as ear drop	[30]
Local tribes Ethnic community	Mancherial and Jannaram Forest Divisions, Adilabad (Telangana)		Tender tips	Tender tips juice used as an ear drops	[31,27]
Rural tribes	Medak (Andhra Pradesh)				
Rural people	Madurai (Tamil Nadu)		Leaf	Leaf powder+mustard oil	[9,32,33]
Tribal community	Thar Desert (Rajasthan)				
Ethnic community	East Nimar (Madhya Pradesh)				
Ethnic group	Krishna (Andhra Pradesh)		Leaf juice	Leaf juice used as ear drop	[34]
	Purulia (West Bengal)		Whole plant	Dry powder given as decoction to babies	[35]
Ethnic groups	Rayalaseema (Andhra Pradesh)		Root		[36]
Yanadi tribes	Sriharikota Island (Andhra Pradesh)	Early stages of cataract	Latex	1–2 drops of latex dropped into eyes 2–3 times a week	[37]
Rural tribes	Madurai (Tamil Nadu)	Rheumatism, Arthritis and joints pain	Stem	Stem juice+water	[9,32,33]
Rural people Tribes	Thar Desert (Rajasthan)				
Tribal communities	East Nimar (Madhya Pradesh)				
Yerukala tribe	Barmer (Rajasthan)		Whole plant	Whole plant extract	[22]
Rural tribes	Warangal, (Telangana)		Latex	Latex applied on the joints	[38]
Rural people	Madurai (Tamil Nadu)	Body lotion	Latex	Milky latex	[9,32]
Rural people	Thar Desert (Rajasthan)				
Rural people	Thar Desert, (Rajasthan)	Snakebite	Stem and root extract	Stem and root extract+neem bark	[32]

(Contd...)

Table 1: (Continued)

Communities	Region	Ailment	Part used	Method	References
Local people	Uttaranchal		Leaves, latex, flower	N/A	[39]
Local community	Northern Warangal and Southern Nalgonda (Telangana)		Bark	Aqueous extract of stem bark	[40]
Rural tribes	Madurai (Tamil Nadu)		Root	Root+neem bark	[9,27,41]
Ethnic community	Medak (Andhra Pradesh)				
Koyas tribe	Warangal (Telangana)	Dog bite	Leaf	Dry leaf powder+mustard oil	[9]
Rural tribes	Madurai (Tamil Nadu)				
Rural people	Thar Desert (Rajasthan)		Stem and root extract	Stem and root extract+neem bark	[32]
Yanadi tribe, Local community	Chittoor (Andhra Pradesh) Jogimatti forest, Chitradurga (Karnataka)		Root	Root infusion	[42,43]
Ethnic community	Krishna (Andhra Pradesh)		Stem extract	Stem extract+C. dactylon grass+turmeric applied on bitten area for 2 weeks	[34]
Rural tribes	Madurai (Tamil Nadu)	Chronic ulcer	Latex	3 drops of latex+honey thrice a day	[9,25,44]
Sacred grooves	Bhongir, Nalgonda (Telangana)				
Paliyan tribes	Sirumalai hills, Eastern Ghats (Tamil Nadu)				
Rural tribes	Madurai (Tamil Nadu)	Emetic	Stem and root	Stem and root extract	[9]
Local community	Jogimatti forest, Chitradurga (Karnataka)		Stem	Dried stems	[43,45]
Paderu tribes	Visakhapatnam (Andhra Pradesh)				
Village peoples	Thoppampatti Dindigul (Tamil Nadu)		Whole plant	Oral and raw	[46]
Sacred grooves	Bhongir, Nalgonda (Telangana)		Latex	N/A	[25]
Local community	Northern Warangal and Southern Nalgonda (Telangana)	Bone fracture	Stem	Stem paste	[40,47]
Tribes local community	Harda (Madhya Pradesh)		Whole plant		[48]
Local people	Sonbhadra (Uttar Pradesh)				
Local people	Uttaranchal		Leaves, latex, flower	N/A	[39]
Yanadis tribes	Cuddapah (Andhra Pradesh)	Epilepsy/Hysteric fits	Stem	Water solution of pulpy mesocarp given as nasal drops	[49]
Tribes	Prakasam (Andhra Pradesh)	Wounds/Burns	Latex	Applied externally	[50]
Ethnic group	Eastern Ghats (Andhra Pradesh)		Leaf	20-25 fresh leaves chewed with 3-4 pieces of rock salt once per day for 5 days	[51]
Local people	Uttaranchal	Boils	Leaves, latex, flower	N/A	[39]
Chenchus tribe	Nallamalais forest (Andhra Pradesh)	Ocular infections	Leaf sap	Used as eye drop	[52]
Irula tribe	Walayar valley, Western Ghats (Tamil Nadu)	Cough	Leaf	Decoction taken orally	[29]
Local people, tribes	Nagpur (Maharashtra)	Cooling effect	Stem	Applied orally	[53]
Tribes	Paderu, Visakhapatnam (Andhra Pradesh)	Sinusitis/allergy	Whole plant	Whole plant	[45]
Kani tribes	Keeriparai Kanyakumari (Tamil Nadu)		Roots and leaves	N/A	[10]
Tribes	Andaman and Nicobar Islands	Cow lactation,	Whole plant	All parts are administered orally or applied externally	[54]
Local inhabitants	Dhinodhar hill, Nakhatrana taluka, Kutch (Gujarat)	Cattle skin parasites (ticks, mites, twine etc.)	Latex	Applied externally	[24]
Tribes	Andaman and Nicobar islands		Whole plant	All parts are administered orally or applied externally	[54]
Tribes	Rapur, Chitvel, Eastern Ghats (Andhra Pradesh)	Scabies	Latex	Latex applied externally for 1 week	[11]
Local people	Uttaranchal	Antifertility	Leaves, Latex, flower	N/A	[39]
Tribal community	Kurnool, Prakasam, Guntur, Nallamalais (Andhra Pradesh)	Skin disease	Latex	N/A	[55]

(Contd...)

Table 1: (Continued)

Communities	Region	Ailment	Part used	Method	References
Tribal community	Kurnool, Prakasam, Guntur, Nallamalais (Andhra Pradesh)	Asthma	Latex	N/A	[55]
Local tribes	Anantapur (Andhra Pradesh)	Hemorrhagic septicemia in cattle	Stem	Stem paste+pepper 50 g+goat milk. 100 ml given orally for 5-6 days	[56,57]
Kadugolla tribes Village peoples	Tumkur (Karnataka) Thoppampatti, Dindigul (Tamil Nadu)	Viral infection, hydrophobia, insecticidal, psychopathy	Whole plant	Oral and raw	[46]
Rural tribes	Madurai (Tamil Nadu)	Hypodermis diseases	Stem and root	Stem and root extract	[9]
Ethnic group	Purulia (West Bengal)	Lactation	Latex	N/A	[35]
Local community	Northern Warangal and Southern Nalgonda, (Telangana)		Bark	N/A	[40]
Rural people, traditional practitioners	Mandla, Bhopal. and Malwa (Madhya Pradesh)		Whole plant	Plant crushed and made infusion with the water and taken twice a day	[23]

N/A-not available. *S. acidum*

Moreover, there are the reports of using the similar methodology to cure ailments by the different tribal community in different regions in India. Yanadis tribe of Cuddapah, Andhra Pradesh [26], and Ethnic Community in Medak, Andhra Pradesh [27], use whole plants in burning micturition. To cure swelling, the local people consumes decoction of the whole plant with water in Tapkeshwari hill, Bhuj Taluka, Kutch, Gujarat [8], and Mandla, Bhopal, and Malwa region, Madhya Pradesh [23]. The tribe of Tapkeshwari hill, Bhuj Taluka [8], and Dhinodhar hill, Nakhatrana taluka [24], Kutch, Gujarat, uses a plant decoction to remedy bronchitis and whooping cough. The local tribes of Mancherial and Jannaram Forest Divisions, Adilabad, Telangana [31] and Medak, Andhra Pradesh [27], use tender tips juice, and Madurai, Tamil Nadu [9], Thar desert, Rajasthan [32] and East Nimar, Madhya Pradesh [33], use leaf powder and mustard oil, as an ear drop for treating an earache. The native tribes of Madurai, Tamil Nadu [9], Thar, Rajasthan [32], and East Nimar, Madhya Pradesh [33], use stem juice and water in a similar fashion to treat rheumatism, arthritis, and joint pain.

The milky latex of the plant is used as a lotion by the tribal community of both regions Madurai, Tamil Nadu [9], and Thar Desert, Rajasthan [32]. To cure snakebite, the rural tribes of Madurai, Tamil Nadu [9], Medak, Andhra Pradesh [27], and the Koyas tribe of Warangal, Telangana [41], use Somlata plant root and neem tree bark for the ailment. Plant root infusions are a common mode of administration among Yanadi tribes, Chittoor, Andhra Pradesh [42], and local people of Jogimatti forest, Chitradurga, Karnataka [43], for treating dog bites. The treatment of chronic ulcer by consuming latex with honey is a common mode of administration among tribal communities of Madurai, Tamil Nadu [9], Paliyan tribes, Sirumalai hills, Eastern Ghats, Tamil Nadu [44], and Bhongir Nalgonda, Telangana [25]. The tribes of Paderu Visakhapatnam, Andhra Pradesh [45], and the local community of Jogimatti forest, Chitradurga, Karnataka [43], use stem for emetic disorders. The application of stem paste on the fractured bone is the common methods adopted by tribal community of Harda, Madhya Pradesh [47], and North and South Nalgonda, Telangana [40]. The local tribes of Anantapur, Andhra Pradesh [56], and Kadugolla tribes from Tumkur, Karnataka [57], have a similar mode of treating hemorrhagic septicemia in cattle using a mixture of stem paste, pepper, and goat milk and given orally to the cattle for 5-6 days.

As far the mode of preparation is concerned, most of the medicines are prepared from plant parts only without using any other ingredient. However, the aqueous solution (20 preparations), neem tree bark (three preparations), mustard oil (two preparations), toddy, cow milk, *C. dactylon*, turmeric, honey, rock salt, pepper, and goat milk (one

preparation each) are used in addition along with the plant/parts, as per the prescribed dose most probably either to enhance or to neutralize unpleasant taste of the plant for easy consumption.

CONCLUSION

The present study provided medicinal knowledge of the various uses of *S. acidum* (Somlata) by different communities in India. The present study provided medicinal knowledge of the various uses of *S. acidum* (Somlata) by different communities in India. The study helps in documentation and substantiates in securing knowledge of the curative application of the plant. The ethnopharmacognostic information of the plant would be useful for further scientific studies. As the plant is categorized under threatened vulnerable species, there is an urgent need to frame a long-term strategy for the involvement of government organizations, traditional and all concerned communities to explore therapeutic potential, along with applying conservation strategies of plant species.

CONFLICT OF INTEREST

The authors have declared that no conflict of interest.

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