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Ethno-Medicinal Profile of Different Plant Parts of *Calotropis procera* (Ait.) R. Br.

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Abstract

The present paper reviews the literature on recent ethno medicinal uses of every plant part of *Calotropis procera* (1968-2009) and its medicinal properties used for the treatment of various ailments as in the case of many types of fevers, rheumatism, indigestion, cough, cold, eczema, asthma, elephantiasis, nausea, vomiting and diarrhea, etc. The review includes accounts of medicinal values of all parts of the plant that have been used in folk medicine as a remedy. The name and parts of the plant studied, the spectrum of activity, and methods used are discussed in this review paper.

Key words: *Calotropis procera;* traditional medicines; ethno-medicinal use.

Introduction

The herbal medicines occupy distinct position right from the primitive period to present day. The ethnobotanical pharmacology is as old as man himself. These medicines have less side effects and man can get the herbs easily from nature. India being a tropical country is blessed with vast natural resources and ancient knowledge for its judicious utilization. However, in order to make these remedies acceptable to modern medicine, there is a need to scientifically evaluate them, to identify the active principles and to understand the mechanism of action (Ashok Vaidya, 1998). *Calotorpis procera* in India holds a pride of place largely because of its other uses and economic values. The genus *Calotropis* R.Br. (Asclepiadaceous) is distributed in tropical and subtropical regions of Asia and Africa (The wealth of India, 1959). It is represented in India by two species viz. *C. procera* and *C. gigantean.*

Calotropis procera (Ait.) R. Br., a wild growing plant of family *Asclepiadaceae*, is well known for its medicinal properties. Different parts of this plant have been reported to exhibit anti-inflammatory, analgesic, and antioxidant properties. It is found in most parts of the world in dry, sandy and alkaline soils and warm climate and is more common in south western and central India and western Himalayas. It is found in waste lands and grows as a weed in agricultural lands. In ancient Ayurvedic medicines the plant *Calotropis procera* was known as

"Rakta arka".

Morphologically the plant is erect, tall, large, much branched and perennial shrub or small tree that grows on a height of 5.4m, with milky latex throughout. Bark is soft and corky, branches stout, leaves sub sessile, opposite, decussate, broadly ovate, oblong, elliptic or obovate, acute, thick, glaceous, green coloured with fine cottony pubescent hair on young. Flowers in umbellate cymes and tomentose on young. Seeds broadly ovate, acute, flattened, minutely tomentose, brown coloured and silky.

Methodology

Most of the research papers, research articles and review papers were consulted and compiled. The useful material regarding the information of ethno medicinal aspects of *C. procera* were collected from time to time and summarized in present paper. This paper recovers the traditional medicinal values of each and every part of the selected the plant (*C. procera*).

Result

A number of research papers, articles and review papers treat the ethno medicinal aspects of this plant. Table 1, 2 and Fig. 1 showing the percentage of ethnomedicinal uses of different plant parts of *C. procera*.

Table 1. Ethno medicinal uses of different plant parts of *C. procera*.

S.No.	Part used	Preparation	Use	Refrences
1.	Whole Plant	In Nigeria traditional medicine, *C. procera* is either used alone or with other herbs	To treat common diseases such as fever, rheumatism, indigestion, cold, eczema and diarrohea.	Kew (1985)
2.	Whole plant	Whole plant is used	In boils and also to remove thorn from body.	Rai *et al* (2000)
3.	Whole Plant	The whole plant is used	for the treatment of jaundice	Jan *et al (*2009)
4.	Whole Plant	Ash of whole plant	Is used as coloring material.	Zabihullah *et al* (2006), Jan *et al* (2008)
5.	Root	The alcoholic extracts of the root and leaves of *C. procera*	Were found to have anticanceractivity against human epidermal carcinoma of the nasophyrnx tissue	Dhar *et al* (1968)

			culture.	
6.	Root			Mishra and Fridowich (1972)
			digestive agent	
		Root used as		
7.	Root			Basu *et al* (1992)
			Induced acute and chronic liver injury by carbon tetrachloride.	
		Chloroform root extract of *Calotropis procera*		Ajibade *et al* (2005)
8.	Roots			
			Hydrocede, in headache, severe body pain, malarial fever and convulsion	
		Root is used as		
9.	Roots			Joshua (2006)
		Root are used to treat	Eczema, leprosy, elephantiasis, asthma, cough and rheumatism.	Sen and Behra (2007)
10.	Roots			
		Roots are tied with the help of a red thread on the affected part	To relieve filarial	Jain *et al (*2007)
11.	Roots			
		Extract of root is taken orally by the tribal ladies.	in dysmenorrhea	Showkat (2007)
12.	Roots			
		Used as purgative and taken in	Dysentery.	Khan (2009)
13.	Roots			
			rabid dog bite and on the paralyzed limbs	
		The root powder is mixed with butter and this ointment is applied to.		Kumar (2009)
14.	Root			
		given with black pepper	protracted labour and also used for spleen complaints, elephantiasis, rheumatism,	Chopra *et al* (1983)
15.	Root bark			
			Is locally applied in elephantiasis.	
		The paste of root bark		Jain *et al* (1985)
16.	Root bark			
			In the treatment of Diarrhoea and dysentery. In case of diarrhoea it changes the faecal matter into a semisolid mass	
		The root bark powder is used.		

			with in the first day of treatment	Jain *et al* (1985)
17.	Root bark			
		Root bark powder	Is used to treat diarrhea and dysentery and it is an excellent substitute for ipecac. Traditionally it is used to treat cholera, extracting guinea worms and indigestion.	Parrota (2001)
18.	Root bark			
		The secretions from the root bark are traditionally used	For the treatment of skin diseases, enlargements of abdominal viscera and intestinal worms.	Jasrai *et al* (2003)
19.	Root Bark			
		The bark of root is taken out and mixed with a minute dose of arsenic and given in the form of a pill	To people suffering from leprosy.	Jan *et al* (2008)
20.	Root Bark			
		The bark of root is powdered	Used as tonic, antispa modic, expectorant and in large doses emetic.	Mishra and Fridowich (1972)
21.	Stem			
			To enhance amylase activity.	Zabihullah *et al* (2006), Jan *et al* (2008)
22.	Stem			
		Stem used as tooth brush		Jain *et al (*2007)
			As Tooth brush having the property of curing toothache	
23.	Stem latex			
		Stem is used as Maswak	To the patient of tuberculosis	
		Latex is mixed with Sodium Chloride (Nacl) and warmed on hot slow heating. During heating continuous stirring should be done. One microgram given orally thrice a day.	To cure Leucoderma.	Fatima (2007)
		The latex applied locally During the course of this treatment, prepared from the whole plant Swertia Chirayita is also taken.	As an antidote in rabies	
24.	Stem bark			
			Used as tonic and stimulant.	Abdullah(1975), Awan *et al*

25.	Leaves	4 gm of latex is taken orally by the tribal's		*(*1986), Said *et al* (1996)
		Small pieces (stem bark) in maceration in a liter of water,	To prompt healing.	Prasad (1985)
26.	Leaves			
		Dried powered leaves can be dusted over wounds, ulcers and old sores	All patients suffering from migraine headaches got relief.	Khirstova and Tissot (1995)
27.	Leaves			
		In morning, before sunrise, tender leaves were given in a capsule with water on an	As a nematicide *in vitro* and *in vivo.*	Anis *et al* (2000)
28.	Leaves	empty stomach. After treatment for three days		
		Leaf extract, chopped leaves and latex of *C.procera* have also shown great promise	Bones/ parts affected from Sinus fistula.	Ahmad and Beg (2001)
29.	Leaves			Ajibade *et al* (2005)
		Mature leaves of *C. procera* along with urine of the patient concerned are filled	To treat fever	
30.	Leaves	in an air tight earthen pot. After ten days, a cloth wet in this urine is applied on	Hydrocede, headache, severe body pain,	Shah *et al (*2006)
31.	Leaves	Leaves of *Calotropis procera* are used	malarial fever and convulsion.	Joshua (2006)
		Leaves used as	used for joints and waist pain	
32.	Leaves		for asthma To cure malarial fever.	Bhogaonkar *et al* (2007)
		Leaf extracts mixed with oil on heat. Leaves are smoked.	Eczema, leprosy, elephantiasis, asthma,	
33.	Leaves	Leaf and black pepper used	cough and rheumatism.	
		leaves are used to treat	To confirm whether the snake that had bitten the person was poisonous or not,	Jain *et al* (2007)

34.	Leaves	Young leaves are crushed and the juice is expressed on the palms of the person venomated. It is allowed to be there for five minutes and		Dhiman (2007)
35.	Leaves	is sniffed. If immediately sneezing starts the snake is declared to be poisnous.	To cure asthma.	Fatima (2007)
36.	Leaves	Milk of goat feeding on leaves of *C. procera* is given to infants	In rheumatism, gout and to relieve pains.	Reddy (2008)
37.	Leaves		Against rheumatism, asthma and also used as sedative.	Jan *et al* (2008)
38.	Leaves	The fresh leaves of the plant are warmed and are applied as poultice The decoction (leaves)	To get relief from joint pain.	Shah *et al* (2009) Khan *et al* (2009)
39.	Leaves	Leaves are pounded with castor oil and banded over knee joints	To apply on ulcers For washing cloths. Swelling part of body.	Patil *et al* (2009)
40.	Leaves	The leaves are heated and bandage is made.	To cure flatulence, anorexia, indigestion and intestinal worm infestation.	Bhatt *et al* (2009)
41.	Leaves	The leaves are used Fresh leaves are roasted in the ghee or oil and applied on the	On the wounds.	Kumar (2009)
42.	Leaves	The leaves and flowers are crushed and the paste is mixed with honey	To cure migraine	Maliya (2007)
43.	Leaves	leaves mixed with turmeric, honey and karanji was applied as a paste	Sores, skin diseases, inflammation and rheumatic joints.	Muthuswami and Solomon (2009)
44.	Leaf latex	Powder of 5g dried leaves mixed with gur given orally before sunrise for 5 days.	To treat pain in any part of the body.	Flatie *et al* (2009)
45.	Leaf latex	Leaves are used on	Treat scorpion and snake	

			bite. Leaf latex is applied on bitten area.	Misra and Fridowick (1972)
46.	Leaf latex	Leaf latex is externally applied twice a day for 2-3 days	The wart affected area.	
47.	Latex	Leaf latex is used to	For Scorpion bite. Fresh leaves are cut and the excluding latex applied to affected area.	Mortan (1981)
48.	Latex	Small quantity of fresh latex is applied over Leaf latex is used as antidote	Black scars on face; boils, cold, cough, asthma, ear ache, eczema, skin eruptions, inflammatory lesions, pain of the body, rheumatism, syphilis, leprosy and oedema.	Kew (1985) Kew (1985)
49.	Latex	Calotropin isolated from latex is used as a remedy for	Inserted in to painful tooth cavities and applied to various skin complaints.	Badruzzamana *et al* (1989)
50.	Latex	Latex is antisyphilitic and is also	Cutaneous diseases such as ringworm, syphilitic sores and leprosy.	Pandey and Anita (1990)
51.	Latex	Milky latex is locally applied in the treatment of	Anti rabies and also in the treatment of toothache and cough.	Kumar and Basu (1994)
52.	Latex	Preparations from latex with honey are used as	On ringworm and eczema, affected area becomes black after the application due to its burning effect	Rasik *et al* (1999)
53.	Latex	Latex is applied	Used for abortion	Anis *et al* (2000)
54.	Latex		Acute inflammatory response.	

55.	Latex	Latex is, either taken internally or locally to the mouth of uterus with the aid of a stick well coated with juice.	For wound healing potential.	Giday (2001)
		A single dose of the aqueous suspension of the dried latex was effective to a significant level against the	To cure arthritis.	Negi *et al* (2002)
		Topical application of 20 micro liters of 1% sterile solution of the latex of *Calotropis procera* twice daily for 7 days		Ahmad *et al* (2004)
56.	Latex			Khan and Kamran (2006)
57.	Latex	Pills of a black gram size are made from one tablespoonful of latex mixed with 20g sugar and 1g calcium carbonate. One pill twice a day given for three days is	Blackleg by Zay people	
58.	Latex	said	In toothache	Galav *et al* *(*2007)
59.	Latex	Latex of the plant is filled in spaces between nails and finger tips of patient twice daily for a few days to cure conjunctivitis.	As antiseptic	Kumar *et al* (2007)
		Latex is used in the treatment of.	gum bleeding and salt	Showkat (2007)
60.	Latex	Latex is applied		Fatima (2007)
		Latex is used		
61.	Latex		Skin infection.	Jan *et al* (2008)
62.	Latex	Take 26 gm of lahori salt, put it in an earthen pot, add *Calotropis* milk so that the salt dipped in to it, and cover earthen pot mouth and heat up. Grind it and use the powder externally for gum	Cholera and leprosy.	Jain *et al* (2008)
63.	Latex	bleeding with small amount of HCL. It is effective for	Purgative and used in dysentery.	Khan (2009)

64.	Latex	4 to 5 drops of fresh latex of the plant is dropped over the injured portion as an antiseptic in the	Odontalgic.	Patil *et al* (2009)
65.	latex	Milky latex is used to treat	Various skin diseases also act as purgative.	Kumar (2009)
66.	Latex	Used as	Antidote in scorpion bite.	Smith *et al* (1995)
67.	Latex	Latex is topically used as	Relieve inflammation and snake bite to neutralize poison.	Anis *et al* (2000)
68.	Latex	The milky juice is poisonous and is used in	on the wounds	
69.	Flower	Latex of *Calotropis procera* and *Mangifera indica* mixed with one drop of conc. HCL is applied locally as an	Tooth ache, ringworm and also for removing face darkness.	Shah *et al* (2006)
70.	Flower	Milky latex of plant is applied on inflamed areas to	Cytotoxicity of human colorectal carcinoma cell line and displayed the strong cytotoxic activity	Jan *et al* (2008)
		Latex and leaves mixed with turmeric, honey and karanji was applied as a paste.	In malaria fever	Jan *et al* (2008)
71.	Flower	Latex is used in Extracts of *Calotorpis procera* flower was investigated for	To get relief from migraine.	Khan (2009)
72.	Flower	Pills of the size of a black gram are made from the paste obtained by mixing 6gm flower buds with 7-8 black pepper seeds and 3gm	Abdominal diseases and asthma.	Kumar (2009)

73.	Flower	salt. Two pills are given twice daily for three days.	To remove dandruff from the hair.	
		Flowers of *C. procera* and leaves of *Nicotiana tobacum* L. (Solanaceae) taken in equal quantity, are burnt to ash, which is inhaled	To cure cholera and severe dysentery.	Anis *et al* (2000)
74.	Flower	Internal part of flower and sugar used for	To cure flatulence, anorexia, indigestion and intestinal worm infestation.	Khan and Kamran (2006)
75.	Flower	The hair is washed with flowers		
76.	Stigma	Powder of dried flowers of *Calotropis procera* grind along with *Papaver somniferum* and *Eletteria cardomomum* (20gm each), called Tally, used three times daily (about one teaspoonful)	In piles and asthmatic problems. To treat cholera.	
77.	Seed	The leaves and flowers are crushed and the paste is mixed with honey		
		Flowers of this plant are used	It is useful in cholera	
		About 12gm stigmas are added to 5-8 black pepper, 3gm black salt and opium (equal to one seed of mustard) and make into pills of the size of black pepper. One pill three times daily to given with hot water for three times a days		
		Take 3 gm of C*alotropis* seeds, 18 gm of red chili seeds and 6 gm opium. Grind all of these and mix it in one		

teaspoon of ginger and half cup of onion water, if unavailable then use syrup of sugar and citrus medica water..

Table 2. Percentage of ethno medicinal uses of different plant parts of *C. procera* against total number of uses.

PARTS USED	NUMBER OF USES	PERCENTAGE OF USES
1. WHOLE PLANT	4	5.19
2. ROOT	10	12.98
3. ROOT BARK	6	7.79
4. STEM	2	2.59
5. STEM LATEX	2	2.59
6. LEAF	19	24.67
7. LEAF LATEX	3	3.89
8. LATEX	22	28.57
9. FLOWER	7	9.09
10. STIGMA	1	1.29
11. SEED	1	1.29

Fig.1. Graphical presentation of ethno medicinal uses of different plant parts of *C. procera.*

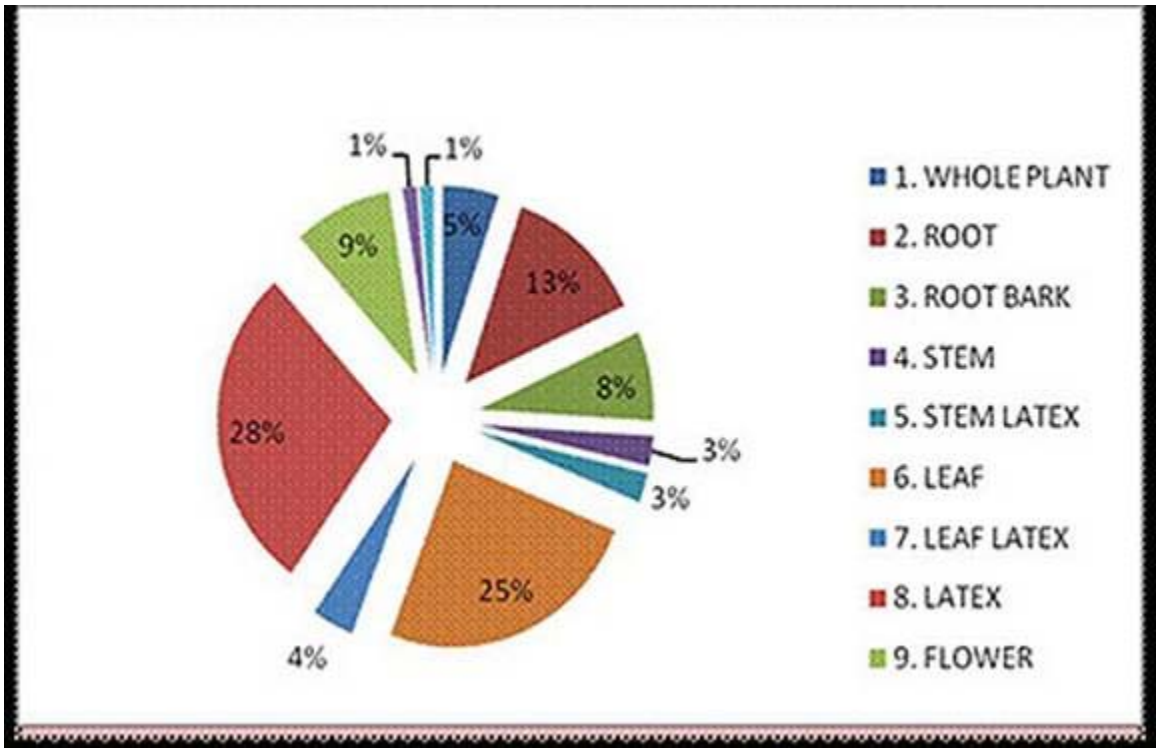
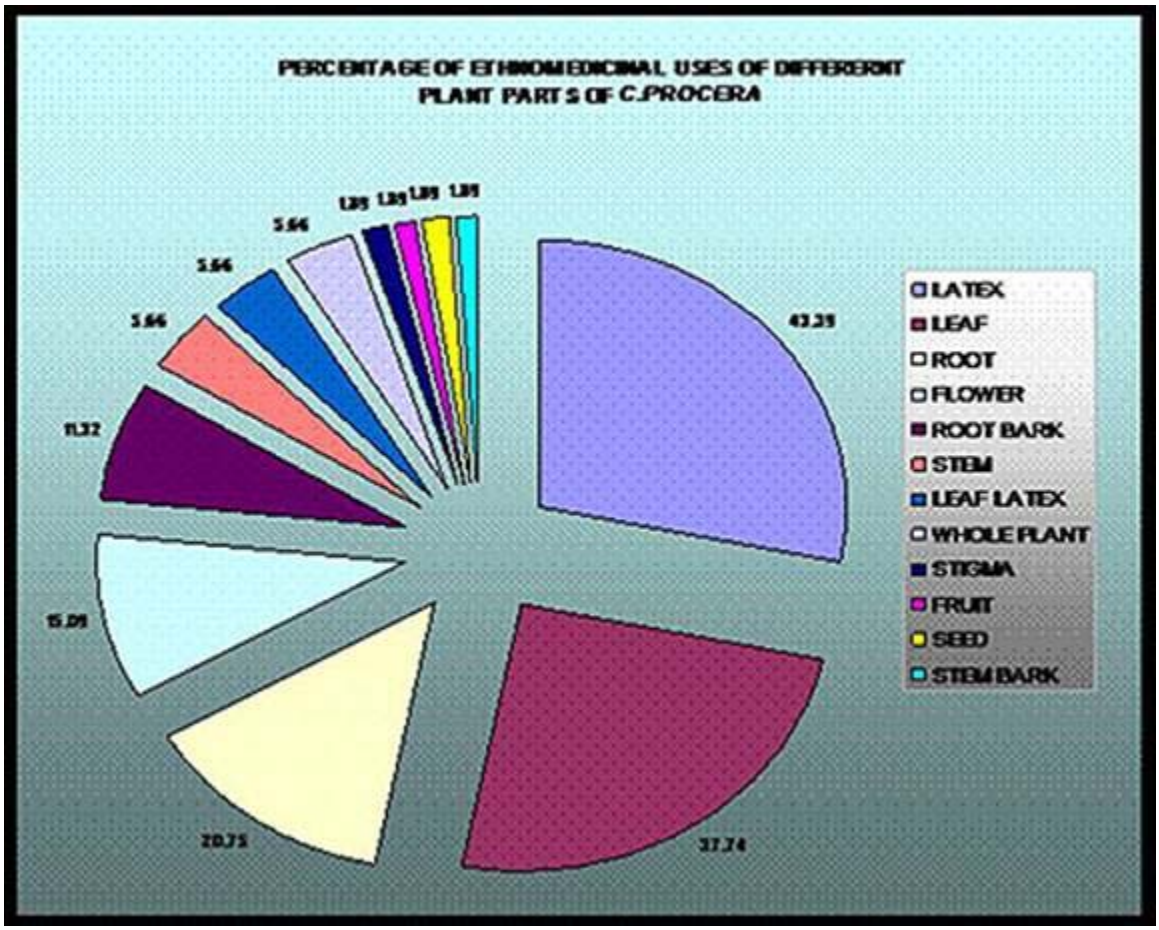


Fig.2. Graphical presentation of ethno medicinal uses of different plant parts of *C. procera.*



Discussion

This ethno-medico-botanical study on the plant *Calotropis procera* has revealed the enormous diversity of its medicinal uses and popular use of the plant *C. procera* for a wide range of common ailments like fevers,

rheumatism, indigestion, cough, cold, eczema, asthma, elephantiasis, nausea, vomiting and diarrhea. Either the whole plant or a plant part used singly or mixed with other plant materials to enhance the efficacy.

Plant based drugs have been in use against various diseases since the time immemorial. The primitive man used herbs as therapeutic agents and medicament, which they were able to procure easily. The nature has provided plant wealth for all living creature, which possess medicinal virtues (Bhatti *et al*, 1998). Medicinal plants are an important source of drugs in traditional system of medicine (Sher and Hussain, 1998a). They are valuable natural resources and regarded as potentially safe drugs. In addition, they are playing an important role in alleviating human suffering by contributing herbal medicines in primary health care system of rural and remote areas where more than 70% of population depends on folklore and traditional system of medicines. The reason for their popularity is due to high cost of allopathic medicines and side effects.

Medicinal plants have been used since prehistoric period for the cure of various diseases. Since these are in common use by the local people and are of great importance that's why a lot of people are engaged in the trade of important medicinal herbs throughout the world (Elisabetsky, 1990). Especially, people living in villages have been using indigenous plants as medicines since ages because this knowledge transfers from generation to generation and is based on life long experiences. Besides, the villages are far away from cities and mostly lack proper health facilities (Shinwari and khan, 2000).

This field is well established and a lot of work has been done worldwide. Radhakrishman *et al* (1998) reported ethnobotanical information on *Ulteria salicifolia*, a monotypic species endemic to south Western Ghats of peninsular India and gave its taxonomic identity, distribution pattern and affinity to an allied genus for the first time. Beyra *et al (*2004**)** carried out an ethnobotanical survey from Camaguey, Cuba and reported 111 plant species belonging to 96 genera and 55 families from the study area. These species are used in the treatment of 173 local health problems in the study area. Bondya & Sharma (2004) conducted a survey of medicinal plants used in diabetes in Jharkhand and collected 11 plant species with remarkable uses. Buckingham (1991) reported that there are total of 2,50,000 species of flowering plants in the world, much less than animal species (5-10 million) however, plants contribute to our lives more than animals mainly due to their extra ordinary array of diverse classes of biochemicals with a variety of biological activities. Ji *et al* (2004) reported the medico-ethnobotany of Nujiang, Northwest Yunnan, and China. They described 52 medicinal plant species belonging to 32 families used for the treatment of various human ailments. Among them, 11 species were reported as rare and 16 were commercially utilized.

The indigenous traditional knowledge of herbal plants of communities where it has been transmitted orally for many years is fast disappearing from the face of world due to transformation of traditional culture. The people, who are native to the area in which the plants occur, use around 90% of the medicinal species (Baquar, 1989). This is indicative of the vast repository of knowledge of plant medicine that is still available for global use, provided of course that it does not get lost before it can be tapped or documented. Traditional and indigenous medical knowledge of plants, both oral and codified, are undoubtedly eroding (Mujtaba and Khan, 2007). In the present scenario, traditional knowledge system in our country is fast eroding and there is an urgent need to inventoried, record all ethno-botanical and cultural information among the diverse ethnic communities before the

traditional cultures are completely lost. Therefore, documentation of information on ethno-medicinal uses will help in conserving the knowledge. A comprehensive database of the plants used for various purposes could be saved for the forthcoming generations.

Conclusion

This information about medicinal values of *C. procera* has paramount importance in life and how these ethno herbal data have key role in life. Moreover, it can be initiative for further phytochemical and pharmacological investigations about the medicinal use of the plant, which may be a step ahead towards the new drug development.

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