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Medicinal plant wealth of local communities in some villages in Shimoga District of Karnataka, India

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Abstract

An ethnomedicinal survey (1998–2000) was conducted in three villages of Shimoga district of Karnataka, India, using a questionnaire designed by Sinha (1996) [Sinha, R.K., 1996. Ethnobotany—The Renaissance of Traditional Herbal Medicine. Ina Shree Publishers, Jaipur, India, 242 pp.]. The herbal practitioners in the study area were interviewed and information on medicinal plants, their local names, habitat and their seasonal availability was collected. The survey revealed the utilization of 47 species of plants belonging to 46 genera in 28 families used to treat 9 infectious and 16 non-infectious diseases. Twelve new claims on ethnomedical knowledge were reported and there were formulations that were similar to that described already in the literature.

Keywords: Ethnomedicine; Local community; Infectious diseases; Non-infectious diseases; Western Ghats; Karnataka

1. Introduction

Traditional knowledge of herbal remedy to treat human diseases is fast declining in many parts of the world, including India. Even today, tribals and certain local communities in India still practice herbal medicine to cure a variety of diseases and disorders. They collect and preserve locally available, wild and cultivated plant species. Compared to the large number of floristic surveys in southern peninsular India (Saldanha and Nicolson, 1976; Yoganarasimhan et al., 1981; Gamble, 1995), there are few surveys that reveal the practice of herbal medicine by either tribals or indigenous communities (Bhandary et al., 1995, 1996; Harsha et al., 2002, 2003; Parinitha et al., 2004). It is apparent from these surveys that tribals and communities residing in remote places followed different practices. However, even certain local communities residing near towns and cities do follow traditional healing systems. A preliminary survey of villages around Shimoga town of Karnataka, revealed that local communities residing in three villages are still practicing herbal medicine extensively in their primary health care. These villages are located next to Bhadra wild life sanctuary. There are no previous records on ethnomedical knowledge from the study area. Hence, an attempt has been made to document plant species, medicinal formulations and treatment of particular diseases by various communities residing in this area.

2. Methodology

The study covered three villages: Nellisara, Malenahalli and Shankaraghatta located about 30 km away from Shimoga town, at an elevation of 620 m above sea level, 13°43′ latitude and 75°38′ longitude (Fig. 1). The study area is situated in the Western Ghats of Karnataka, which is one of the biodiversity hotspots in India. The population of the study area is about 2500, comprising various communities and castes whose major occupation is agriculture, while some are labourers.

About 60% of households in these villages use locally available, wild and cultivated medicinal plants to treat common diseases. In each village, medicinal plants are used by

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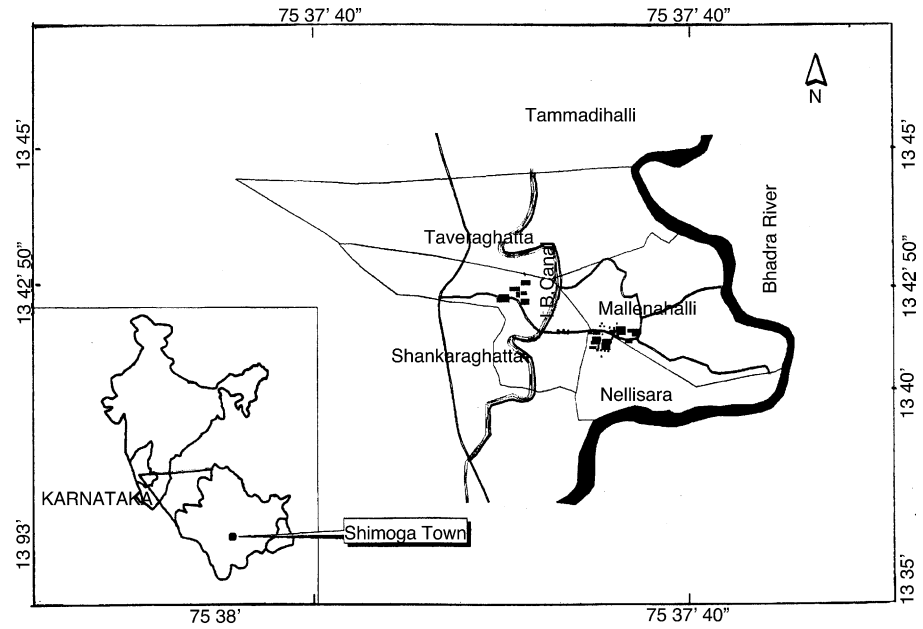

Fig. 1. Map of the study area.

healers in different formulations to treat ailments, including skin diseases, stomach and kidney ailments, asthma, cough, diabetes, leprosy, jaundice and wounds.

Extensive surveys were undertaken for the period of 1998–1999 and 1999–2000 in the study area for the purpose of documenting plants used by the local communities. They were convinced of the academic significance and bona fide intention of the study through repeated contacts, explanations and interviews. They consented orally to document and publish the results of the study in the interest of the society. A previously prepared questionnaire designed by Sinha (1996) was used to collect ethnobotanical information from the herbal practitioners and knowledgeable elders in the study area, and information on the plant species and their parts used for the formulation of medicine. Information on the habitat of the plants, their local names and seasonal availability was also collected. Plants were identified with the help of published regional flora (Saldanha and Nicolson, 1976; Yoganarasimhan et al., 1981; Gamble, 1995) and by comparing voucher specimens with identified herbarium collections. A set of voucher specimens has been deposited at the Department of Applied Botany, Kuvempu University. The information recorded was further ascertained or cross-checked by consulting the beneficiaries, villagers and other medicine men. The conservation status of each medicinal plant species collected was assessed using the IUCN Red list and its criteria (Nayar and Sastri, 1990; Gowda et al., 1997; Ravikumar and Ved, 2000).

3. Results and discussion

Twenty informants of Nayaka, Chelvadi, Lambani, Tamilian and Muslim communities, in the age group of 30–80 years, who practiced herbal medicine in the villages of the study area, were interviewed. They had knowledge of 47 species of medicinal plants used in therapy, belonging to 46 genera in 28 families, to treat 25 diseases and disorders. Of the 47 species, 28 were collected from the wild, 11 cultivated, and 8 both collected from the wild and cultivated (25 trees, 10 shrubs, 9 herbs and 3 climbers). For the sake of convenience, 25 diseases and disorders were grouped into infectious and non-infectious diseases (Tables 1 and 2). The information gathered is arranged alphabetically by disease together with the botanical name of the plants, their families, local and common names and information on part used, method of preparation, dosage, duration, ingredients and other recommendations (Tables 1 and 2).

The present study reveals that the local medicine men of the study area have good knowledge of the medicinal property of a variety of plant species that grow around their locality. They use 20 plant species to treat nine infectious diseases and 30 species to treat 16 non-infectious diseases. Twelve species of plants belonging to 19 genera and 14 families have not been previously cited in the literature for the treatment of human diseases. Among the species of plants listed in Tables 1 and 2, five are endangered in the wild, three are vulnerable and two are of lower risk category based on the Red Book category (Nayar and Sastri, 1990; Gowda et al., 1997; Seetharam et al., 1998; Ravikumar and Ved, 2000). Most of the species used in the preparation of herbal medicine are collected fresh; very rarely, stored materials are used. Among the various plant parts used for the herbal formulations, leaves, followed by stem bark and root, were preferred over other plant parts.

Upon interviews with the beneficiaries, elders and residents of the study area and neighbouring villages, they unanimously agree to the efficacy of the herbal formulation

Table 1
Plant species used to treat infectious diseases

Disease	Botanical name and family	Local (common) name	Part and method of use
Cholera	*Oldenlandia auricularia* K. Schum.[a] (Rubiaceae) (KU/SG/V 055)	Nelae nekkare (Indian madder)	Paste of whole plant mixed with cow's milk or water and taken orally with sugar, for 10–12 days.
	Terminalia paniculata Rothm.[a] (Combretaceae) (KU/SG/V 056)	Hunalu (Flowering murdah)	Flowers mixed with leaves of *Cocculus villosus* DC.[a] (Vasantikta) (KU/SG/MH 322) plant, made into a paste and taken orally.
Chronic dysentery	*Phyllanthus amarus* Schum. et Thonn.[a] (Euphorbiaceae) (KU/SG/V 057)	Nela nelli (Bhumyamalaki)	Leaves ground with *Acacia Senegal* Willd.[a] (Snetakhadira) (KU/SG/N 323) leaves, add sugar and give orally, or tender leaves ground with cow's milk curd given orally, for 2–5 days, before food.
	Mangifera indica L.[b] (Anacardiaceae) (KU/SG/V 058)	Mavu (Mango)	Bark powdered, sieved and taken with cow's milk, two to three times a day.
	Jatropha curcas L.[c] (Euphorbiaceae) (KU/SG/V 059)	Bettada haralu (Angular leaved physic nut)	Fruit and seeds ground and mixed with cow's milk, taken orally for 2 days.
	Syzygium cumini Lam.[c] (Myrtaceae) (KU/SG/V 060)	Naeralae (Black plum)	Stem bark macerated with cow's milk curd taken orally, for 2–3 days before food.
	Holarrhena antidysenterica (L.) Wall,[a] [EW] (Apocynaceae) (KU/BS/KG 032)	Kodasalu (Kurchi)	Paste made with flower and cow's milk taken orally, for 4 days.
Cough	*Ocimum sanctum* L.[b] (Lamiaceae) (KU/SG/V 061)	Tulsi (Holy basil)	Leaf paste made with cow's milk or water taken orally, two to three times a day.
	Butea frondosa Koenig ex Roxb.[a] (Papilionaceae) (KU/SG/V 062)	Muttuga (Bastard teak)	Gum of tree with cow's milk taken orally, for 2–3 days.
	Areca catechu L.[b] (Arecaceae) (KU/SG/MH 063)	Adikae (Arecanut)	Nut paste mixed with three to four drops of honey taken orally, for 4 days.
	Daemia extensa R. Br.[a] (Asclepiadaceae) (KU/BS/TH 045)	Yugaphala (Uttara varuni)	Leaf decoction taken orally, for 5 days.
Herpes simplex	*Tamarindus indica* L.[b] (Leguminosae) (KU/SG/MH 064)	Hunasae (Tamarind tree)	Fruit paste with coconut oil and *Argemone mexicana* L.[a] (Prickly poppy) (KU/BS/KH 043) leaves ground and applied locally throughout the affected part.
	Holoptelea integrifolia Planch,[a] [Vu] (Ulmaceae) (KU/BS/GG 032)	Tapasi (Indian elm)	Bark paste applied over the affected part until it disappears. Patient advised not to use cow's milk curd and sour foodstuffs.
	Santalum album L.[c] [EW] (Santalaceae) (KU/SG/V 065)	Srigandha (White sandal wood tree)	Wood paste with lemon juice applied on the affected area.
Itching	*Pongamia glabra* Vent,[a] (Papilionaceae) (KU/SG/V 066)	Hongae (Indian beech)	Oil from seeds applied over the itching body parts, for 5 days.
	Plumbago zeylanica L.[a] [EW] (Plumbaginaceae) (KU/BS/MA 023)	Chitramula (White lead wort)	Root paste applied over the skin during the night, for 3–5 days.
Leprosy	*Azadirachta indica* A. Juss.[c] (Meliaceae) (KU/SG/MH 067)	Baevu (Neem)	Gum exudate from the plant mixed with cow's milk given orally, for five to six times a day.
	Xylia xylocarpa (Roxb.) Taub.[a] (Mimosaceae) (KU/SG/V 068)	Jambae (Scimsapa)	Bark decoction with cow's milk, taken for a week.
Malaria	*Holoptelea integrifolia* Planch. (Ulmaceae) (KU/BS/GG 032)	Tapasi (Indian elm)	Bark cut in the shape of a coin tied on left arm below the shoulder.
	Jatropha curcas L. (Euphorbiaceae) (KU/SG/V 059)	Bettadaharalu (Angular leaved physic nut)	Latex mixed with white jaggery and taken orally.
	Clerodendron inerme (L.) Gaertn.[a] (Verbenaceae) (KU/SG/NS 069)	Vishamarae (Kundali)	Leaf decoction of this plant and of *Azadirachta indica* (Baevu) (KU/SG/MH 067) taken orally.
Skin diseases, dhobis itch and ringworm	*Leucas aspera* Spreng.[a] (Lamiaceae) (KU/BS/MU 013)	Tumbae (Chota halkusa)	Leaf paste applied over the skin, for 8 days.
	Momordica charantia L.[b] (Cucurbitaceae) (KU/SG/JS 136)	Haagala (Bitter gourd)	Leaf paste with lime applied over skin, for 5 days.
	Butea frondosa Koenig ex Roxb. (Leguminosae) (KU/SG/V 062)	Muttuga (Bastard tree)	Flower paste applied over the infected parts.
Sore-wounds	*Plumbago zeylanica* L. (Plumbaginaceae) (KU/BS/MA 023)	Chitramula (White lead wort)	Bark juice applied using cotton and bandaged for 2–3 days.

[EW]: Endangered in wild; [Vu]: Vulnerable.
[a] Wild.
[b] Cultivated.
[c] Wild as well as cultivated.

Table 2
Plant species used to treat non-infectious diseases

Disease	Botanical name and family	Local (common) name	Part and method of use
Asthma	*Terminalia bellerica* Roxb.[a] [Vu] (Combretaceae) (KU/SG/V 070)	Tara (Beleric myrobalans)	Macerated fruit taken orally with honey, for 2–3 days.
	Tylophora asthamatica Wight et Arn.[a] (Verbenaceae) (KU/BS/KH 042)	Pitta mari (Indian ipecacuanha)	Leaf decoction mixed with two to three drops of honey taken orally, for 5 days in the morning.
	Withania somnifera Dunal.[a] [EW] (Solanaceae) (KU/SG/NS 071)	Ashwagandha (Winter cherry)	Root decoction is taken orally with garlic and cow's milk, two to four times a day.
	Ficus religiosa L.[a] (Moraceae) (KU/SG/V 072)	Arali (Sacred fig)	Dried fruits pulverized and taken with water.
Boils, bums and sores	*Diospyros montana* Roxb.[a] [LR] (Ebenaceae) (KU/SG/V 073)	Jagalaganti (Mountain persimmon)	Fruit made into a powder and applied on burnt parts.
	Bombax malabaricum DC.[a] (Bombacaceae) (KU/SG/V 074)	Booruga (Silk cotton tree)	Flowers macerated and applied on boils and sores.
Breast cancer	*Plumbago zeylanica* L. (Plumbaginaceae) (KU/BS/MA 023)	Chitramula (White lead wort)	Roots ground with lime juice and applied over the part with symptom, three to five times a day.
Cataract	*Breynia rhamnoides* Muell.- Arg.[a] (Euphorbiaceae) (KU/BS/LV 035)	Hullkadi (Tikhar)	Root exudate collected in the morning and dropped carefully into eyes, two to three times a day. Medicine men need to take care not to touch the exudate.
Dog bite	*Acalypa indica* L.[a] (Euphorbiaceae) (KU/SG/MH 075)	Kuppi (Indian acalypha)	Leaf paste with a little lime applied to bitten area two times a day, for 3–4 days.
	Ricinus communis L.[b] (Euphorbiaceae) (KU/SG/NS 076)	Haralu (Castor)	Leaf paste applied over bitten area for 5 days and a small quantity of paste taken orally with food.
	Azadirachta indica A. Juss. (Meliaceae) (KU/SG/MH 067)	Baevu (Neem)	Leaf paste of this and of *Butea frondosa* Koenig ex Roxb. (Muttuga KU/SG/V 062) applied over the bitten area, for 3–4 days. Advised not to use cow's milk or curd.
Fever	*Ruta graveolens* L.[b] (Rutaceae) (KU/BS/MA 018)	Naagadali (Garden rue)	Leaf paste with honey or cow's milk taken orally, two times a day for 5 days.
	Adhatoda vasica Nees. [c] (Acanthaceae) (KU/SG/NS 077)	Adusoge (Malabar nut)	Leaf paste mixed with black pepper powder (*Piper nigrum* L) (KU/BS/SM 053) made into pills taken orally, two to three times daily.
Hair fall (severe)	*Vitex trifolia* L.[a] (Verbenaceae) (KU/SG/MH 078)	Nira lakki (Indian wild pepper)	Leaf paste blended with coconut oil and applied to hair and scalp.
Infertility	*Careya arborea* Roxb.[a] (Lecythidaceae) (KU/BS/LV 036)	Kavalu (Kumbi)	Flower paste prepared with fruits *of Emblica officinalis* Gaertn. J (Indian goose berry) (KU/SG/JS 223), *Terminalia chebula* Retz.[c] (Chebulic myrobalan) (KU/SG/JS 218) and macerated with ghee, taken orally in empty stomach for 4 days. Advised not to use salt.
Jaundice	*Tylophora asthmatica* Wight et Arn. (Verbenaceae) (KU/BS/KH 042)	Pitta maari (Indian ipecacuanha)	Roots with black pepper (*Piper nigrum* L.) (KU/BS/SM 053), garlic and fruits of *Syzygium cumini* Lam. (KU/SG/V 060) made into paste, taken orally for 2–3 days.
	Phyllanthus amarus Schum. et Thonn. (Euphorbiaceae) (KU/SG/V 057)	Nela nelli (Bhumyamalaki)	Leaf paste with cardamom taken internally, two tea spoons daily.
	Plumbago zeylanica L. (Plumbaginaceae) (KU/BS/MA 023)	Chitramula (White lead wort)	Roots, gum of *Acacia concinna* DC.[a] (Saptala) (KU/SG/JS 235), cardamom seeds, dates, coconut fruit pulp and sugar mixed well and taken orally for 9 days. Root paste prepared with lime juice applied onto the body for 3–5 days.
Migraine and headache	*Euphorbia tirucalli* L.[a] (Euphorbiaceae) (KU/SG/MH 079)	Sanna kalli (Milk hedge)	Milky latex applied on the forehead and leaves of *Moringa oleifera* Lam.[b] (Drum stick) (KU/BS/MU 012) stuck on it for 6–8 days during morning hours before sunrise.
	Asteracantha longifolia Nees[a] (Acanthaceae) (KU/SG/MH 080)	Kulyanka (Kolistha)	Root juice is dropped into the ear, which is on the opposite side of the headache.
	Eucalyptus globulus Labill.[b] (Myrtaceae) (KU/SG/V 081)	Neelagiri (Blue gum tree)	Oil from leaves applied over forehead, for 5 days.

Table 2 (*Continued*)

Paralysis	*Mentha arvensis* L.[b] (Lamiaceae) (KU/SG/NS 082)	Pudina (Peppermint)	Plant parts of *M. arvensis* and seeds of *Trachyspermum ammi* (L.) Sprague.[b] (Carum) in equal proportions along with rock salt taken with coffee, three to four times a day.
Piles	*Careya arborea* Roxb. (Lecythidaceae) (KU/BS/LV 036)	Kavalu (Kumbi)	Bark powder with honey taken orally, early in the morning.
Snakebite	*Acalypa indica* L. (Euphorbiaceae) (KU/SG/MH 075)	Kuppi (Indian acalypha)	Leaf paste applied over the bitten part for relief from poisoning.
	Rauvolfia serpentina Benth. ex Kurz[a] [EW] (Apocynaceae) (KU/BS/HB 025)	Sarpagandha (Serpentine)	Root paste taken orally. For quick relief, root paste with cow's milk curd in a copper vessel taken orally.
	Elaeodendron glaucum Jacq.f.[a] (Celastraceae) (KU/SG/NS 083)	Mukarthi (Bhutphal)	Roots and of plant made into paste taken orally with cow's milk.
	Tylophora asthmatica Wight et Arn. (Asclepiadaceae) (KU/BS/KH 042)	Pitta maari (Indian ipecacuanha)	Leaf juice taken orally
	Canthium parviflorum Lam.[a] (Rubiaceae) (KU/SG/NS 084)	Kaarae (Kirni)	Root powder with cow's milk curd or cow's milk taken orally.
	Calotropis procera R. Br.[a] (Asclepiadaceae) (KU/BS/GG 031)	Ekka (Safed Ak)	Root bark paste given orally to patient to induce vomiting and latex applied over the bitten area.
Scorpion sting	*Careya arborea* Roxb. (Lecythidaceae) (KU/BS/LV 036)	Kavalu (Kumbi)	Fresh bark paste applied over affected part and infusion of the fruit taken orally for quick relief.
Stomach ache	*Azadirachta indica* A. Juss. (Meliaceae) (KU/SG/MH 067)	Baevu (Neem)	Leaves ground with castor oil and sugar, taken orally for 3 days.
	Hemidesmus indicus R. Br.[a] [LR] (Asclepiadaceae) (KU/BS/MG 001)	Sogadae beru (Indian sarasaparilla)	Whole plant paste with cold unboiled cow's milk, taken orally for 2–3 days.
Mouth ulcer	*Aegle marmelos* Correa ex Roxb.[c] [Vu] (Rutaceae) (KU/SG/V 085)	Bilva patre (Bael tree)	Gum of the plant applied over the affected area for 3–4 days.
	Wrightia tinctoria R. Br.[a] (Apocynaceae) (KU/SG/V 086)	Bepalle (Sweet indrajo)	Fruit homogenised and applied over the affected part for 5 days.

[EW]: Endangered in wild, [Vu]: Vulnerable, [LR]: Lower risk.

[a] Wild.

[b] Cultivated.

[c] Wild as well as cultivated.

suggested by the local herbalists. They also point out that allopathic medicines, which are available in the nearby towns, are expensive and have side effects in comparison to the herbal medicine. This might indicate the reason for the dependence of local residents on herbal medicine rather than allopathic medicine.

The findings of the present study are in conformity with study published by Nadakarni (1976) in the treatment of certain diseases with specific medicinal plants. For example, plant species recommended for the treatment of asthma, cholera, cough, dysentery, jaundice, leprosy and snakebite are essentially the same species, although the plant parts differed. However, there are certain examples of other plant species, which are used exclusively for the treatment of specific diseases in the study area and represent the first report of such uses. For example, *Breynia rhamnoides* is used to treat cataract, leaf paste of *Ricinus communis* to treat dog bite, flower of *Careya arborea* to treat infertility, and the bark of *Xylia xylocarpa* for leprosy. It is interesting to note that decoction of various parts of *Holoptelea integrifolia*, *Jatropha curcas*, *Clerodendron inerme* and *Azadirachta indica* are used to treat malaria.

The present investigation points out that often, more than one plant belonging to different taxonomic groups are being used to treat a specific disease or disorder. A proper scientific understanding of the pharmacological effect of herbal drugs is necessary for effective therapy of diseases.

Several cases of indirect evidence on the pharmacological effects of certain medicinal herbs (*Aristolochia trilobata*, *Artemisia absinthium*, *Centella asiatica*, *Leucas aspera* and *Plumbago zeylanica*) have been documented in the literature (Samy and Ignacimuthu, 2000; Quinlan et al., 2002; Somchit et al., 2003 and Nessa et al., 2004). Rao (2000) provides a list of herbs that have various medicinal properties in his book on database of medicinal plants. Certain herbal drugs listed in the ayurveda and other traditional medicine systems are not only time-tested but have also been screened for their pharmacological properties (Dev, 1997, 1999). For example, guggul, the gum resin from *Commiphora wightti* Engl. (Burseraceae) has been used to treat rheumatoid arthritis and lipid disorders in addition to other diseases. It has been shown that two antihyperlipoproteinemic compounds, Z-guggulsterone and E-guggulsterone extracted from the gum resin, have hypolipidemic activity similar to that of the synthetic drug, clofibrate (Dev, 1999). The presence of resveratrol and pterostilbene in darakchasava, an ayurvedic medicine whose principal component being grapes, has been shown to reduce cardiac disease rate and carcinogenesis (Paul et al., 1999). Certain Chinese traditional herbal drugs used to retard ageing and to treat several other diseases have been found to

contain considerably high amounts of melatonin, which is related to the scavenging of free radicals (Chen et al., 2003).

The present results also suggest that different groups of people practice herbal medicine differently, and their formulations might not resemble that of herbal medicine of people residing either in the far-off places or nearby places. For example, 'Siddis' and 'Gowlis' of Uttar Kannada in Kamataka used entirely different types of plant species for the treatment of a variety of human diseases. Bhandary et al. (1995) reported that 'Siddis' used bark of *Careya arborea* to treat dysentery and ear pain. On the other hand, local communities of the study area used flowers of the above plant for treating infertility, piles and scorpion sting. 'Gowlis' of Uttar Kannada used *Rauvolfia serpentina* to treat herpes infection (Bhandary et al., 1996), while people of the study area used this plant for treating snakebite.

Finally, this study also points out that certain species of medicinal plants that are endangered are being exploited by the local residents who are unaware of their importance in the ecosystem. In view of this, there is a great necessity to educate the local population and healers to adopt conservation measures as necessary, so that over-collection of such species will not lead to their extinction in their territory, which signifies the loss of their source medicinal material.

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