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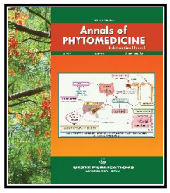

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Ethnicity of tribal's on Indigenous medicinal plants: A review

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Abstract

Indian tropical forests are the most multifaceted of all the terrestrial habitat, create a diversity of natural resources and helps to endure the livelihood of localized communities. The tribal communities in the Eastern Ghats region of Northern Andhra Pradesh are forest inhabitants living in synchronization with the surrounding environment and mostly hinge on major and minor forest products for their self-sustenance and they have customized the usage of herbal plants as remedies to cure the general and specific ailments to the tribals in their niche. This has commanded to the development of better understand on the use of plants and has become the practice of the tribal societies. Because of the increasing health consciousness among the people, the requisition for therapeutic herbs is accelerating since no side effects are being reported with phytomedicines. The forest lands of the Eastern Ghats of northern Andhra Pradesh denote its rich biodiversity for various species. In this region, Fabaceae is the most predominant botanical family to which medicinal plants belong followed by Rubiaceae, Caesalpinaceae, Ascalpidaceae, Malvaceae, Moraceae and Phyllanthaceae. Ethnomedicinal uses of plant species from the region belonging to 54 genera from 33 families have been documented. The roots, stem bark, leaves and seeds account for 62% of medicinal use and most of these medications are administered orally while some are functional externally. The public of this region has worthy wisdom of herbal remedies but as the public is in accelerating exposure to modernization, their wisdom of conventional utilizes of herbs may be gone at a later time.

1. Introduction

Herbal plants are nature's offering to humankind and are the wealthy heritage of India. India is renowned as an "Emporium of medicinal plants". Nearly 70% of the countryside people depend on medicinal herbs for their health management. India with rich vegetation of about 45,000 plants is considered among the 12 mega-biodiversity countries of the globe. The history of endemic wisdom is as old as the human race and has always been a matter of survival for them. Credentials of conventional wisdom related to plant wealth are designated as ethnobotany (Satyavathi *et al.,* 2014). The utility of native herbs as remedies for various ailments has been well documented in Indian literature Charaka Samhita. The folk medicine approach of India uses over 5,000 plant species with nearly 25,000 formulations for curing numerous diseases, while tribal medicine connected with the use of above 8,000 wild plants with nearly 1,75,000 specific preparations or applications. The classical indigenous approach of Indian medication prescribes about 10,000 designated formulations (Padal *et al.,* 2013; Seetharamu *et al.,* 2023).

The Eastern Ghats are a long belt of fragmented hills and vertical plateaus, running over 1750 km between the Mahanadi River and Vaigai River alongside the east coast of Orissa, Andhra Pradesh and Tamil Nadu. The Eastern Ghats exist in northern Andhra Pradesh allied in the middle of $16^0$15'-$19^0$12'N latitudes and $80^0$50'–$84^0$47'E longitudes and run along Visakhapatnam, Vizianagaram and Srikakulam districts. The altitude of these Ghats ranges between 300-2500 m above Mean Sea Level and the highest peak with an elevation of 2527m recorded at Sambari Konda near Gudem village of Visakhapatnam district. The annual rainfall in this zone is 1350 mm received between July and September from the southwest monsoons and the relative humidity (70-88%) is relatively high around the year. The temperatures usually range between 28-46°C in summer and 13-27°C in winter (Naidu and Kumar, 2015). The five major types of forests types reported in the Eastern Ghats of north coastal Andhra Pradesh are tropical dry-deciduous, tropical semi-evergreen, tropical thorny-scrub, tropical moist-deciduous and tropical dry-evergreen forest types (Champio and Seth, 1968) and the soil types are lateritic, loamy, alluvial, and black. Deciduous forests are the most common type with lateritic soils (Subrahmanyam, 1982).

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The predominant tribal communities reside in the Eastern Ghats of northern Andhra Pradesh, *viz*., are Konda Dora, Bagata, Valmiki, Gadabas, Konda Kammara, Yerukulas, Goudus, Mali, Muka Dora, Khond, Kotia, Porja, Jatapu, and Savaras, *etc.,* are well experienced with the medicinal plants and regularly use the herbal products in tribal medicine (Padal *et al*., 2013). Different parts or products of medicinal plants such as root bark, root, stem, tuber, rhizome, stem bark, leaf, flower, tender branch, fruit, latex, gum, seed and whole plant are utilizing for ethnomedicinal purposes and use of various formulations like paste, decoctions, extract, infusion, powder, *etc.,* is in practice to cure various human ailments.

Conventional medicine is the total of all wisdom and practices interpretable in the diagnosis, prevention and elimination of mental and physical and relying exclusively on practical exposure and observation transferred by individuals from one generation to another. Hence, it becomes essential to acquire and conserve traditional wisdom through proper documentation and recognition of specimens which also shore up the preservation and management of botanical resources. The present review emphasizes ecological and botanical elements and also documents the diversity of medicinal plant resources available and their uses in tribal medicine in the Eastern Ghats region of northern Andhra Pradesh, India based on the published shreds of evidence by different ethnobotanists on medicinal plants in Andhra Pradesh and the adjoining states of Odisha, Telangana and Tamil Nadu.

1.1 Geographical position, climate, soil and forest descriptions of the north coastal districts

Srikakulam: The district lies between $18^0$51'-$19^0$12' N latitudes and $83^0$12' - $84^0$47' E longitudes with an altitude of 900-1200 m above MSL and rainfall is 900-1250 mm and the temperature ranges from 11^0C-47^0C. The soils have wide range from red sandy to deltaic alluvial type. The forest is mainly of dry-deciduous type with a few areas of moist deciduous spots at higher altitudes. The district consists of 35 mandals, out of which 7 mandals lie in the peaks of Mahendra Giri and Palakonda of Eastern Ghats from the tribal belt of Srikakulam. The main tribes of this region, *viz.,* Savaras, Gadabas and Jatapus have a close association with the forests. The tribals use forest plants in several ways, especially for food, firewood and medicine. Medicinal plants are used as an antipyretic by the tribal folks of Srikakulam District (Naidu *et al.,* 2009).

Nearly 50 angiosperm plant species belonging to 28 families and 46 genera have been identified and catalogued for ethnobotanical uses. Over the 21 families recorded, Caesalpiniaceae is the dominant one with six species followed by Malvaceae, Apocynaceae, Euphorbiaceae, Mimosaceae, Sterculiaceae, Rubiaceae and Cucurbitaceae with three species each; Capparidaceae, Celastraceae and Lythraceae each with two species while the remaining families each having a single species and the trees are dominating component of the forest. The tribal people utilize most of these medicinal plants to heal health problems like diarrhea, general fevers, joint pains, skin diseases, wounds, snake bites, menstrual problems and dyspepsia, (Padal and Vijaykumar, 2013).

Vizianagaram: The district is situated between $17^0$15'- $19^0$15' N latitude and $83^0$00'-$83^0$45' E longitude. It is bounded on the north by the Srikakulam, on the south by the Visakhapatnam, by the Bay of Bengal on the southeast and on the northwest by Koraput district of Odisha. Of the 34 mandals in the district, 13 mandals have the tribal population and the total agency area covers 2,393 sq.km. There are several peaks of altitude ranging between 914 m to 1,615 m above MSL such as Kankanapalli (850 m), Jarada (960 m), Himagirica (1120 m), Nanda (1162 m), and Shankaram (1615 m). The forest region of Vizianagaram occupies 1,18,652,38 hectares controlled under one forest division. This district inhabited by 2,14,839 tribal population comprising 9.55 per cent of the district population. The majority tribal groups are Jatapu, Kondadora, Mukhadora, Mannedora, Yerukula, Goudu, Gadaba and Savara of which the last two are considered the primitive tribal groups.

Fabaceae is the dominating family from which 21 species have been identified for their use in tribal medicine followed by Asteraceae (20 species), Euphorbiaceae (19 species), Lamiaceae (15 species), Caesalpinaceae (12 species), Asclepidaceae and Apocynaceae (11 species each), Cucurbitaceae (10 species), Malvaceae and Verbenaceae (9 species each) as reported by Parijatham *et al*. (2016) and Naidu *et al.* (2012).

Visakhapatnam: The district with an area of 11,161 sq. km (4.1% of the state) lies between 17º34' 11" and 18º32' 57" northern latitude and 18º51' 49" and 83º16' 9" eastern longitude. It is bounded partly by Odisha and partly by Vizianagaram district on the north; by East Godavari district on the south; by Odisha on the west and the east by the Bay of Bengal. Out of the 43 mandals, 11 are located in high altitude and tribal areas. The total tribal area covers 6298 km^2, *i.e*., 56.4% of the entire geographical area of this district. The altitude of the region ranges between 1300 and 1670 m above MSL. Sambarikonda near Gudem village (1670 m), Kappalakonda (1589 m) and Dharakonda (1365 m) are a few of peaks. Visakhapatnam district known for its rich biodiversity has luxuriant forests and has a floristically and ecologically important habitat and harbours various herbaceous medicinal plants that are used by native tribes to cure various disorders or ailments (Rao *et al*., 2000; Padal *et al.,* 2012).

A number of 270 tree species belonging to 177 genera of 55 families have been identified from this forest region. As per the field observations, 141 species are reported to be common, 78 species are occasional and 51 species are observed to be rare. Out of the 55 families, 21 are represented by a single species and 21 other families with more than five species. Fabaceae is the predominant family have 33 species after this Rubiaceae with 15 species, Moraceae, Phyllanthaceae and Malvaceae with 13 species each, Rutaceae with 12 species and Lamiaceae with 11 species (Padal *et al*., 2013). Similarly, Pragasan and Parthasarathy (2009), also indicated Moraceae, Euphorbiaceae, Rutaceae and Rubiaceae as predominant families in the south Eastern Ghats, whereas Naidu and Kumar (2015) reported 25 species of *Ficus*, 12 species each of *Grewia, Diospyros and Acacia* as predominant in the Eastern Ghats of southern peninsular region of India.

Regional Agricultural Research Station, Chintapalli explored medicinal plants in the Chintapalli Forest range in the Eastern Ghats region. During the exploration period nearly 150 species of medicinal plants were collected and maintained at medicinal block. Horticultural Research Station, Chintapalli is multiplying medicinal plants of different species and distributing them to the farmers. Both institutes are involved in increasing awareness by conducting training programmes and field visits to the tribal farmers, tribal youth and NGOs to motivate them towards the cultivation of medicinal plants

in this tribal region. The research work published and documented on herbal plants used in tribal medicine across the tribal area of Andhra Pradesh and other adjacent states is sumptuously reviewed and presented hereunder.

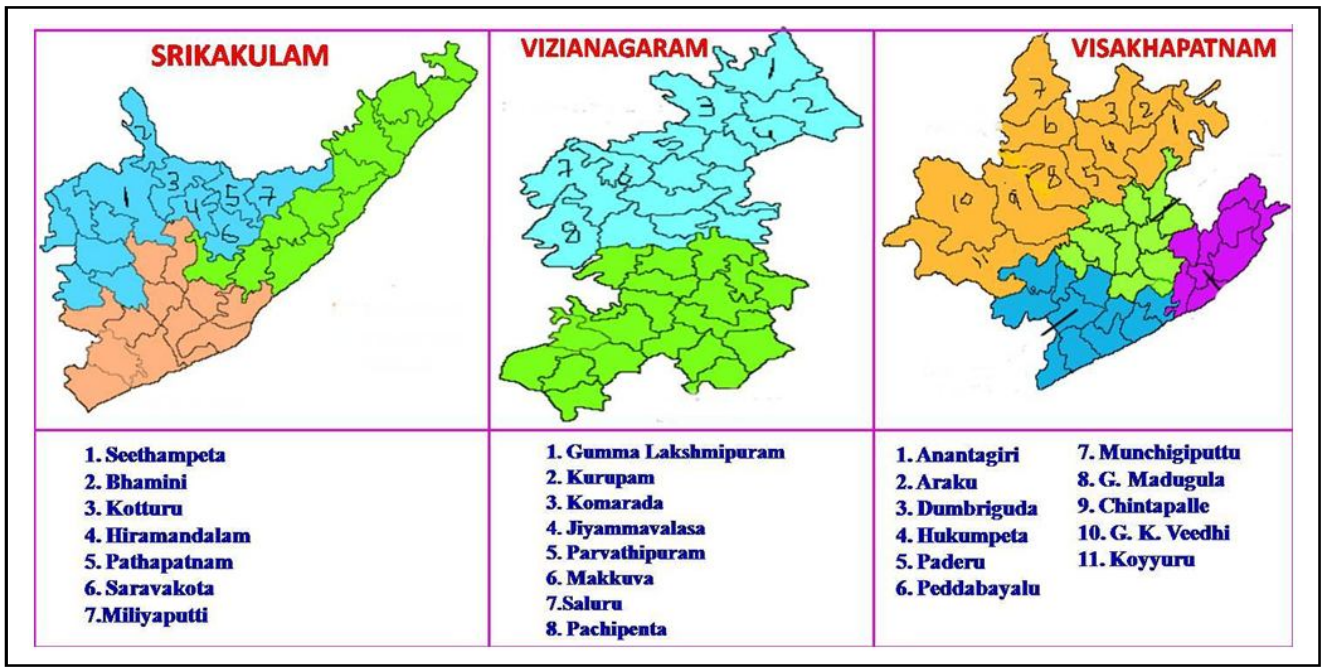

Figure 1: Map of the tribal area of Andhra Pradesh covered in this review.

Ramarao *et al.* (1984) presented a status report on ethnobotanical investigations in Andhra Pradesh. Sudhakar and Rao (1985) described the medicinal plants of East Godavari whereas Arunkumar *et al.,* (1990) enlisted the medicinal plants located in Kakinada. The medicinal plant resources of Krishna district were presented by Venkanna (1990). Hemadri (1991) made a report on the medicinal flora of the Srikakulam district. Reddy *et al.* (1996) reported the use of herbal plants, *viz*., *Andrographis paniculata, Aristolochia bracteolata, Gymnema sylvestre, Plumbago zeylanica, Strychnos nux-vomica, Heliotropium indicum, Tinospora cordifolia, Tiliacora acuminata and Wattakaka volubilis* against snakebite in Nallamala is of Eastern Ghats while the brief note on phyto-zoo therapy of the tribes of Andhra Pradesh was published by Ramarao *et al.* (1999). Ratnam and Raju (2005) recorded folk medicine utilized for women's diseases by tribal people in the Eastern Ghats region of Andhra Pradesh. Medicinal plants utilized to cure diabetes are of considerable interest and several plants have been reported to show different levels of hypoglycemic and anti-hyperglycemic activity (Ignacimuthu *et al.,* 2006).

Tirkey (2006) conducted a survey on ethnomedicinal plants of Fabaceace exploited by local tribals of Chhattisgarh and recorded some Fabaceious plants used in tribal medicine *viz*., *Clitoria ternatea* as diuretic, *Abrus precatorius* for poor eye-sight and skin disease, *Desmodium gangeticum* for goitre, *Crotalaria medicaginea* to cure white discharge, *etc*., Bhakshu and Raju (2007) described certain Euphorbiaciaceous plants of Eastern Ghats, Andhra Pradesh that are used as medicinal plants. Chitralekha and Jain (2008) observed the use of *Achyranthus aspera, Andrographis paniculata, Anogeissus latifolia* and *Calotropis procera* against snake bites by the Banjaras of central India. Samy *et al*. (2008) reported that the fabacious medicinal plants used in tribal medicine and reported that *Abrus precatorius* is used as traditional healers against snake bite in southern Tamil Nadu. Johnson *et al.* (2008) reported on crude drugs present in herbs like *Andrographis paniculata, Strychnos nux-vomica and Wattakaka volubilis* utilized for poisonous bites by tribals of Rayalaseema region, Andhra Pradesh.

Similarly, the use of *Rauwolfia serpentina* as the herbal remedy to cure scorpion stings and snake bite by tribes belonging to Malwa region of Madhya Pradesh (Dwivedi *et al.,* 2009); use of *Aristolochia indica, Calotropis gigantea* and *Achyranthes aspera* in conventional phytotherapy for snakebite by tribal people of Chitradurga district, Karnataka (Hiremath and Taranath, 2010) and use of *Hemidesmus indicus, Achyranthes aspera, Aristolochia bracteolata, Andrographis paniculata, Vitex negundo, Strychnos nux-vomica* and for the therapy of jaundice and snakebite in Vellore district of Tamil Nadu (Thirumalai *et al.,* 2010) have also been reported which are in line with reports from Andhra Pradesh. Kar *et al.* (2013) also reported that 42 plants are used to treat dysentery, 40 plants are used to control diarrhea, four plants are used to treat cholera and three plants are utilized both for dysentery and cholera in Northern tribal districts of Odisha.

The medicinal plant *Coccinia grandis* is used to cure diseases like asthma, snake bite, paralysis and gastric problems and *Gymnema sylvestres* for diabetes in Paderu and West Godavari (Kalpaana, 2008; Padal *et al.,* 2010). The tribal people of West Godavari district use the roots of *Abrus precatorius* to cure joint pains whereas, the root powder is utilized as an antidote for snake bite by Adivasi people in Vizianagaram district as reported by Kalpana (2008) and Lakshmi (2002).

Padal *et al.* (2010) conducted studies on the ethnobotany of the Paderu division and reported the potential use of 455 plant species from 354 genera belonging to 115 families by the 13 tribal groups in

the Paderu division of Visakhapatnam. Sandhyasri and Reddi (2011) studied the herbal medicines used by the Bagata tribal group and reported that the commonly used plant species against the snake bite of *Najanaja* and other poisonous snakes *are Andrographis paniculata, Achyranthes aspera, Aristolochia indica, Cipadessa baccifera, Calotropis gigantea, Tinospora cordifolia, Rauwolfia serpentina, and Wattakaka volubilis*. It is very common to administer 'podapatri' (*Gymnema sylvestres*) against snake bite of 'podapamu' (*Russels viper*), while *Holoptelea integrifolia, Achyranthes aspera and Trianthema portulacastrum* are mainly used to cure the bites of King cobra. Plants belonging to about 21 genera from 18 families have been identified and are reported to be used for the treatment of diabetes by Sugali tribals in the yerramalai forest area in Kurnool district (Basha *et al.,* 2011).

Sandhyasri and Reddi (2011) recorded the traditional use of 38 plant species belonging to 36 genera of 27 families utilized to treat snakebite practiced by the Bagata tribe of the Eastern Ghats region of Visakhapatnam district, Andhra Pradesh. Padal *et al. (*2013) reported that 34 monocotyledon plant species belonging to 28 genera of 10 families are usually used in the treatment of various diseases in the Araku Valley of Visakhapatnam. Padal and Vijaaykumar (2013) conducted extensive field surveys and regular recurrent interviews in different areas of the tribal villages and reported that 50 medicinal plants available in the Eastern Ghats forest region of Srikakulam are used to cure about 30 human illnesses.

Padal *et al*. (2014) reported that 71 plant species either individually or in combination with others are used to treat 33 ailments like cough, fever, wounds, asthma, rheumatism, snake bite, jaundice, stomachache, dandruff, scabies, itching, paralysis, chickenpox, backache, earache, tooth decay, heart pain, diabetes, weakness, headache, leg pain, scorpion sting, heel crakes, bone fracture, boils, sprain, and leg pain in the Eastern Ghats zone of Andhra Pradesh and two plant species *Neolamarckia cadamba* and *Cleome aspera* to be used to cure fever either alone or in combination by the tribal people of the Alluri Seetharama Raju district.

Pooja and Vidyasagar (2015) recorded about the ethnomedicinal properties of Fabaceae plants and reported that *Cassia tora, Albizzia lebbeck*, *Abrus precatorius*, *Saraca asoca, Butea monosperma* and *Dalbergia sissoo* are used to cure snake bite, malaria, tonsils, fever, stomach worms, ring worms, white discharge, *etc*., by Rajgond tribes of Karnataka. Sannyasi *et al.* (2020) observed that the leaves and seeds of *Clitoria ternatea* and *Senna occidentalis* were used to cure cough, cold, stones in kidneys and swellings in tribal medicine.

Parijatham *et al.* (2016) conducted an ethnomedicinal survey in tribal communities of the Eastern Ghats of Vizianagaram district intending to document the knowledge on indigenous medicinal plant species utilized in the treatment of different diseases and it has been reported that plant species like *Tagetes erecta, Nerium odorum, Jasminum angustifolium* and *Chrysanthemum indicum* are used as ornamental purposes as well as ethnomedicinal plants to cure skin diseases, sexually transmitted diseases, leprosy and Rheumatism. The paste made of *Catharanthus roseus* flowers has also been reported as good control over insect and scorpion bites.

The details of different botanical families of medicinal plants predominantly used by the tribal people in the Eastern Ghats of Andhra Pradesh are presented in Table 1.

Table 1: Most frequently used medicinal plants in tribal medicine under the Eastern Ghats region of Andhra Pradesh

Sl. No.	Family and Botanical name	Vernacular name (in Telugu)	Economic plant part	Uses
1.	**Fabaceae**			
	Abrus precatorius L.	Gurivinda	Leaf	Cough and Catarrh (Seetharamu *et al*., 2022; Ramakrishna and Ranjalkar, 2020)
	Bauhinia purpurea L.	Kanchanam	Stem Bark	Improve Memory Power (Seetharamu *et al*., 2022; Pooja and Vidyasagar, 2015)
	Bauhinia racemosa Lam.	Arichettu	Bark	Desentery (Ramakrishna and Ranjalkar, 2020)
	Bauhinia variegate L.	Devakanchanam	Stem Bark	Sustain Pregnancy (Pullaiah, 2006; Patel, 2012; Seetharamu *et al*., 2022)
	Butea monosperma (Lam.) Taub.	Moduga Chettu	Seed, Flower	Contraceptive, Backache, Asthma (Padal *et al*., 2013; Seetharamu *et al*., 2022)
	Butea superba Roxb.	Palasamu	Flowers	Snake Bite (Pullaiah *et al*., 2001; Pooja and Vidyasagar, 2015)
	Clitoria ternatea L.	Sanku Pushpalu	Roots	Eye Disease, Anemia, Menstrual Disorders (Sannyasi *et al*., 2020; Ramakrishna and Ranjalkar, 2020)
	Crotalaria umbellate Wight Ex Wight	Peda Gilicha	Roots	Body pains, Rheumatism (Prusti and Panda, 2005; Patel, 2012)
	Dalbergia sissoo Roxb.	Sissoo	Bark	Urinary Infection, Ring Worms, Skin Diseases (Tirkey, 2006; Patel, 2012)
	Dalbergia lanceolaria Subsp. *lanceolaria* L.f.	Pasaraganni	Bark	*Diarrhea* (Padal *et al*., 2015)
	Dalbergia lanceolaria Subsp. *paniculata* (Roxb.) Thoth.	Patsari	Bark	Rheumatoid Arthritis, Osteo-arthritis (Ramakrishna and Ranjalkar, 2020)

	Dalbergia latifolia Roxb.	Iridi	Bark	*Diarrhea*, Indigestion, Leprosy (Pooja and Vidyasagar, 2015)
	Derris indica (Lam.) Bennet.	Nalla Teega	Root	Snake Bite (Tirkey, 2006)
	Erythrina variegata L.	Baditha	Leaf	Fertility, Rheumatic Pains (Rahman and Parvin, 2014)
	Glycyrrhiza glabra (Retz.) DC.	Athimadhuram	Root	Allergy (Padal *et al*., 2013)
	Indigofera linnaei	Yerrapalleru	Leaf, Root	Asthama (Dwivedi, 2003)
	Indigofera tinctoria L.	Neeli Mandu	Leaf, Plant	Boils, Bronchitis, Kidney Stones (Padal *et al*., 2013)
	Mucuna pruriens (L.) DC.	Dulakondi	Seed, Root	Paralysis, Oedema (Tirkey, 2006)
	Pongamia pinnata (L.) Pierre	Kanugu	Root, Seed,	Paralysis, Allergy, Mosquito Repellent (Ratnam and Raju, 2005; Patel, 2012)
	Pterocarpus marsupium Roxb.	Yegisa	Bark	Cough (Rasmita and Behera, 2018)
	Pueraria tuberosa (Roxb. Ex Willd.) DC.	Bharda	Tuber	Blood Pressure, Body Pains, Parkinson (Nimisha *et al*, 2022; Madhu and Suvartha, 2009; Tirkey, 2006)
	Saraca asoca (Roxb.) Willd.	Seetha Asoka	Whole Plant	Diabetes, Rheumatism (Rahman and Parvin, 2014; Pooja and Vidyasagar, 2015)
	Sesbania grandiflora (L.) Pers.	Avisa	Stem Bark & Seed	Diarrhea, Diabetis, Itches, Asthama (Samy *et al*., 2008)
	Teprosia purpurea (L.) Pers.	Vempali	Root	Liver Disorder, Asthma, Ulcer (Ratnam and Raju, 2005; Patel, 2012)
	Teramnus labialis Spr.	Masaparni	Root	Fever (Naik *et al*., 2017)
2.	**Caesalpiniaceae**			
	Bauhina racemosa Lam.	Devakanchana	Stem bark	Memory power, Dysentery (Padal *et al*., 2013)
	Caesalpinia crista L.	Gatchakaya	Seed	Leprosy, Abdominal pain, Malaria, Uterine Stimulant (Padal *et al*., 2013)
	Caesalpinia pulcherrima L.	ChinnaTurayi	Leaf, Flower, Seed	Asthma, Bronchitis, Malaria (Padal *et al*., 2013)
	Cassia absus L.	Chanupalavittulu	Leaf, seed	Asthma, Cough Skin diseases, Control hiccups (Padal *et al*., 2013)
	Cassia alata L.	Seema metta tamara	Leaf, Stem	Hepatitis, Skin diseases, Eczema (Padal and Sandhyasri, 2013)
	Cassia auriculata L.	Tangedu	Plant	Malaria, Skin diseases (Padal *et al*., 2013)
	Cassia fistula L.	Rela	Leaf	Asthma, Skin diseases (Padal *et al*., 2013)
	Cassia occidentalis L.	Kasivinda	Leaf, Root, Stem bark	Chicken pox, Joint pains, Eczema (Padal *et al*., 2013)
	Cassia tora L.	Tagarisha	Leaf	Goiter, Mouth ulcers, Diabetes, Eczema (Padal and Vijaykumar, 2013; Umesh *and* Mahendra., 2022)
	Tamarindus indica L.	Chinta	Leaf	Jaundice, Fever, Wound healing, Anti inflammatory, Scorpion bite (Padal and Vijaykumar, 2013)
3.	**Euphorbiaceae**			
	Acalypha indica L.	Kuppinta	Leaf	Cold, Stomachache, Scorpion bite (Arulappan *et al*., 2015)
	Euphorbia hirta L.	Pachabottu	Plant, Leaf, Root	Cough, Asthma Dysentery, Kidney Stones (Padal *et al*., 2015; Verma *et al*, 2022)
	Euphorbia ligularia Roxb.	Chettu jamudu	Latex	Heel Cracks (Padal *et al*., 2015)
	Euphorbia nivulia Buch.-Ham.	Bontha jemudu	Leaf	Earache (Padal *et al*., 2015)
	Euphorbia tirucalli L.	Kada jamudu	Latex, Stem	Galactagogue, Earache, Paralysis (Padal *et al*., 2015)
	Jatropha curcas L.	Amuku	Leaves, Latex	Piles, Fever (Padal and Vijaykumar, 2013)

	Pedilanthus tithymaloides (L.) Poir.	Nalla jilledu	Root	Skin diseases (Parijatham *et al*., 2016)
	Phyllanthus amarus Schum.	Nelausiri	Plant	Fever, Acidity, Carbuncle (Parijatham *et al*., 2016)
	Phyllanthus emblica L.	Usiri	Fruit	Diabetes, Menorrhagia (Padal *et al*., 2015)
	Securinega virosa (Roxb.) Baill.	Ballichettu	Bark	Eruption, Diarrhea (Kar *et al*., 2013)
4.	**Asteraceae**			
	Acanthospermum hispidum DC.	Pothorokonta	Leaf	Cough, Uterus Cancer, Cuts & Wounds (Parijatham *et al*., 2016)
	Ageratum conyzoides L.	Pumpulla	Leaf	Wounds, Itching, Scabies (Padal *et al*., 2013; Padal *et al*., 2015)
	Artemisia absinthium L.		Flower	Eyes Watering (Parijatham *et al*., 2016)
	Artemisia vulgaris L.	Maachipatri	Leaf,Flower	Blood Dysentery, Fever, Cataract, Leg Swellings, Contraceptive, Intoxication (Padal and Sandhyasri, 2013)
	Chromolaena odorata (L.) R.M. King	Paacha ambira	Tuber	Jaundice, Neck sprain (Parijatham *et al.,* 2016; Seetharamu *et al*., 2023)
	Chrysanthemum indicum L.	Chaamanti	Root	Gonorrhea (Parijatham *et al*., 2016)
	Eclipta prostrate (L.) Mant.	Guntagalaga	Leaf	Amoebic Dysentery, Bald Head, Liver Disorders, Jaundice (Revathi and Parimelazhagan, 2010)
	Elephantopus scaber L.	Edduadugu/ Nelamarri	Root	Dryness Of Tongue, Itching, Diarrhea (Kar *et al*., 2013)
	Emilia sonchifolia (L.) DC.	Garbapodu	Root, Leaf	Cough, Fits, Wounds Diarrhea (Kar *et al*., 2013)
	Helianthus annuus L.	Podhu thirugudu	Root	Goiter, Joints Pains, Menstrual Disorders (Parijatham *et al*., 2016)
	Sphaeranthus indicus L.	Bodataram	Flower, Leaf	Scabies, Fever (Arulappan *et al*., 2015)
	Spilanthes acmella Murr.	Akkalakarra	Flower, root, whole plan	Tooth Decay, Toothache (Revathi and Parimelazhagan, 2010)
	Tagetes erecta L.	Banti	Leaf, Flower	Rheumatic Pains (Parijatham *et al*., 2016)
	Tridax procumbens L.	Gaddi Chamanti	Whole plant, Leaf	Jaundice, Rheumatism, Swellings, Dysentery, Cancer, Wound healing (Revathi and Parimelazhagan, 2010; Padal *et al*., 2013)
	Vernonia anthelmintica (L.) Willd.	Neeruvisham	Seed	Diabetes (Basha *et al*., 2011)
	Vernonia cinerea (L.) Less.	Sahadevi	Root	Earache, Insomnia, Fever (Padal and Vijaykumar, 2013; Padal and Sandhyasri, 2013)
	Xanthium strumarium L.	Marulamatangi	Seed	Small pox (Padal *et al*., 2013)
5.	**Apocynaceae**			
	Alstonia scholaris (L.) R.Br.	Edakulapala	Bark	Asthma, Snake bite (Sandhyasri and Reddi, 2011)
	Anodendron paniculantum L.		Leaf,	Anti-Abortifacient, Gastric ulcers, Joint pains, Blood dysentery (Parijatham *et al*., 2016)
	Catharanthus roseus L.	Billaganneru	Leaf, Flower	Blood dysentery, Diabetes, Bone strength (Naik *et al*., 2017)
	Gymnema sylvestre R.Br.	Podapatri	Leaf	Diabetes, Diarrhea, Asthma, Cough (Padal *et al*., 2010; Kamalakkannan *et al*., 2021)
	Hemidesmus indicus (L.) R.Br.	Sugandipala	Root	Diarrhea (Satyavathi *et al*., 2014)
	Holarrhena pubescens Wall.	Tedlapala	Stem bark	Amoebic dysentery, Diabetes, Snake bite (Sandhyasri and Reddi, 2011; Kar *et al*., 2013)
	Nerium odourum Soland.	Ganneru	Root bark, Root	Heart pains, Leprosy (Pullaiah *et al*., 2001; Parijatham *et al*., 2016)

	Rauwolfia serpentina L.	Sarpagandha	Root	Blood pressure, Diabetes, Heart attacks, Snake bite (Sandhyasri and Reddi, 2011)
	Rauwolfia tetraphilla L.	Paalagandha	Root	Blood pressure, Nervous disorders (Arulappan *et al*., 2015)
	Thevetia peruviana (L.) Lippold	Paccha ganneru	Bark	Stomachache (Seetharamu *et al*., 2023)
	Tylophora indica (Burm.f.) Merr	Asma thega	Root, Leaf	Asthma,(Seetharamu *et al*., 2023), Diarrhea (Parijatham *et al*.,2016)
	Wrightia tinctoria R.Br.	Ankudu	Stem, Bark,	Parkinsomnia Menstrual Disorders, Eczema, psoriasis, skin diseases, flatulence (Arulappan *et al*., 2015; Aruna *et al*., 2015)
6.	**Lamiaceae**			
	Anisomeles indica (L.) Kuntze	Adabeera	Leaf	Cold, Fever, Rheumatism (Padal *et al*., 2015)
	Coleus barbatus (Andr.) Benth.	Paashaanabhedi	Root	Asthma, Bronchitis, Itching (Parijatham *et al*., 2016)
	Hyptis suaveolens (L.) Polt.	Sirlatulasi	Seed	Cancer, Diabetes, Malaria (Pratibha *et al*., 2021)
	Dysophylla quadrifolia Benth.	Rati thulasi	Leaf	Chickenpox, Stomachache (Padal *et al*., 2015)
	Leucas aspera (Willd.) Link.	Thummichettu	Leaf	Jaundice, Stomachache Headache, Migraine, Snake bite (Revathi and Parimelazhagan, 2010)
	Leucas cephaltoes (Roth) . Spreng	PeddaTummi	Leaf	Sinusitis (Parijatham *et al*., 2016)
	Leonotis nepetiifolia (L.) R. Br.	Pedharanaberi	Flower, Seed	Rheumatic Pains, Eczema, Psoriasis, Ring worm, Athama, Fever, Gastric problems (Sousa *et al*., 2021)
	Mentha spicata L.	Pudina	Leaf	Sore Throat, Stomachache, Tootheache, Cold, flu, Headache, Indigestion (Sousa *et al*., 2021)
	Ocimum americanum L.	Kukka Tulasi	Leaf	Dysentery, Jaundice, Malaria (Padal *et al*., 2012)
	Ocimum basilicum L.	Tulasi	Leaf	Earache, Blindness, Skin Diseases, Asthama and other breathing problems (Revathi and Parimelazhagan, 2010)
	Ocimum gratissimum L.	Rama tulasi	Leaf	Earache, Scabies (Padal *et al*., 2015)
	Ocimum sanctum L.	Vishnu tulasi	Leaf, Stem,	Malaria, Bronchitis (Padal and Vijaykumar, 2013; Seetharamu *et al*., 2023)
	Ocimum tenuiflorum L.	Krishna Tulasi	Leaf	Cough & Catarrh, Itches, Malaria, Ear pan, Body pains, Cuts & Wounds (Padal *et al*., 2015; Naik *et al*., 2017)
	Pogostemon benghalensis (Burm.f.) O.Ktze.	Gondripoolu	Leaf, Root	Body aches, Headaches, Fever, Dysentery (Kar *et al*., 2013)
	Vitex negundo L.	Tella vaavili	Leaf	Swellings (Padal *et al*., 2015; Seetharamu *et al*., 2023)
7.	**Rutaceae**			
	Aegle marmelos (L.) Corr.	Maredu	Leaf	Jaundice, Dysentery, Piles, Diabetes (Padal *et al*., 2013; Padal *et al*., 2015)
	Atalantia monophylla L.	Aadavi nimma	Fruit	Body heat, Rhumatism (Naidu and Kumar, 2015; Seetharamu *et al*., 2023)
	Citrus medica L.	Madeepalamu	Fruit, Seed	Dysentery, Anthelmintic Skin Diseases (Padal *et al*., 2013)
	Glycosmis pentaphylla (Retz.) DC.	Konda Golugu	Leaf, Stem bark	Cough, Wounds, Asthama (Revathi and Parimelazhagan, 2010)
	Limonia acidissima L.	Velaga	Leaf	Dysentery, Diarrhea (Kar *et al*., 2013)
	Murraya koenigii (L.) Spreng.	Karivepaaku	Leaf	Itches, Vomiting, Anaemia, Diabetes, Dysentery, Diarrhea (Padal *et al*., 2013; Kar *et al*., 2013; Padal *et al*., 2015; Verma *et al*, 2022)
	Zanthoxylum armatum DC.	Tella Kasimi	Leaf, Bark	Dysentery and Vomitings in children, Scabies, Tooth problems (Padal *et al*., 2015; Parijatham *et al.,*2016)

8.	**Arecaceae**			
	Acorus calamus L.	Vasa	Roots	Malaria, Asthama, Cough, Fever (Padal *et al*., 2013)
	Areca catechu L.	Vokka	Nut	Indigestion (Kar *et al*., 2013)
	Arisaema tortuosum (Wall.) Schott.	Dhammasaaru	Tubers	Snake bite, Headache (Padal *et al*., 2013)
	Amorphophallus paeoniifolius (Dennst.) Nicolson	Adavi kanda	Dried plants	Tumors, Lung Swelling, Asthma, Vomiting
	Caladium bicolor Vent.	Rudra chama	Tuber	Snakebite (Padal *et al*., 2013)
	Caryot urens L.	Jilugu	Toddy	Blood purification, Snake bite (Padal *et al*., 2013)
	Phoenix loureirii Kunth.	Konda karjuram	Tuber	Bronchitis (Parijatham *et al*., 2016)
	Rhaphidophora decursiva (Roxb.) Scott.	Atukuchettu	Stem	Rejoin for bone fracture (Padal *et al*., 2013)
	Scindapsus officinalis Schott.	Atukusaru	Root	Rejoin the bones (Padal *et al*., 2013)
9.	**Malvaceae**			
	Abelmoschus moschatus Medik.	Adavibenda	Seed	High BP, Intoxication Joint pains, Tumors in stomach (Padal *et al*., 2013)
	Abutilon indicum (L.) Sweet	Tuttara Benda	Leaf	Piles, Menstrual disorders, Piles (Revathi and Parimelazhagan, 2010; Padal *et al*., 2013)
	Hibiscus rosa-sinensis L.	Mandara	Flower	Mennorrhagia (Padal *et al*., 2013)
	Hibiscus vitifolius L.	Adavipatti	Root	Tuberculosis
	Pavonia zeylanica (L.) Cav.	Karubenda	Root	Diarrhea (Parijatham *et al*., 2016)
	Sida acuta Burm. F.	Nelacheepuru	Leaf	Sprain, Boils, Dysentery, Malaria, Wounds (Revathi and Parimelazhagan, 2010; Kar *et al*., 2013; Padal *et al*., 2015; Srinivasan and Murali, 2022)
	Sida cordifolia L.	Chiru benda	Root	Menorrhagia (Padal *et al*., 2013; Padal *et al*., 2015)
	Sida rhombifolia L.	Ativala	Root	Leucorrhoea, Intermittent Fever (Padal *et al*., 2015)
	Thespesia populnea Corr.	Gangaravi	Root, Fruits, Leave	Diabetes, Psoriasis, Headache, Ring Worm, Swellings (Padal *et al*., 2013)
	Urena lobata L.	Puliadugumokka	Root, Leaf	Stomachache, Sprains (Parijatham *et al*., 2016)
10.	**Rubiaceae**			
	Anthocephalus chinensis (Lam.) A. Rich. ex.Walp	Kadambamu	Stem bark	Diarrhea (Kar *et al*., 2013)
	Catunaregam spinosa (Thunb.) Tirveng.	Mangachettu	Fruit	Dysentery, Diarrhea (Kar *et al*., 2013)
	Gardenia gummifera L.f.	Bhurudu	Resin	Diarrhea, Dysentery (Kar *et al*., 2013)
	Haldina cordifolia (Roxb.) Ridsdale	Kamba	Stem bark	Diarrhea, Fertility, Skin Allergy, Leucorrhoea (Aruna *et al*., 2015)
	Mitragyna parvifolia (Roxb.) Korth.	Nerkadamba	Bark	Rheumatism, Eye disease (Padal *et al*., 2013)
	Morinda pubescens J.E.Sm.	Togara	Stem bark	Body Pains, Stomachache (Padal *et al*., 2015)
	Morinda tomentosa Heyne.	Maddicettu	Leaf	Earache (Padal and Vijaykumar, 2013)
	Rubia cordifolia L.	Mangala katthi	Tuber	Jaundice, Fever, Headache, Leg Pains, Malaria, Sexual Diseases, Scorpion sting (Revathi and Parimelazhagan, 2010)
11.	**Anacardiaceae**			
	Buchanania cochinchinensis (Lour.)	Charumamidi	Leaf, Fruits, Root	Skin Diseases, Asthama, Constipation, Diarrhea (Satyavathi *et al*., 2014)

	Lannea coromandelica (Houtt.) Merr.	Gumpena	Stem bark	Headache, Snake bite, Diarrhea, Dysentery (Kar *et al*., 2013; Padal and Vijaykumar, 2013)
	Semecarpus anacardium L.f.	Nallajeedi	Stem bark, Pericarp	Swellings, Scabies, Sprains (Parijatham *et al*., 2016)
	Spondias pinnata (L.f.) Kurz.	Kondamamidi	Root, Fruit, Bark	Astringent, Earache, Diarrhea (Kar *et al*., 2013)
12.	***Combretaceae***			
	Anogeissus latifolia (Roxb. Ex DC.) Wall	Sirimanu	Gum	Sciatic pains, Skin Diseases, urinary problems (Aruna *et al*., 2015)
	Terminalia alata Roth.	Nalla Maddi	Stem bark	Jaundice (Padal *et al*., 2015)
	Terminalia arjuna Wight (Roxb. Ex DC.)	Tella Maddi	Leaf, Stem bark, Seed	Earache, Kindney stones, Diarrhea, Rheumatism (Kar *et al*., 2013)
	Terminalia bellirica (Gaertn.) Roxb.	Thani	Fruit	Asthma, Blood dysentery, Skin diseases (Revathi and Parimelazhagan, 2010; Padal *et al*., 2015)
	Terminalia chebula Retz.	Karaka	Fruit, Seed, Root	Fever, Bums, Migrain, Piles, Rheumatism, Boils (Padal *et al*., 2015)
13.	***Zingiberaceae***			
	Alpinia galangal (L.) Willd.	Dumpa rastram	Rhizome	Body pains (Seetharamu *et al*., 2023)
	Costus speciosus Koen. Ex Retz.	Chengalvakosta	Rhizome	Asthma, Fever, Skin diseases, Snake bite, Ear pain (Padal *et al*., 2013)
	Curcuma angustifolia Roxb.	Desavali palagunda	Rhizome	Ulcers in stomach, Urinary tract infections, Asthma, Cholera (Kar *et al*., 2013; Padal and Sandhyasri, 2013)
	Curcuma aromatica Salib.	Kasturi pasupu	Rhizome	Rheumatism, Snake bite, Skin diseases, Headache, Earache (Padal and Sandhyasri, 2013)
	Curcuma caesia L.	Nalla pasupu	Rhizome	Skin care (Seetharamu *et al*., 2023)
	Curcuma longa L.	Pasupu	Rhizome	Wounds, Skin diseases, Blood purifier, Jaundice (Padal and Sandhyasri, 2013; Padal *et al*., 2013)
	Hedychium coccineum Buch. Ham.	Devakasthuri	Tuber	Fever, Body heat (Padal *et al*., 2013; Seetharamu *et al*., 2023)
	Kaempferia rotunda L.	Metta kaluva	Tuber	Wounds, Swellings, Migraine (Padal *et al*., 2013)
	Zingiber officinale Roscoe.	Allam	Rhizome	Asthma, Leprosy, Bile, Sinus, Skin diseases, Jaundice, Cough, Earache, Itches (Padal and Sandhyasri, 2013; Padal *et al*., 2013)
14.	**Mimosaceae**			
	Acacia catechu (L.f.) Willd.	Kaviri Chandra	Bark	Diarrhea (Kar *et al*., 2013)
	Acacia leucophloea (Roxb.) Willd.	Tella Tumma	Bark	Diarrhea, Arthritis (Padal *et al*., 2013)
	*Acacia sinuata (*Lour.) Merr.	Shikaaya	Bark	Leprosy, Asthma, Control Bleeding, Acidity (Padal *et al*., 2010)
	Albizia lebbeck (L.) Benth.	Sirisa	Bark	Diarrhea, Asthma (Padal *et al*., 2015)
	Mimosa pudica L.	Attipatti	Root, Leaf	Blood dysentery, Piles, Diabetes, Hydrocel, Whooping cough, Wound healing (Revathi and Parimelazhagan, 2010; Seetharamu *et al*., 2023)
15.	**Moraceae**			
	Artocarpus heterophyllus Lam.	Panasa	Fruit	Gangrene, Diabetes (Parijatham *et al*., 2016)
	Ficus benghalensis L.	Marri	Latex	Back pain, Urinary infection (Naik *et al*., 2017)
	Ficus hispida L.	Boddachettu	Root	Gonorrhea, Leucorrhoea, Menorrhagia (Padal *et al*., 2015)
	Ficus microcarpa L.f.	Yerrajuvvi	Stem bark	Blood dysentery, Giddiness (Padal *et al*., 2015)
	Ficus racemosa L.	Medi	Fruit	Mouth ulcers, Uterine disorders, Backache (Padal *et al*., 2015)

16.	**Lauraceae**			
	Cinnamomum camphora (L.) Presl.	Karpooram	Leaf, Root, Branches	Asthma, Headache, Body pains, Bronchitis, Swellings, Neck sprains
	Cinnamomum zeylanicum Blume.	Daalchina	Leaf, Bark	Dysentery, Indigestion, Tooth decay, Diabetes, Chelesterol (Parijatham *et al*., 2016)
	Litsea chinensis Lour.	Nara mamidi	Bark	Broken bones (Padal *et al*. 2014; Seetharamu *et al*., 2023)
17.	**Piperaceae**			
	Piper longum L.	Pippallu	Root, Fruit	Asthma, Respiratory problems, Cholera, Cough, Migraine (Kar *et al*., 2013; Parijatham *et al*., 2016)
	Piper nigrum L.	Miriyaalu	Seed	Asthma, Joint pains, Piles, Malaria, Cold, Cough, Diarrhea (Padal and Sandhyasri, 2013; Kar *et al*., 2013; Parijatham *et al*., 2016)
18.	**Amaranthaceae**			
	Achyranthes aspera L.	Uttareni	Whole plant	Leprosy, Snake bite, Toothache, Heart, Lung and Skin diseases, Rabies (Revathi and Parimelazhagan, 2010)
	Aerva lanata (L.) Juss.	Kondapindi	Leaf	Piles, Kidney stones, Headache, Wounds (Naik *et al*., 2017)
19.	**Liliaceae**			
	Asparagus racemosus Willd.	Sataavari	Root	Indigestion, Rheumatism pains, Nerves diseases, Weakened immunity (Revathi and Parimelazhagan, 2010)
	Gloriosa superba L.	Adavinabhi	Tuber, Leaf	Abortion, Piles, Gonorrhea, Stomachache, Jaundice, Wounds (Padal *et al*., 2010)
	Urginea indica Roxb.	Aadavi yerra ulli	Tuber	Fits, Dandruff (Padal *et al*., 2013)
20.	**Capparidaceae**			
	Cadaba fruticosa (L.) Druce	Chedonda	Leaf	Eczema (Padal *et al*., 2013)
	Cleome monophylla L.		Leaf	Gangrene (Parijatham *et al*., 2016)
	Cleome gynandra L.	Vominta	Seed	Cough, Headache (Padal *et al*., 2013; Padal *et al*., 2010)
	Cleome viscosa L.	Kukkavominta	Seed	Pain, Fever, Wounds (Padal *et al*., 2013; Padal *et al*., 2010)
21.	**Celastraceae**			
	Celastrus paniculatus Willd.	Bavungie	Seed	Leucorrhoea, Rheumatic pains, Respiratory problems (Padal *et al*., 2010)
	Maytenus emarginata Willd.	Danti	Leaf	Jaundice, Fits (Padal *et al*., 2010)
22.	**Sterculiaceae**			
	Helicteres isora L.	Kavanchi	Root	Anthelmintic, Snake Bite, Dysentery (Padal *et al*., 2010)
	Sterculia urens Roxb.	Kovela gum	Latex	Fertility, Constipation, Sexual desire, Easy delivery (Padal *et al*., 2010; Padal and Sandhyasri, 2013)
23.	**Hypoxudaceae**			
	Curculigo orchioides Gaertn.	Nelataadi	Tubers	Liver problems, Spleen Problems, Skin diseases, Cough, Asthma, Headache (Padal and Sandhyasri, 2013; Padal *et al*., 2010)
24.	**Vitaceae**			
	Cissus quadrangularis L.	Nalleru	Stem	Joint pains, Paralysis, Bone fracture, Headache (Padal *et al*., 2010; Padal and Sandhyasri, 2013)

2. Conclusion

The comprehensive review on medicinal plant usage in folk medicine in the Eastern Ghats of northern Andhra Pradesh still plays a vital role in containing various commonly occurring human ailments among tribal people. It is also noticed that the wisdom of medicinal plants is restricted to conventional therapists, aged people and tribal's from interior locations. The public of this region has worthy wisdom of herbal remedies but as the public is in accelerating exposure to modernization, their wisdom of conventional utilizes of herbs may be gone at a later time. Hence, it is crucial to study and record the utilization of plants by divergent tribes and sub-tribes to facilitate the transfer of knowledge to the next generations. Improving the sustainable use and preservation of indigenous wisdom of medicinal plants is very useable and also enhances the standard of life of the penniless people of the tribal region. The research on phytochemical studies of these medicinal plants is the need of the hour to work out the active ingredients and to feed basic knowledge to the pharmaceutical sector for further studies on the effective management of human diseases.

Conflict of interest

The authors declare no conflicts of interest relevant to this article.

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