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Akhilesh Chandra Mishra

Professor, Banda University of
Agriculture and Technology,
Banda, Uttar Pradesh, India

Sharad Pandey

Associate Professor,
Department of Agriculture,
Himgiri Zee University,
Dehradun, Uttarakhand, India

A study of traditional knowledge on medicinal uses of plant biodiversity in Palamu division of Jharkhand

Akhilesh Chandra Mishra and Sharad Pandey

Abstract

In India, indigenous system of Medicine is based on use of wide biodiversity of medicinal plants. Jharkhand state is one of the hot spot of biodiversity of medicinal plants in eastern India having 29.2 per cent area under forest. The present study concentrates on the Garhwa district of Jharkhand which is primarily rural and most of the population resides in villages. Tribal population of the district is still thriving for the livelihood in the forest areas. Presence of Biodiversity in the forests proves to be a precious gift of god for People as they seek food, fodder, fuel and pharmaceutical aids. In the present study during 2016-17, inventory of Indigenous Technological Knowledge (ITKs) in the district was developed during Participatory Rural Appraisal (PRA) of six adopted villages by Krishi Vigyan Kendra, Garhwa. In this investigation, indigenous knowledge on medicinal use of most commonly occurring 67 plant species belonging to 37 families in Garhwa district of Jharkhand was studied. The available biodiversity was found to be frequently used in ailment of gynaecological and physiological problems like gonorrhoea, leucorrhoea, vomiting, diarrhea, dysentery, bone fracture, strengthening of gums, diabetes, abdominal complaints, malarial and typhoid fevers, cough and cold, snake and scorpion bite, rheumatism etc. in human and in cure of different infectious diseases and wounds of animals. The mode of administration varied from decoction, extract, infusion, powder, paste and poultice to combination with other plants. Many plants were administered locally and others orally.

Keywords: medicinal plants, biodiversity, indigineous, ailment

Introduction

India is one of the 17 mega Biodiversity countries of the world contributing 7% of the world's biodiversity. India has a vast biodiversity of 45000 plant species and 7500 medicinal plant species growing in 15 agroclimatic zones under 63.7 million hectares of forest cover (Ashis *et al.*, 2005) [2]. Indigenous system of Medicine in India is based on use of traditional medicinal knowledge of plant biodiversity. Ayurveda and Unani system of medicine largely relies on plant based formulations. About 65 per cent of world's population has access to traditional system of medicine with local medicinal plants whereas 70 per cent of rural population is struggling to access and afford modern allopathic medicines (Shukla and Gardener, 2006; WHO 2005) [5, 7]. Jharkhand state is the hot spot of biodiversity in eastern India having 29.2 per cent area under forest. The Garhwa district of Jharkhand is primarily rural and most of the population resides in villages. Tribal population of the district still lives in the forest areas. Out of the total population of 13 lakhs of the district, 19.9 per cent is tribal population. An extensive area of the district (1,69,790 ha) is under forest cover which is 39.62 per cent of total geographical area (4,28,550 ha). Furthermore, the Garhwa district is border lined by biodiversity rich Sonebhadra district of U.P. in West, Kaimur hills of Bihar in North, Sarguja district of Chhattishgarh in South and Palamau and Latehar districts of Jharkhand in East (Anonymous, 2006) [1].

A huge biodiversity provides multidirectional service to backward peasantry of the district. It proves to be a precious gift of god for People as they seek food, fodder, fuel and pharmaceutical aids from this biodiversity in forest. The healing power of traditional herbal medicines has been realized since antiquities. About 34 per cent of all pharmaceutical preparations come from higher plants and it goes to 60 per cent when bacteria and fungi are taken in to account (Iyenger, 1988; Tag *et al.*, 2007) [3, 6]. In Jharkhand, collection and documentation of traditional knowledge of medicinal use of plant species is of utmost importance in view of establishing relation between Indigenous System of Medicine (Ayurveda, Homeopathy) and tribals'/ traditional knowledge (Horopathy, Mundari system).

Corresponding Author:**Sharad Pandey**

Associate Professor,
Department of Agriculture,
Himgiri Zee University,
Dehradun, Uttarakhand, India

Materials and Methods

The present study conducted during 2016-17 was based on developing inventory of Indigenous Technological Knowledge (ITKs) in the district during Participatory Rural Appraisal (PRA) of six adopted villages by Krishi Vigyan Kendra, Garhwa. The 30 veteran villagers aged 60 or above were selected as respondents from each village. Responding farmers were kept free to discuss and confirm the vernacular name and ways of utilization of plant species. A list was prepared of vernacular name, habit, habitat and medicinal use of different plant species occurring in nearby forests and villages. Some live samples and photographs were also collected as per the identification made by the respondents. Complete documentation of listed plants was done as per Prasad (2003) [4] who has given a detailed account of medicinal and other plants occurring in Jharkhand and adjoining areas of Bihar.

The sites of study included six villages of different blocks of Garhwa district of Jharkhand where the rural peasantry showed nearness to forest herbs rather than modern allopathy. As far as geographical situation is concerned, the Garhwa district of Jharkhand is situated at 300 m above mean sea level, longitude between 83° 10' 13'' & 83° 56' 38'' and latitude between 23° 34' 11'' & 24° 32' 05''. The climate of the district is warm and humid with maximum and minimum temperature of 45 °C and 3.9 °C, respectively. The months of April, May and June are hottest and subjected to dry and hot waves ('Loo') from West whereas December and January are the coldest ones.

Results and Discussion

In the present investigation, indigenous knowledge on medicinal use of most commonly occurring 67 plant species belonging to 37 families in Garhwa district of Jharkhand was studied (Table 1). Regarding habit and habitat of the plant biodiversity, most of the plants of medicinal use were trees and shrubs occurring in forests or villages. Annual herbs of medicinal importance mostly occurred in cultivated or fallow

lands where as climbers, perennial grasses and parasitic epiphytes occurred in forests. In this investigation, traditional knowledge on medicinal value of 31 tree species, 9 shrubs, 20 herbs, 4 climbers, 2 perennial grasses and one parasitic epiphyte was studied.

The available biodiversity was found to be frequently used in ailment of gynecological and physiological problems like gonorrhoea, leucorrhoea, vomiting, diarrhea, dysentery, bone fracture, strengthening of gums, diabetes, abdominal complaints, malarial and typhoid fevers, cough and cold, snake and scorpion bite, rheumatism etc. in human and in cure of different infectious diseases and wounds of animals. The mode of administration varied from decoction, extract, infusion, powder, paste and poultice to combination with other plants. Many plants were administered locally and others orally.

As far as plant parts in use are concerned, roots, bark, leaves, and fruits were taken for external as well as internal use for ailment. It was found that many species which were sometimes abundant in the forests and even in waste lands of Garhwa are facing danger of extinction today. For example, *Asparagus racemosus* (Satawar), *Tinospora cordifolia* (Giloe), *Withania somnifera* (Aswagandha), *ucuna prurita* syn. *M. pruriens* (Kawanch), *Curcuma amada* (Amahaldi), *Curcuma angustifolia* (Tikhur) and *Hemidiscus indicus* (Anant mool, chhoti dudhi). Some plant species viz., *Butea monosperma* (Palas), *Acacia catechu* (Khair) were gregariously growing encroaching the cultivated lands.

In absence of modern medical facilities in remote forest or rural areas, such herbal pharmacy is only way of primary health care. Therefore, conservation and controlled use of the plant biodiversity is necessary particularly for the plant species on the edge of extinction (endangered species). Further collection of traditional knowledge and documentation of ethno-medicinal uses of a huge number of other plant species occurring in the forest of different areas in Jharkhand should be strengthened for up scaling Indian System of Medicine and Homeopathy.

Table 1: Traditional Knowledge on Medicinal use of Plant Biodiversity of Garhwa district of Jharkhand

Sl. No.	Botanical Name	Common / Vernacular name	Family	Habit	Habitat	Traditional knowledge on medicinal uses
1	<i>Acacia Arabica</i> Willd.	Babool, Harsain	leguminosae	A tree	Commonly growing in sandy loams of river side waste lands and planted along the roadsides, railway lines and pool banks.	Gums exudating from trunk is taken in dysentery. Twigs are used for brushing the teeth in case of gum problems.
2	<i>Acacia catechu</i> Willd.	Khair	Leguminosae	A tree	Usually in dry forests of Palamu and Garhwa.	The wood chips are used to obtain Kattha. Bark or wood boiled with water is used in dysentery. Plant is an astringent.
3	<i>Achyranthus aspera</i> L.	Chirchiri, Latjira	Achyranthaceae	A herb	A shrub common in waste lands.	1. Plant made in to paste with water and fruits of <i>Piper longum</i> and taken to cure effects of bite of mad dog. 2. Root made in to paste is given to stop bleeding after abortion. It is also given to facilitate delivery.
4	<i>Aegle marmelos</i> Corr.	Bel	Rutaceae	A tree	Frequent in villages and forests.	Pulp of ripe fruit is febrifuge and is given in diarrhea, dysentery and other gastric problems.
5	<i>Ageratum conyzoides</i> L.	Vchuinti	Compositae	A herb	A very common weed occurring in damp places	Juice of leaves with Neem oil is used as antiseptic in skin diseases and on fresh cuts to stop bleeding.
6	<i>Albizza lebbek</i> Benth.	Siris	Leguminosae	A tree	Frequent in valleys and road sides	Seeds and bark are given in biles and diarrhea. Root and bark powder is also used to strengthen gums.

7	<i>Andrographis paniculata</i> Wall.	Kalmegh	Acanthaceae	A herb	A herb common on stony places in forests.	Leaves are pounded and applied on body in itching, juice of the leaves is given
8	<i>Annona squamosa</i> Linn	Saripha	Annonaceae	A small tree	Common in villages.	Fruits are used gastric problems.
9	<i>Argemone mexicana</i> L.	Bharbhar	Papaveraceae	A prickly herb	Common on waste ground	Fresh root bruised and applied to the part stung by scorpions gives relief. Powdered root in very low dose is useful for tapeworm and skin diseases.
10	<i>Artocarpus lakoocha</i> Roxb.	Barhar	Moraceae	A tree	Occasionally planted on road sides.	Bark in powder form applied to sores to draw out purulent matter, infusion is applied to small pimples and cracked skin
11	<i>Aspergus racemosus</i> L.	Satawar	Liliaceae	A Prickly herb	Occurring in forest areas	The roots of Satawar and roots of Putri (<i>Croton oblogifolius</i>) are ground with water and the decoction is orally administered in fever. The roots are also used in blood urination and dysentery. The root is fed to milch animals for increasing milk yield.
12	<i>Azadirachta indica</i> A. Juss	Neem	Meliaceae	A tree	Occurring in forests and road sides	The leaves are crushed with water and taken for blood purification in skin diseases. Leaves boiled with water are used for cleaning the injuries and bathing in case of skin diseases.
13	<i>Bachmania lanzan</i> Spreng.	Piar	Anacardiaceae	A tree	Common in dry forests.	The young bark of piyar together with new earth preferably out of ant-hill is ground with water and paste prepared is massaged on snake bitten part from up to downward.
14	<i>Bombax ceiba</i> L. syn. <i>Salmalia malabaricum</i>	Semul	Malvaceae	A tree	Frequent throughout the area especially in cool valleys.	Bark exudates is given in diarrhea and dysentery when it turns brown.
15	<i>Boswellia serrata</i> Roxb.	Salai		A tree	Common on dry mountainous forests.	Antiseptic lotion is prepared from bark. Decoction of bark is also given in stomach pain.
16	<i>Butea monosperma</i> Lam.	Palas	Leguminosae (Papilionaceae)	A gregarious Tree	Gregariously growing tree through dry forests and waste lands of Palamau	Trees are used as host for rearing Lac insect. The tree bark is boiled in water and the extract is used to cure the Foot and Mouth Disease in cattle. Flower petals are used as colouring material for cotton and fabrics. Seeds are abortifacient.
17	<i>Calotropis gigantian</i> L. syn. <i>C. procera</i> L.	Akawan	Asclepiadaceae	A Shrub	Shrubs frequent in open wastelands throughout the region.	The root is applied on snake and scorpion bite. The root is pounded in water and Mahua (<i>Madhuca indica</i>) flower is mixed and applied externally in leprosy and also taken orally.
18	<i>Cassia tora</i> L.	Chakora	Leguminosae	A herb	In all districts; a common weed during the rains	Tender leaves and growing tips are cooked and used as green vegetable. The seeds are good feed for cattle.
19	<i>Centella asiatica</i> L. syn. <i>Hydrocotyle asiatica</i> L.	Beng seg, Brahni	Umbelliferae	A trialing herb	Very common in wet places	Entire plant is boiled in water and decoction is given to those suffering from leprosy.
20	<i>Croton oblongifolius</i>	Putri	Euphorbiaceae	A herb	Growing on waste lands	Fresh oozing juice is applied in sore-eyes.
21	<i>Curcuma amada</i> L.	Amahaldi	Zingiberaceae	A herb	Growing in humid dense forests	Poultice of rhizomes crushed with onion is used in rheumatism and fractures. Powdered rhizomes boiled in milk are given in body pain particularly to women during post pregnancy.
22	<i>Curcuma angustifolia</i> L.	Tikhur	Zingiberaceae	A herb	Growing in humid dense forests	Powdered rhizomes boiled in milk are given in body pain particularly to women during post pregnancy.
23	<i>Cuscutta reflexa</i> Roxb.	Amar bel	Convolvulaceae	A twining parasite	Frequent in forests on trees and shrubs.	Poultice of threads are applied in rheumatic swellings, heal pain.
24	<i>Cynodon dactylon</i> L.	Doob	Graminae	A perennial	A omnipresent common grass.	Sap of white Doob grass is administered orally in asthma.

				grass		
25	<i>Datura metel</i> L.	Dhatura	Solanaceae	A shrub	Common in wastelands near villages.	Warmed leaves are wrapped on rheumatism and swellings. Leaf paste is also applied such troubles.
26	<i>Embilica officinalis</i> Gaerth.	Aonla	Euphorbiaceae	A tree	Common in villages and forests.	Dried fruit powder is given in gastric problems, headache and bleeding gums along with warm water.
27	<i>Euphorbia hirta</i>	Dudhia	Euphorbiaceae	A herb	Growing on cultivated as well as waste lands	The root is powdered and taken with water in body pain, fever and blood dysentery. It is useful in removing worms in children and bowel complaints. The latex of herb promotes formation and flow of milk in women.
28	<i>Ficus bengalensis</i> L.	Bargad,	Moraceae	A tree	Common in forests and villages.	Infusion of bark is administered in dysentery. Milky juice from stem is applied in rheumatism.
29	<i>Ficus lacor</i> Buch Ham.Syn. <i>F. infectoria</i> Roxb.	Pakar	Moraceae	A tree	Common in forests and villages.	Decoction of bark is used for wash of ulcers.
30	<i>Ficus racemosus</i> L. Syn. <i>F. glomerata</i> L.	Gular,	Moraceae	A tree	Common in forests and villages.	Fruits are given in dysentery. Milky juice is given in diarrhea and root infusion is administered in diabetes. Bark is given in gonorrhoea.
31	<i>Ficus religiosa</i> L.	Peepal	Moraceae	A tree	Common in forests and villages.	Fruits are recommended in dysentery.
32	<i>Gloriosa superba</i> L.	Kalihari	Liliaceae	A climber	Occurring in forests.	Root is used in gonorrhoea.
33	<i>Gynandropsis gynandra</i>	Hurhur	Capparidaceae	A herb	Occurring as seasonal weed in cultivated as well as waste lands during Kharif	The leaf juice is extracted in blowing ears to stop pus formation.
34	<i>Hemidiscus indicus</i>	Anant mool	Asclepiadaceae	A creeper herb	Occurring in shade and moist localities.	Used in fever, skin diseases and urinary problems. Root decoction is also used as blood purifier.
35	<i>Hibiscus rosa sinensis</i> L.	Gurhal, Urhul	Malvaceae	A shrub	Grown as ornamental in parks and near the house in villages.	Flower has hypoglycemic activity. 2-4 flowers are eaten daily by diabetic person to reduce blood sugar level.
36	<i>Holoptelea integrifolia</i> Planch	Chilbil	Ulmaceae	A tree	Usually in valleys, dry forests and sandy river banks.	Leaf and bark extracted with water is used to kill worms in wound of animals. Juice of boiled bark is applied on rheumatic swellings. Seeds are protein and fat rich and eaten.
37	<i>Jatropha curcas</i>	Bagharandi	Euphorbiaceae	A shrub	Occurs in humid places in forest and wastelands	Latex mixed with salt is kept on burns. Latex is also used to strengthen gums.
38	<i>Madhuca indica</i> Gmel.	Mahua	Sapotaceae	A tree	A tree common in villages and forest areas.	Small quantity of seed cake is kept in a piece of cloth, little water is added. It is beaten slowly and decoction is dropped in to the nostrils of the victim of snake bite (two drops in each nostril). It is also believed that smoke of cake drives out snakes.
39	<i>Michelia champaca</i> L.	Champa	Magnoliaceae	A shrub	Planted as ornamental and hedge	Bark is used as abortifacient for 2-3 months old pregnancy. As an oral contraceptive, 6-8 mm long root is made in to paste with 21 fruits of black pepper and given after menstruation for three days.
40	<i>Mimosa pudica</i>	Lajvanti, Chhui-mui	Leguminosae	A herb	Occurs in low land area	Used to check the bleeding after injury.
41	<i>Moringa oleifera</i> L.	Sahjan, Munga	Moringaceae	A tree	Often planted in villages and towns for fruits and flowers.	Pods and flowers are used as vegetable. Root is ground with water and applied on wounds of cattle as vermifuse. Bark and root is boiled in water and filtrate is used to wash the hoops of infected animal from foot and mouth disease (FMD) and also given orally.
42	<i>Mucuna prurita</i> Hook syn. <i>M. pruriens</i>	Kawanch, Khujali	Papilionaceae	A trailing herb	Frequent in dry forests.	Roots are made in to paste and given orally in blood dysentery.
43	<i>Nyctanthes</i>	Har-singhar	Oleaceae	A small	Frequent on the hills. Also	The root is ground with water and the

	arbortristis Linn			tree	raised in gardens.	decoction is orally administered in loose motion. Leaf decoction is used in bronchitis and influenza.
44	<i>Ocimum sanctum</i>	Tulsi	Labiatae	A herb	Occurs in villages and populated areas	Leaves are used in cough, cold and fever.
45	<i>Phyllanthus niruri</i> syn. <i>P. amarus</i>	Bhuiaonla	Euphorbiaceae	A herb	Seasonally occurs in cultivated and waste lands	Sap of plant is given with honey in whooping cough and with sugar in jaundice.
46	<i>Plumeria rubra</i> var. <i>acutifolia</i> Bailey	Gulainchi	Apocynaceae	A small tree	Occurring in gardens.	When mothers have no milk, Munda tribals crush the leaves and mix with Karanj (<i>Pongamia pinnata</i>) oil and apply on breast.
47	<i>Plumbago zeylanica</i> L.	Chita, Chitwair	Plumbagineae	A shrub	Usually in the rocky places and grown for flowers.	The root is ground with water and decoction is administered orally in ordinary fever. The root is also boiled with a litre of water to reduce the volume up to half the n the roots are crushed in it and decoction is given orally in stomach pain. It also promotes appetite and excites digestion.
48	<i>Smilax proliferata</i> Roxb.	Atkir, Rajdantani	Liliaceae	A climber	Common in damp forests.	The root is ground with water and decoction is given orally in constipation, blood dysentery and renal problem. Children who awake up in the night are given food on its leaves and twigs as tooth stick. It is good appetizer.
49	<i>Pongamia pinnata</i> (L.) Merr. Syn. <i>P. glabra</i> Vent	Karanj	Leguminosae	A tree	Largely planted in villages and roadsides, also occurring in forests.	Leaves poultice are use on rheumatism. Seed paste and oil is massaged in case of cutaneous diseases. Twigs are used as tooth stick in case of gum and teeth problems.
50	<i>Premna herbacea</i> L.	Bharangi, Bhui Jamun	Verbinaceae	A climber	A woody climber on clay in open grounds, fire lines in Chhotanapur	Rheumatism and swelling- the root is massaged over the affected parts.
51	<i>Saccharum munja</i> Roxb	Munj	Graminae	A perennial grass	In open and along river beds of Sone valley	Sharp serrated leaves are used to deter the rats from cropped field by inserting a bunch of the leaves in burrows and also spreading the same in the pathway of rats.
52	<i>Sida cordifolia</i> L.	Kunjyi	Malvaceae	A herb	In moist places, especially in scrub jungles	Roots and leaves are pounded and applied locally on boils to ripen and open them.
53	<i>Shorea robusta</i> Gaertn. F.	Saal	Dipterocarpaceae	A tree	Frequent throughout Jharkhand.	Resin is taken in dysentery. Seeds are eaten to improve digestion.
54	<i>Solanum nigrum</i> L.	Makoi	Solanaceae	A herb	Growing as weed in cultivated lands.	Ripe Juicy fruits are beneficial in dysentery and night blindness.
55	<i>Solanum torvum</i> Sch. & Wend.	Kanta	Solanaceae	A prickly herb	Common along the road sides, wet places and waste lands	Root is powdered with tamarind water and given as antidote in poisoning. Tender fruits are dried and eaten with Ragi (<i>Eleusine corcana</i> L.)
56	<i>Solanum xanthocarpum</i> Sch. & Wend.	Kaateli, kanta	Solanaceae	A prickly herb	Common along the road sides, wet places and waste lands	Root extract boiled with black pepeer is given in cough, fever and body pain.
57	<i>Syigium cumini</i> L. syn. <i>Eugenia jambolana</i> L.	Jamun	Myrtaceae	A tree	Occurring in forests and road sides.	Leaves are crushed extracted and given orally in dysentery. Seed s are used in diabetes, fruits are given in dysentery.
58	<i>Tamarindus indica</i> L.	Imli	Tamarandaceae	A tree	Occurring in dry forests and villages.	Fruits are used for making preparations with other herbs in ailment of different troubles. Leaf paste and fruit is used in dyspepsia and diarrhea (Loo).
59	<i>Tectona grandis</i> L.	Sagwan	Verbinaceae	A tree	Important plantation tree and also occurring in swamp forests.	The oil obtained from distillation of wood chips is excellent remedy of eczema and ringworm.
	<i>Tephrosia villosa</i>	Sarphonka, sapunkha	leguminosae	A herb	Occurs gregariously in waste lands	Massaging seed paste in itching and skin diseases.
60	<i>Terminalia arjuna</i> W. A.	Arjuna		A big tree	Plantation along the River, Nalas and road sides.	Dried bark is powdered and taken with jaggery and cow milk in heart

						problems.
61	<i>Terminalia belerica</i> Roxb.	Bachera	Combretaceae	A tree	Occurring in dry forests of Garhwa and Palau.	Fruits bitter, laxative used in diarrhea, dyspepsia and headache. Seed oil is used as cooling in headache.
62	<i>Terminalia chebula</i> Retz.	Harra	Combretaceae	A tree	Occurring in dry forests of Garhwa and Palau.	Fruits bitter, laxative used in diarrhea and dyspepsia. Powdered bark in applied in ulcers of gums and carious teeth.
63	<i>Tinospora cordifolia</i>	Giloi, Guruchi	Menispermaceae	A perennial vine	Occurring in swamp forests.	The stem chops boiled with black pepper, tulsi (<i>Ocimum sanctum</i>) leaves is administered orally in Malarial and other long lasting fever
64	<i>Vitex negundo</i> L.	Nirgundi, sinduar	Verbinaceae	A shrub	Frequent in waste lands, bunds and dry forest areas.	The leaves are boiled with water for bathing in skin diseases. Dried leaves are smoked for relief in headache. Leaf paste heated and applied locally on rheumatic swellings. Twigs are also used to deter the rats from crop field.
65	<i>Vitis repanda</i>	Harjor	Ampelidaceae	A perennial herb	Occurs dry and stony places of forests.	Chewing fresh leaves of harjor and thungi for five days rejoins fractured bones.
66	<i>Zizyphus mauritiana</i> Lamk. Syn Z. <i>jujube</i> Lamk.	Ber	Rhamnaceae	A tree	Largely cultivated for fruits and lac-host. Naturally occurring in dry forests.	Leaves are chewed in diabetes. Fruits are given to anaemic women.
67	<i>Zizyphus oenoplia</i> Mill.	Banber	Rhamnaceae	A thorny shrub	Common in dry forests and uncultivated lands.	The bark containing much tannin is ground with water and decoction is orally administered in bacillary dysentery and diarrhea.

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