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*Full Length Research Paper*

# Phytotherapy and traditional knowledge of tribal communities of Mayurbhanj district, Orissa, India

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**The present ethnobotanical exploration documents phytotherapeutical practices in Mayurbhanj district of Orissa, eastern India. It is primarily based on field surveys and taxonomic identification of plants carried out in villages, where dwellers provided information on plant species used as medicine, parts used to prepare the remedies, and the illnesses to which the remedies were prescribed. One hundred and twelve plants from sixty two families were described, which are therapeutically used against different ailments such as cough, diarrhea, chronic dysentery, chronic constipation, jaundice, menstrual problem, piles, snakebite, rheumatism, tuberculosis, diabetes, leprosy, skin diseases etc. The plant parts namely; leaf, bark, seed, root, tuber, fruit and whole plant were used in raw or cooked forms. The most important medicinal plant families were: Asteraceae, Euphorbiaceae, Fabaceae, Rutaceae, Solanaceae and Zingiberaceae. These phytotherapeutical resources were used for the cure of 45 illnesses.**

**Key words:** Mayurbhanj, Orissa, phytotherapy, traditional knowledge, tribals.

## INTRODUCTION

Plants have always been the source of medicine and of direct use to the mankind. The history of early civilization reveals that a considerable number of drugs in modern medicine figured in ancient manuscripts such as Rig-Veda, the Bible, the Quran, and the Iliad. All systems of traditional medicine have their roots in folk medicine and household remedies. However some of those earliest remedies were subjected to certain refinements, revisions and improvements through practices by trained medicine men. The people were using various recipes traditionally from generation to generation and only some of them have been Ayurveda (Ayur-life, Veda-knowledge), the Indian system of medicine, offers certain plant products (known as Rasayana) to strengthen the body resistance to disease. The passage of time saw the birth and progress of the modern medical system. The faster pace and the need for the faster cure led to the proliferation of the synthetic drugs. Medicinal plants are moving from fringe to the mainstream use, in some cases free from side effects caused by synthetic chemicals. India is an outstanding country because of its great wealth of genetic resources and complex cultural diversity. The adaptation of the various human groups to the rich biological resources has generated invaluable local knowledge systems that include extensive information on plant uses in general and medicinally useful species in particular. In spite of the ecological and ethnobotanical significance of the forest in the context of present day environmental and health crisis, the forests are being cleared, denuded and degraded at an alarming rate. Degradation of forest adversely affects many plant species possessing medicinally important bioactive compounds due to the destruction of their natural habitats- owning to rapid agricultural development, urbanization, indiscriminate deforestation and uncontrolled collection of plant materials. Recently considerable attention has been paid to utilize ecofriendly and biofriendly plant- based products for prevention and cure of different human diseases via

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traditional knowledge. In this context, ethnobotanists can play a very useful role in returning such disappearing knowledge to local communities. In this way, local ethnobotanical knowledge can be conserved as part of living cultural-ecological systems, helping to maintain a sense of pride in local cultural knowledge and practice and reinforcing links between communities and the environment, so essential for conservation (Gary and Martin, 1995). The neglect of traditional foods and medicines may seriously deteriorate the health and well-being of traditional peoples (Begossi, 1998; Pieroni et al., 2002). Furthermore, nature-based traditional foods and medicines are generally viewed as interchangeable, diet being highly regarded as the primary basis for sustaining and/or restoring health and well-being. Though there is no authentic evidence of when and how plants came into usage for curing the human, the tribes of Mayurbhanj district use traditional knowledge of several ethnomedicinal plants for curing various diseases. Little information has been documented on these aspects from Mayurbhanj district of Orissa, Eastern India (Mudgal and Pal, 1980). Literature data (Yoganarasimhan and Dutta, 1972; Saxena and Dutta, 1975; Saxena et al., 1988; Pandey and Rout, 2002, 2006; Pandey et al., 2000; Rout and Pandey, 2007; Rout et al., 2009) indicate that all these studies are concentrated on similpal biosphere reserve (located in Mayurbhanj district) only, and the tribes involved in different parts of the district are not covered properly under any of the earlier studies. Therefore, there is an urgent necessity to document traditional knowledge, focusing on the maintenance of this important cultural practice. Keeping in view of the fast vanishing traditional knowledge of phytotherapy and to cover the unexplored areas, this study was undertaken. Documentation on phytotherapeutical practices can assist in protecting traditional knowledge, and in ensuring that future users recognize the contributions made by traditional communities, the current custodians of traditional knowledge. This research bridges the gap and will provide a better database for future studies on the various aspects of reported plants.

## MATERIALS AND METHODS

### Study area

Mayurbhanj district (21°-17' and 22°-34'N and 85°-40' and 87°-10'E) is located in the northern part of Orissa, India (Figure 1). The study was carried out in different villages of the district during 2006-2008. The villages have been selected taking the following criteria into account: (i) the villages are situated in the vicinity of the forest which harbors rich biodiversity (ii) the villages are chiefly inhabited by the tribes (iii) the traditional health system of the tribes is mostly based on the plants available within the locality (iv) the villages are situated in the mountainous terrain of the district that is, not well communicated with the district head quarter hospital.

In the Mayurbhanj district tribes occupy a major chunk of the population constituting 73% of it; fifty three communities both aboriginal and migrated are found in the district (Naik, 1998). Among the tribes the chief ones include Santal, Kol, Bhomij,

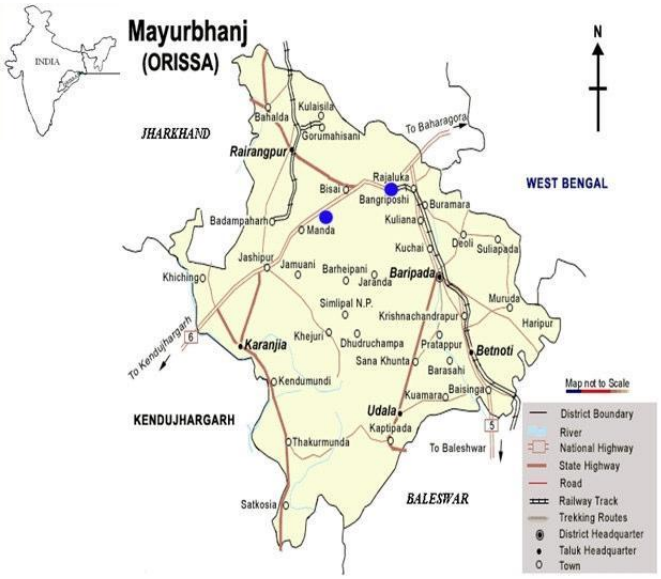


**Figure 1.** Map of Mayurbhanji Orissa.

Bhuyan, Bathuri, Kharia, Gonds, Mankdias, Pauri-Bhuyan, Saharias, Mahalis and Sounti. Some of these tribes namely Kharias, Mankdias and Saharas are still in a primitive state of living. They depend solely on their surrounding forests ranging from food to medicines (Saxena et al., 1988). Agriculture is not well developed and therefore most of them depend solely on forests for catering their daily and perpetual need from food to medicine. Since time immemorial, the intimate association and dependence of the tribal communities on the local natural resources have enriched them with invaluable knowledge on bio-resource utilization and consequently they have developed extensive knowledge on various plants.

The climate of the Similipal is warm and humid. Three distinct seasons are felt during the year. Rainy season (mid June till October), winter (mid October to February) and summer (March to mid June). The annual rainfall varies from 1200 to 2000 mm. The temperature ranges from 9.8 to 33.5°C. The southern and western aspects are cooler and north eastern aspects are warmer. Periodic earth tremors, thunder-storms and dust storms in late May and early June are further characteristic features of Similipal.

In Mayurbhanj district, phytotherapy (treatment with medicines from plant and their derived products) forms an integral part of the local culture, and the information about plants and their uses are passed from generation to generation through oral folk-lore, primarily amongst the elderly; the natural retainers of traditional knowledge in their respective communities. The field study was carried out from September 2006 to November 2008, and the information on the use of medicinal plants was obtained through structured questionnaires, complemented by free interviews and informal conversations (Huntington, 2000). The interviews were individually carried out during the first contacts with the local population, "native specialists" were identified, in other words, people who consider themselves, and are considered by the community as having exceptional knowledge about the use of plants. One hundred and twenty two (89 men and 33 women) persons were interviewed. Among these interviewees, 10% were aged 21-40 years, 40% were 61 years old or more and half of the sample (50%) were in the 41-60 age range. Surveys were conducted in different villages within the district. Collections are valuable because they serve as voucher specimens, records of the plants that are known by community and function as specimens for

systematic identification (Martin, 1995). A voucher specimen facilitates the identification of the species encountered during the research and permits colleagues to review the results of the study (Jain and Rao, 1977; Jain, 1987) . Knowledgeable persons or medicine men, Kaviraj, experienced and aged persons and local healers of the villages were consulted for recording local name; parts of plants used methods of drug preparation and recommended doses. Personal interviews and group discussions with local inhabitants revealed some very valuable and specific information about the plants, which were further authenticated by crosschecking. In addition to crosschecking and recording folk names of plants through collecting voucher specimens, it is important to crosscheck information with different people and compare the results from different methods (Cunningham, 2001). Interviews with people out of the village in pastures or forests were conducted on a systematic basis to know more details about species, their management and distribution. The consulted literatures during the field time for identification of species were Haines (1921-1925), Mooney (1950), Ambasta, (1986), Saxena and Brahmam (1989, 1994-1996), Kirtikar and Basu (1991) and Chopra et al. (1996). The medicinal plants collected are listed here with their botanical names followed by family name, their local names in Oriya if any and the parts used for medicinal purpose.

## RESULTS AND DISCUSSION

Traditional healers use their five senses to diagnose the diseases which are remarkable because they live in remote areas and lack of the modern scientific equipments for diagnosis and treatment; however, they treat diseases using medicinal plants and animals (Santhya et al., 2006) . Documentation of such plants from the perspective of ethnobotanical angle is important for the understanding of indigenous knowledge systems. These resources are genetically important for future research. This study reveals that the inhabitants of the forest area of Mayurbhanj have a vast knowledge about ethnomedicinal uses of plants growing in their vicinity. The tribal inhabitants like Kharia, Mankadia, Bhumija, Santals, Gonds, Kols and Mahalis live in deep forests and use a large number of plants for medicine. The tribal's are not interested to share their knowledge with others. However, after developing intimacy with some of the medicine men and other traditional healers, information on medicinal uses has been collected and is presented in this paper.

The results have revealed that 112 plant species were used for medicinal purposes in the surveyed area. The inventoried species comprise 62 families. The most important medicinal families were: Asteraceae, Euphorbiaceae, Fabaceae, Rutaceae, Solanaceae and Zingiberaceae. The medicinal plant parts, leaf, bark, seed, root, tuber, fruit and whole plant were used in raw or cooked forms (Table 1). These species were used to treat 45 different diseases. Some experienced tribal's have shared their knowledge with the authors about the cure of some important diseases like diarrhea, chronic dysentery, chronic constipation, jaundice, menstrual problem, piles, snakebite, rheumatism, tuberculosis, diabetes, leprosy and skin diseases. Although this is a firsthand knowledge about ethnomedicine in Mayurbhanj district, thorough pharmacological investigations are recommended since the informants claim the uses with confidence and strong belief. The data collected have shown that majority of medicines are taken orally. Most of the reported preparations are drawn from a mixture of plants. The tribal's inherited rich traditional knowledge about the medicinal uses of flora investigated and applies this knowledge for making crude phytomedicines to cure infections and a number of ailments from simple cold to other complicated diseases. Traditional knowledge does not only form the basis for origin of alternative medicine but also paves the way to evolution of a gamut of new and novel modern medicines. However, this knowledge is mostly unknown to scientific world and faces slow and natural death. It is paradoxical to see the modern world is focusing more on alternative medicine which has herbal base predominantly. Phytotherapeutics are usually applied in simple ways, mostly through ingestion or direct application to the affected area and usually not in association with other animal derived ingredients. In some cases, however, an association with medicinal plants or other resources is observed as, for example, for the treatment bronchitis using the excreta of cockroach (*Periplanata americana)* in association with sugar or the whole body of the Chharpoka (*Cimex lactularica)*, and was inserted in to the ripen banana and taken orally for the treatment of piles (Mishra et al., 2011). It is known that the use of medicinal plants is frequent in several countries (Swanton et al., 1990; Gadgil et al., 1993; Cox, 1994) and that often there are overlaps in the medicinal use of plants and animals in traditional medicine for humans (Alves and Rosa, 2005; Alves et al., 2007; Alves et al., 2009). Consequently, it is assumed that there is a close association between phytotherapeutic and zootherapeutic practices in traditional medicine for human usage. The catalogued plants in the present study are common in the surveyed area, this way it is evidenced that the flora composition of Mayurbhanj influences the choice of medicinal plants' usage. A similar tendency was reported by Adeola (1992) who observed that the species used for preventive and healing medicine were associated with the natural area in which the users live, as well as with their relative species abundance.

### Conclusion

This study shows that knowledge and usage of herbal medicine for the treatment of various ailments among tribes is still a major part of their life and culture. Cultural and biological biodiversity are intimately and inextricably linked. The indigenous phototherapy of tribes can provide a useful alternative to conventional human health care. Traditional knowledge system is important for modern societies, not only because traditional knowledge itself is a valuable aspect of cultural heritage and should be protected in its own right, but also because of its great

**Table 1.** Phytotherapy of tribals of Mayurbhanj district, Orissa, India.

| S/N | Botanical name, author's, family and local name | Parts used | Disease or condition | Mode of application |
|---|---|---|---|---|
| 1 | *Abrus precatorius* L. (Fabaceae); 'Kaincha' | Whole plant | Fever | Two spoonful decoction of whole plant is taken orally twice a day for three days to cure fever. Seed paste is used for abortion |
| 2 | *Acacia leucophloea* (Roxb.) Willd (Mimosaceae); 'Kanta siriso' | Bark | Diarrhea | Bark is deep for full night in cold water and the decoction is given in the morning to cure diarrhea. Bark decoction along with hot ghee given to child to cure dental carries |
| 3 | *Achyranthes aspera* L. (Amaranthaceae); 'Apamaranga' | Root | Dysentery | 25 g of root juice with 50 g of sugar in water is taken twice a day until relief from dysentery. Root is boiled in water and decoction is given orally with honey to pregnant mothers. This helps in quick delivery of child |
| 4 | *Acorus calamus* L. (Araceae); 'Bacha' | Rhizome | Diarrhea | The underground rhizome paste is used to cure severe diarrhea |
| 5 | *Acronychia pedunculata* (L.) Miq. (Rutaceae | Leaves | Indigestion | 2 g of fresh leaf paste is taken orally on empty stomach twice a day for 10 days for immediate relief from indigestion |
| 6 | *Adiantum lunulatum* Burm. f. (Adiantaceae); | Leaves, root | Cardiovascular and menstrual cycle. | Leaves and root decoction is used for the treatment of chest complaints. Fresh Leaves decoction is given to cure irregular menstrual cycle |
| 7 | *Adiantum philippense* L. (Adiantaceae); 'Dodhali' | Leaves | Indigestion | 2 g of fresh leaf paste is taken orally on empty stomach twice a day for 10 days for immediate relief from indigestion |
| 8 | *Adhatoda vasica* Nees. (Acanthaceae); 'Basanga' | Leaves, root | Piles | 5 pieces of leaf paste with 2-3 pieces of roots of *Abrus precatorius* and 3-4 pieces of roots of *Achyranthes aspera* is mixed and the grinded pasty mass taken twice a day after meal for twenty days as cure for the treatment of piles |
| 9 | *Agava sisalana* Perr. (Agavaceae); 'Nalimurga' | Latex | Spermatorrhoea | About 50 g latex and 10 g sugar are mixed is given thrice daily for four days in spermatorrhoea. |
| 10 | *Aloe vera* L. (Liliaceae); 'Gheekuanri' | Leaves | White patches | The fresh leaves juice is applied on the affected area once a day during morning hours until the white patches on face disappear |
| 11 | *Andrographis paniculata* (Burm. f.) Wall. Ex Nees (Acanthaceae); 'Bhuineem' | Whole plant | Malaria, indigestion, Scabies | Infusion of the leaf twigs is given in empty stomach in the morning for prevention from malaria and also for stomach troubles. Juice extracted from Leaves is mixed with root juice of *Rauvolfia serpentina* and *Nyctanthes arbortristis* and given to patients suffering from scabies |

**Table 1.** Contd.

| | | | | |
|---|---|---|---|---|
| 12 | *Angiopteris evecta* Forst. Hoff. (Angiopteridaceae) | Leaves | Dysentery, leprosy | Leaves extract is used in the treatment of dysentery. Spores are effective in the treatment of leprosy and other skin diseases |
| 13 | *Anogeissus latifolia* (Roxb.) Wall. ex Bedd. (Combretaceae); 'Dhaura'. | Bark | Diarrhea | Bark powder is administered twice or thrice daily in doses of about 5 gm for treatment of diarrhea |
| 14 | *Argemone mexicana* L. (Papaveraceae); 'Kantakusuma' | Leaves, Seed | Eczema | Seed paste (3 g) mixed with seed oil of *Madhuca longifolia* (1 ml) is applied fifteen days continuously on skin for the cure of eczema. The yellow juice is applied to stop bleeding from cuts and wounds |
| 15 | *Argyreia nervosa* (Burm.f.) Boj. (Convolvulaceae); 'Budhadaraka' | Leaves | Ulcers | The leaves used as poultice applied in chronic ulcers |
| 16 | *Asplenium indicum* Sledge. Bull. (Aspleniaceae) | Rhizome | Gonorrhea | 5 g fresh rhizome paste mixed with 10 ml milk is administered thrice a day for 7 days for treatment of gonorrhea |
| 17 | *Asplenium laciniatum* D. Don. Prod. (Aspleniaceae) | Root | Leucorrhea | About 10 g of fresh root paste along with 100 ml of cow urine is taken orally in empty stomach once in the morning for fifteen days to have relief from leucorrhoea |
| 18 | *Atylosia scarbaeoides* (L.) Benth. (Fabaceae); 'Ban Kultha' | Whole plant | Tape worm, skin diseases | Pasty mass of seeds is taken with hot water twice continuously for fifteen days as a cure for tape-worm. The whole plant is boiled in water and bathed to children in skin diseases |
| 19 | *Azadirachta indica* A. Juss. (Meliaceae); 'Nimba' | Leaf ,young shoot | Diabetes, skin disease | Aqueous extract of leaves (15 ml) is taken once a day in empty stomach continuously one month for treatment of diabetes. Leaves extract is given as a blood purifier and for removal of intestinal worms. Leaf paste is applied on skin diseases and in small pox. Young shoots are used as tooth brush |
| 20 | *Bacopa monnieri* (L.) Penn (Scrophulariaceae); 'Brahmi' | Leaves | Memory power | Leave paste is taken in empty stomach so that they become remain young. Leaf juice is used to increase of memory power |
| 21 | *Barleria prionitis* L. (Acanthaceae); 'Daskerenta' | Leaves | Fever | Decoction of leaf extract is given with honey for seven days to cure fever |
| 22 | *Bauhinia vahlii* W. and A. (Caesalpiniaceae); 'Siali' | Bark | Dysentery | Barks of the stem and lime made into paste and are taken orally, twice a day for 3 days to cure dysentery |
| 23 | *Blechnum orientale* L. (Blechnaceae); | Leaves | Intestinal wounds,boils | The leaves juice, 2-3 drops is put as ear drops in case of severe pain. Rhizome is used to cure the intestinal wounds. Fresh fronds are used as poultice for boils and also used for urinary bladder complaints |

**Table 1.** Contd.

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| 24 | *Buchnania lanzan* Spreng. (Anacardiaceae); 'Chara' | Bark, leaves, fruits | Constipation, wounds | Infusion of the bark is administered (10 ml) to cure mouth-sores. Paste of the tender leaves and flower buds is given as a laxative for the treatment of chronic constipation. The ripe fruits are eaten as tonic for strength. The root and bark made into paste is applied to chronic wounds |
| 25 | *Butea monosperma* (Lam.) Taub. (Fabaceae); 'Palas' | Root, latex , seed | Tuberculosis, piles | Roots are used in tuberculosis. Pastes of seeds are applied on skin diseases. Latex mixed with honey cures piles and stomach trouble |
| 26 | *Calendula officinalis* L. (Asteraceae), 'Gendu' | Leave | Cut | Leaves are mixed with lime and form a paste and applied to the effected cut area and insect bite |
| 27 | *Calotropis procera* (Ait.) R. Br.; (Asclepiadaceae); 'Aroko' | Root | Leucorrhoea | Decoction of root (3 ml) with paste of *Piper longum* (1 gm) is given to women in empty stomach continuously ten days for the treatment of leucorrhoea |
| 28 | *Capsicum frutescens* L. (Solanaceae); 'Dhanua lanka' | Seed | Waist pain | Seed powder mixed with castor oil is applied to cure waist pain |
| 29 | *Carica papaya* L. (Caricaceae); 'Amruta Bhanda' | Juice | Toothache | Juice extract is applied in case of toothache |
| 30 | *Careya arborea* Roxb. (Lecythidaceae); 'Kumbhi' | Bark | Indigestion | Bark of plant and cumin seeds made into paste is taken orally with water in indigestion and flatulence |
| 31 | *Catharanthus roseus* (L.) G. Don. (Apocynaceae); 'Sadabihari' | Roots, leaves | Septic wounds, blood dysentery | Root paste is applied twice a day continuously seven days for healing of septic wounds and fresh leaf juice (few drops) mixed with a cup of water and is taken in empty stomach for the treatment of blood dysentery |
| 32 | *Celastrus paniculatus* Willd. (Celastraceae); 'Pengu' | Bark , seeds, oil | Stomach pain | Oil from seeds is used as mosquito repellent, leeches and other biting insects. Stem, bark and seed oil is taken in acute stomach pain |
| 33 | *Cissampelos pareira* L. (Menispermaceae); 'Akanbindu' | Root | Colic | Filtered root juice is taken with water to cure colic |
| 34 | *Cissus quadrangularis* L. (Vitaceae); 'Hadabhanga' | Stem | Conception | Paste of the stem and banana flower is applied to the head of the women for ten days or so for preventing conception |
| 35 | *Citrus limon* (L.) Burm.f. (Rutaceae); 'Lembu' | Fruits | Diarrhea | Fruit is crushed and warmed slightly and applied to cure diarrhea |

**Table 1.** Contd.

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| 36 | *Clausena excavata* Burm. F. (Rutaceae); 'Agnijhal' | Root, leaves | Dysentery | Roots are mixed with the barks of *Hollarrhena pubescens*, *Anogeisus latifolia* and *Pterocarpus marsupium* and prepared a pill. One pill is taken orally in empty stomach for three days against dysentery in body pain |
| 37 | *Cleistanthus collinus* (Roxb.) Benth ex Hook. f. (Euphorbiaceae),'Karada' | Shoot | Foot injury | Young shoot paste is applied on foot to get relief from injury caused by sand |
| 38 | *Clerodendrum serratum* (L.) Moon (Verbenaceae); 'Samarkond' | Leaves | Septicemia | Paste of leaves applied locally for treatment of septicemia, worms and foot diseases |
| 39 | *Clitoria ternatea* L. (Fabaceae); 'Aparajita' | Leaves | Wounds | The leaf juice is applied to stop bleeding from cuts and wounds |
| 40 | *Coccinia grandis* (L.) Voigt (Cucurbitaceae); 'Bana kunduri' | Leaves | Jaundice | Fresh leaves along with leaves of *Kalanchoe pinnata* and sugar are ground with water and taken twice a day for four to five days to cure jaundice |
| 41 | *Crotalaria spectabilis* Roth, (Fabaceae),'Jhunka' | Whole plant | Dysentery | Juice extracted is given orally to cure dysentery |
| 42 | *Curculigo orchioides* Gaertn (Amaryllidaceae); 'Tatmuli'; | Tuber | Snake bite | Tuber is made into paste and applied externally against snake bite |
| 43 | *Curcuma amada* Roxb. (Zingiberaceae); 'Banahaladi' | Rhizome | Piles | Rhizome used for piles. Paste of 7 long peppers (*Piper longum*) mixed with 3 g of plant paste each used twice for 3 days for the treatment of piles |
| 44 | *Curcuma aromatica* Salisb. (Zingiberaceae); Banhaladi, | Rhizome | Skin diseases | Rhizome paste is applied on new born child to prevent all type of skin diseases and also applied to dry up the child naval (round of placenta) and cures other infections. A paste made with its rhizome and dudura leaves (*Datura metel)* is applied on breast swelling of women |
| 45 | *Curcuma angustifolia* Roxb. (Zingiberaceae); 'Palua' | Root | Dysentery | Roots and sugar are mixed with large quantities of water and given twice a day for three to four days to cure dysentery |
| 46 | *Curcuma longa* L (Zingiberaceae); 'Haldi' | Rhizome | Eye(cataract) | Rhizome and black pepper powder is applied in case of cataract of lens |
| 47 | *Cuscuta reflexa* Roxb. (Convolvulaceae); 'Nirmuli' | Stem | Malaria | About 10 g of stem and seven black pepper seed is pasted and taken with water to cure fever and malaria |
| 48 | *Cyathea gigantea* (Wall. ex. Hook.) Holttum. (Hymenophyllaceae); | Rhizome | White discharge | Fresh rhizome 10 g mixed 1 g black pepper seeds (*Piper nigrum*) are powdered and taken orally with milk twice a day for one week in empty stomach against white discharges |

**Table 1.** Contd.

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| 49 | *Cymbopogon flexuosus* (Nees ex Steud.) Wats. (Poaceae); 'Dhanatwari' | Leaves | Cough and cold | 5-6 drops of leaves juice with cow butter is taken early morning in empty stomach to cure cough and cold |
| 50 | *Cynodon dactylon* (L.) Pers. (Poaceae); 'Dubaghasa' | Leaves | Diarrhea | Leaves juice with sugar candy is prescribed to small kids to cure diarrhea and vomiting. Plant powder is taken with honey in the morning in empty stomach to cure bile |
| 51 | *Cyperus rotundus* (L.) Pers. (Poaceae); 'Mutha' | Rhizome | Acidity | One tea spoon of dried rhizome powder is taken every day to cure acidity and other stomach diseases |
| 52 | *Dalbergia latifolia* Roxb. (Fabaceae); 'Sissoo' | Heartwood | Skin diseases | Oil extracts from firing the heart wood pieces cures skin diseases |
| 53 | *Datura metel* L. (Solanaceae); 'Dudura' | Leaves | Swelling and pain | Paste of leaves applied locally to cure swelling and pains |
| 54 | *Drynaria quercifolia* ( L.) J. Sm. (Drynariaceae); | Whole plant | Sexual vigor | Young shoots are shade dried, powdered and mixed with root powder of *Saraca asoca* in 1:1 ratio and administered with one glass of milk after dinner for 15 days for one week to generate strength and sexual vigor |
| 55 | *Elephantopus scaber* L. (Asteraceae); 'Mayur chandrika | Whole plant | Headache | The entire plant is cooked with rice and eaten to cure migraine. An entire root is tied over forehead to get relief from headache |
| 56 | *Enhydra fluctuans* Lour. (Asteraceae); 'Hidimicha' | Leaves | Cough | Pure mustard oil mixed with leaves juice and given to cure headache. Leaves juice mixed with honey is given three times a day in cough |
| 57 | *Erycibe paniculata* Roxb. (Convolvulaceae); 'Chain katho | Bark | Fever, cholera | Bark is chewed two times a day for two days in fever. The bark juice is given in cholera. |
| 58 | *Gmelina arborea* Roxb. (Verbenaceae); 'Gambhari' | root | Wounds | Decoction of root bark is used for washing and healing of septic wounds |
| 59 | *Helicteres isora* L (Sterculiaceae); 'Murmuria' | Fruits | Orthopedic | Fruits and raw turmeric are added in mustard oil and kept for a few days. This oil is applied to the defective limbs of the children |
| 60 | *Hemionitis arifolia* (Burm. f.) Moore. (Hemionitidaceae) | Root | Hypertension | About 10 g of root powder is taken orally with water in empty stomach twice a day for 10 days for treatment of hypertension |
| 61 | *Hibiscus rosa-sinensis* L. (Malvaceae); 'Mandara' | Twig | Dysentery | Twigs and sugar are made into a paste and given as a remedy for dysentery |

**Table 1.** Contd.

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| 62 | *Holarrhena pubescens* (Buch.-Ham.) Wall.ex G. Don (Apocynaceae); 'Kherwa' | Stem bark | Dysentery, fever | Stem bark infusion with honey in the ratio of 3:1 is taken once a day in empty stomach for cure of dysentery. Bark of the plant and black pepper are powered together and orally taken against malarial fever |
| 63 | *Indigofera cassioides* Rottl. ex DC. (Fabaceae); 'Gileri' | Root, flowers | Dysentery | Flowers and roots are mixed and ground into paste with water and given to cure dysentery. Roots with bark juice of *Careya arborea* are given as a remedy for blood dysentery |
| 64 | *Kalanchoe pinnata* (Lam.) Pers. (Crassulaceae); 'Hemsagar' | Leaves | Dysentery | 25 ml of fresh Leaves juice is given orally three times a day for three days to cure dysentery |
| 65 | *Lagerstroemia speciosa* (L.) Pers. (Lythraceae); 'Patoli' | Leave | Gynecological disorder | One teaspoon leave extracts in water is given orally daily in the morning for a weak to cure gynecological disorders |
| 66 | *Lygodium flexuosum* (L.) Sw. (Lygodiaceae); | Leaves | Blood dysentery | Powdered root 2 g mixed with 1 g *Piper nigrum* and 100 ml of water are orally administered twice a day for 3 days to check blood dysentery |
| 67 | *Lygodium scandens* Sw. (Lygodiaceae); | Leaves, rhizome | Joint pain | Equal proportion of leaves mixed with leaves of *Andrographis paniculata* and rhizome of *Curcuma longa* are made into paste and applied for one week to get relief from joint pain |
| 68 | *Lygodium microphyllum* (Cav.) R. Br. (Lygodiaceae) | Leave | Dysentery, skin disease | Leaves decoction is given in dysentery. Leaves poultices are applied for skin diseases and swelling |
| 69 | *Madhuca longifolia* (Koenig) Macbride (Sapotaceae); 'Mahula' | flower | Piles and fistula | Flowers (corolla) are boiled in water with a pinch of salt for half-an-hour; 5-10 ml of this decoction is given with honey, thrice a day for seven days in piles and fistula |
| 70 | *Mangifera indica* L. (Anacardiaceae); 'Amba' | Bark | Blood dysentery | Stem bark decoction (15 ml) is taken in empty stomach twice a day continuously for three days as a cure for blood dysentery and pasty mass of cotyledons is applied on heads as a cure for falling of hairs |
| 71 | *Mimusops elengi* L. (Sapotaceae); 'Baula' | Leaves | Toothache | Decoction of powder of leaves is used with warm water to gargle to reduce toothache |
| 72 | *Momordica dioica* Roxb. ex Willd. (Cucurbitaceae); 'Kankada' | Fruit | Diabetes | Fruit juice is effective in controlling diabetes. It is also used as drink mixed with sugar candy, one glass daily, to control acidity |
| 73 | *Morinda citrifolia* L. (Rubiaceae); 'Achu' | Root | Dysentery | Decoction of root (30-40 ml) is given to cure from dysentery |
| 74 | *Mucuna pruriens* (L.) DC (Fabaceae); 'Baidonko' | Seed | Ulcers | Paste of the seeds is applied to the ulcers of the genital organs of both sexes. Meat preparations are restricted in the diet during the period of treatment |

**Table 1.** Contd.

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| 75 | *Murraya koenigii* (L.) Spreng. (Rutaceae); 'Ban mallika' | Leave | Gastritis | The green leaves are used in curries to check gastric troubles. The decoction of green leaves (20 ml) is taken internally in stomach disorders |
| 76 | *Nyctanthes arbortristis* L. (Oleaceae); 'Gangasiuli' | Leaves | Malaria | 250 gm leaves is boiled with ½ liter of water till it becomes 100 ml and mixed with leaves juice of *Ocimun tenuiflorum*. This decoction is mixed with 50 ml of honey and prescribed for 3 days to cure malaria fever |
| 77 | *Ocimum tenuiflorum* L. (Lamiaceae); 'Tulsi' | Leave | Cough | Fresh leaves of *Ocimum tenuiflorum* along with ginger and honey are made into pills. This pill is taken orally twice a day for one or two days to cure from cough. |
| 78 | *Ophioglossum reticulatum* L. (Ophioglossaceae); | Leave | Menstrual disorder | 5 gm fresh leaves along with 100 gm rice are made into a cake and the boiled cake is taken orally in empty stomach for 15-20 days against menstrual disorders. |
| 79 | *Oroxylum indicum* (L.) Kurz (Bignoniaceae); 'Phimpinia' | Leave | Jaundice | 50 ml Leaves juice is prescribed to be taken orally thrice a day for three to four days to cure jaundice |
| 80 | *Oxalis corniculata* L. (Oxalidaceae); 'Amliti' | Leave, root | Cold | Roots are made into paste along with garlic and given 1 teaspoonful twice a day for cold. The leaves are eaten as vegetable to check burning sensation of soles. |
| 81 | *Paederia foetida* L. (Rubiaceae); 'Gandhali' | Whole plant | Fever, gout, Rheumatism | Two teaspoonful decoctions of leaves are given orally to control fever and gout. 3-6 gm powder of whole plant is taken twice a day for seven days in weakness to get strength and in rheumatism to get relief from joint pain |
| 82 | *Phyllanthus emblica* L. (Euphorbiaceae); 'Anola' | Leave | Eye | Fresh Leaves juice (2 ml) with diluted solution of common salt (1 ml) used as a drop in eyes for improving weak eyesight |
| 83 | *Phyllanthus fraternus* Webster (Euphorbiaceae); 'Bhuianla' | Whole plant | Fever, jaundice | Decoction of 5 g of fresh and clean roots mixed with a glass of unboiled cow's milk is taken twice a day for three days to cure cold fever. Whole plant used in jaundice |
| 84 | *Piper trioicum* Roxb. (Piperaceae); 'Chaikatho' | Stem | Cold, throat infection | The nodal portion of stem (2-5 cm long) is made into paste with black peppers and garlic, heated and given thrice a day for two days only for cold, tonsillitis and throat infection. |
| 85 | *Plumbago zeylanica* L. (Plumbaginaceae);'Doodhbachra' | Roots | Indigestion | Two teaspoon root powder is taken after meal to avoid indigestion |
| 86 | *Polyalthia cerasoides* (Roxb.) Bedd. (Annonaceae),'Champati' | Bark | Reptile bites | The dry and old seed rubbed against stone with water is applied in reptile-bites and scorpion stings |

**Table 1.** Contd.

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| 87 | *Pteris cretica* L. (Polypodiaceae); | Fronds | Wounds | Fronds are antibacterial and made into a paste is applied in wounds |
| 88 | *Pterocarpus marsupium* Roxb. (Fabaceae); 'Piasala' | Bark | Dysentery | Powdered bark is mixed with *Schleichera oleosa* and taken with cold water for treatment of dysentery |
| 89 | *Rauvolfia serpentina* (L.) Benth.ex Kurz. (Apocynaceae); 'Patalgaruda' | Leave | Malaria | Juice extracted from leaves mixed with the juice of *Andrographis paniculata* and *Azadirachta indica* and given it with honey to drink for seven day continuously to cure malaria |
| 90 | *Ricinus communis* L. (Euphorbiaceae); 'Joda' | Leave, seed | Gastritis | Paste of leaves applied locally and teaspoon seed oil for the treatment of swellings, wounds, stomach disorder and gastric problem |
| 91 | *Saraca asoca* (Roxb.) de Wilde (Caesalpiniaceae); 'Ashok' | Bark | Gynecological disorder | Bark used in gynecological disorders |
| 92 | *Schleichera oleosa* (Lour.) Oken (Sapindaceae); 'Kusum' | Whole plant | Gout, scabies | Stem bark paste is applied on skin before bed as curative against for itching and seed oil are used for treatment of gout and scabies. Seed-paste is heated and applied warm to the cuts. White patches on the skin are cured by applying seed-paste |
| 93 | *Shorea robusta* Gaertn. f. (Dipterocarpaceae); 'Sal' | Stem | Earache | Filtered stem juice is directly used for relief from earache |
| 94 | *Smilax perfoliata* Lour. (Smilacaceae); 'Ramdantuni' | Root | Gastritis, gynecological | Roots are boiled in water and this water is given orally with honey to cure gastric problem like indigestion. 150 g fresh crushed root is boiled with 200 ml mustard oil and massaged on affected part twice day for 4-5 days. Root used in gynecological disorders |
| 95 | *Solanum surattense* Burm. f. (Solanaceae); 'Bhagebaigana' | Fruit | Tuberculosis | Paste of fruits mixed with pepper and ghee of cow is given for seven days as a remedy for tuberculosis |
| 96 | *Sphenomeris chinensis* (L.) Maxon. (Lindsaeaceae); | Leaves | Toothache | Tender leaves are chewed for at least 5-10 min for treatment of toothache |
| 97 | *Spondias pinnata* (L.f.) Kurz (Sapindaceae); 'Ambada' | Bark, fruits | Blood dysentery, muscular pain | Root bark paste (5 g) with mustard oil (1 ml) used as massage for the treatment of muscular pain. Unripe fruits (3-4) are roasted, peeled and pulp is made into three pills. One pill is given three times a day for two days for blood dysentery |
| 98 | *Sterculia urens* Roxb. (Sterculiaceae); 'Kudalo' | Bark | Vomiting | Bark powder is given with little water to stop vomiting |

**Table 1.** Contd.

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| 99 | *Strychnus nox-vomica* L. (Strychnaceae); 'Kochila' | Seeds | Gastritis, dyspepsia | Seed are used in gastric trouble and dyspepsia |
| 100 | *Syzygium jambos* (L.) Alston (Myrtaceae); 'Gulabjamun' | Leave | Rheumatic swellings | The leave grounded with garlic is locally applied in rheumatic swellings |
| 101 | *Syzygium cumini* (L.) Skeels (Myrtaceae), 'Jamu' | Seed | Asthma, jaundice | Seed powdered is mixed with juice of Asparagus and Achyranthus is taken with sugar candy twice a day to cure asthma and jaundice |
| 102 | *Tectaria cicutaria* (L.) Copel. Philipp. (Dryopteridaceae); | Leave | Eczema, scabies | Tender leaves are mixed with fresh leaves of *Azadirachta indica* in equal proportion (5:5) by adding little mustard oil and is thoroughly grounded and applied 2-3 times per day for 15 days against eczema and scabies |
| 103 | *Tephrosia purpurea* (L.) Pers. (Fabaceae); 'Gileri' | Leave | Post natal complaints | Decoction of leaf (5 ml) mixed with honey (2 ml) given to women twice a day continuously for one month against post natal complications |
| 104 | *Terminalia bellerica* (Gaertn.) Roxb. (Combretaceae); 'Bahada' | Fruits | Foot and mouth disease | Pounded fruits are used in foot and mouth disease |
| 105 | *Tridax procumbens* L.(Asteraceae); 'Bishalyakarani' | Whole plant | Wounds | Fresh leaf juice is applied as antiseptic cream for healing of cut wounds |
| 106 | *Triumfetta rhomboidea* Jacq. (Tiliaceae); 'Tatatatia' | Root | Quick delivery | 50 gm crushed root given orally for easy delivery during child birth |
| 107 | *Vanda tessellata* (Roxb.) G. Don (Orchidaceae); 'Malanga' | Leaves | Earache | Two to three drops of warmed leaves juice are put in the ear once a day for two to three days to reduce earache |
| 108 | *Ventilago maderaspatana* Gaertn. (Rhamnaceae); 'Rakta pichula', Bark | Bark | Fracture | The bark grounded into a paste and applied locally in bone fracture |
| 109 | *Vernonia anthelmentica* (L.) Willd. (Asteraceae);'Kalajeera' | Seed | Antihelmentic | Seeds are used in antihelmentic especially for children, 2-5 gm with water in empty stomach twice a day for three days |
| 110 | *Vitex negundo* L. (Verbenaceae); 'Begunia' | Leaves, lower | Skin | Seven teaspoons of juice extracted from leaves and barks of *Strycnus nux-vomica* are applied like ointment on the affected part |
| 111 | *Woodfordia fruticosa* (L.) Kurz (Lythraceae); 'Dhatki' | Flowers, bark, leaves | Menstruation | Flower paste and bark paste of Champa (*Michelia champaca)* is given twice a day for 7 days to women in excess of bleeding during menstruation. Juice is good for treating dysentery |
| 112 | *Ziziphus rugosa* Lam . (Rhamnaceae); 'Chunkoli' | Bark, flowers | Hysteria | Decoction of stem bark along with *Piper longum* paste and ginger paste is used in hysteria treatment. |

value in modern development, especially regarding the sustainable use of forests, ecosystem services and management. It is an urgent task to record the posterity, whatever is valuable in the tradition of the tribes, their way of life and their knowledge of the plants before all these disappear.

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