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Patra Biswajit
*Ecology and Floristic Lab., P.G.
Department of Botany
Berhampur University,
Berhampur- 760007, Odisha,
India.*

Sahu Deenabandhu
*Ecology and Floristic Lab., P.G.
Department of Botany
Berhampur University,
Berhampur- 760007, Odisha,
India.*

Misra Malaya K
*Ecology and Floristic Lab., P.G.
Department of Botany
Berhampur University,
Berhampur- 760007, Odisha,
India.*

Correspondence:
Misra Malaya K
*Ecology and Floristic Lab., P.G.
Department of Botany
Berhampur University, Berhampur-
760007, Odisha, India.
Email: malayakmisra@rediffmail.com
Mob: 09861268613*

Ethno-medicobotanical studies of Mohana area of Gajapati district, Odisha, India.

Patra Biswajit, Sahu Deenabandhu, Misra Malaya K

Abstract

The paper reports 73 ethno-medicinal plants under 69 genera and 47 families uses by the tribal people of Mohana region of Gajapati district, Odisha, India. These plants are used against 27 human disease groups in the region.

Keywords: Ethno-medicinal plants, disease, Gajapati district, Odisha, tribal people.

1. Introduction

Medicinal plants have important contributions in the health care system of local communities and it is the main source of medicine for the majority of the rural population in the developing countries. Over 6000 species of medicinal plants are found in India and form the basis for traditional medicine that is a major source of health care for 65% of the population [1]. The World Health Organization estimates that up to 80% of the people in developing countries still depend on local medicinal plants to fulfill their primary health care needs [1]. The use of traditional medicines and medicinal plants in most of the developing countries as therapeutic agents for the maintenance of good health has been widely observed [2]. In India it is reported that traditional healers use 2500 plant species while 100 species of plants serve as regular source of raw material for preparation of medicines in the pharmaceutical industries [3]. The Indian subcontinent is inhabited by more than 53.8 million tribal people in 5000 forest dominated villages comprising 15% of the total geographical area of India, representing one of the greatest emporia of ethno-botanical wealth [4]. Because of non-availability of medicinal plants due to forest clearance and shifting cultivation (podu) the use of ethno-medicine has been reduced to some extent [5]. The importance of traditional medicine that provides health service to 75-80% of world population has been emphasized by Marini-Bettolo [6]. Due to lack of communication of intermingling and breeding of ideas and varying way of life, many of these earlier remedies survived only by word of mouth from generation to generation [5]. In these circumstances specific emphasis should be given to ethno-medicinal plants while setting priorities for biodiversity conservation in India [7]. Some attempts have been made by various authors to collection information on ethno-medicinal uses of plants of Odisha [8-24]. Ethnobotany is generally defined as the 'science of people's interaction with plants'. Ethnobotany must have been the first knowledge acquired by man to satisfy his hunger, healing his wounds and curing various ailments [25].

In this study, an attempt has been made to collect information on traditional medicinal uses of plants by the tribal people of Mohana area of Gajapati district of Odisha, India for the treatment of various diseases they suffer from. Knowledge of medicinal plants has disappeared because most of the specialized healers did not properly pass their knowledge to their next generation. And also there are many cases where the knowledge remains a secret amongst the tribes. Thus the main objective is to document the medicinal knowledge from traditional healers of Mohana area before the knowledge is lost.

Study site and environment

Gajapati is one of the 30 districts of Odisha, which is covered by hills, mountains and undulated topography inhabited by *Saura* tribe. Gajapati district constitutes a part of the Eastern Ghats of India. Mohana is towards the south of the district (Fig. 1). This district is lying between 18.46^o to 19.39^o N lat. and 83. 48^o to 84.00^o E long. Gajapati is surrounded by Andhra Pradesh towards south, Ganjam district on the east, Rayagada district on the west, Ganjam and Phulbani districts on the north. Vansadhara and Mahendratanaaya are the two major rivers of this district. The total forest area of Gajapati district is 2302 sq km, of which

437 sq km is reserve forest.

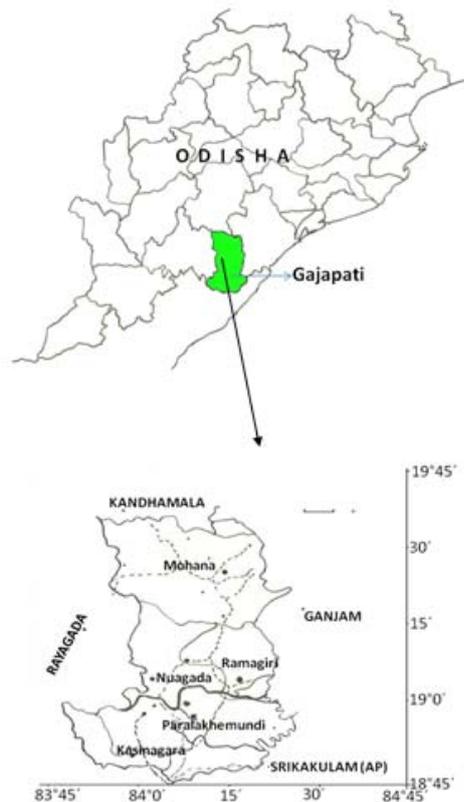


Fig 1: Map showing the Mohana forest division of Gajapati district of Odisha.

The Mohana forest area is 103.6 sq km. The forests are dry deciduous type and dominated by sal (*Shorea robusta*). The tribal people of Mohana area mostly depend on traditional medicine for the treatment of diseases they suffer from. The area is covered with dense sal (*Shorea robusta*) forest and people also use the sal tree for different purposes. Atmospheric temperature varies from 16 °C to 45 °C. The normal annual

rainfall of the district is 1403 mm. Major part of the area belongs to hilly topography.

Methods

Mohana forest division encompasses several villages such as Anlaguda, Betarsingh, Ladruma, Jamaganda, Nalaghat, Gurujhuli, Kuruma, Hidikima, Beleripada, Mohana, Paniganda, Raiganda, Kharikua, Gerigadi, Kamiliguda, Bada Raising, Laberama, Keshara, Solaguda and Rangaguda. Among them Mohana, Betarsingh, Bada Raising, Rangaguda and Pindiki villages were visited several times during 2013–2014 to collect information on ethno-medicine. Six informants were thoroughly interviewed in this study (Appendix I). Besides, some elderly people also provided some information on medicinal uses of plants. There are four basic interview techniques are used by field ethnobotanists: open-ended and semi-structured interviews, which are used in qualitative data collection, and structured interviews and questionnaires, which may be used for quantitative analysis [26]. In this study, questionnaires were used to collect information on the Odia names of the plants, plant parts used for preparation of medicine and method of use of the medicine. In the study area, the people prescribing medicine are known as ‘Dasudu’ (persons performing religious rites), the ‘Village Headman’, the ‘Kaviraj’ (traditional herbal medical practitioner) and other traditional old healers. The profile of informants is given in Appendix I. The age of all interviewed tribal people ranged between 33 to 73 years. The people use the medicine with strong religio-spiritual belief. The old healers pass this information in oral form to their sons and near relation which is not documented. The plant specimens collected with the help of local people were dried and poisoned and herbarium specimens were prepared. The specimens were identified with the help of local flora [27] and the specimens were deposited in the Harbarium of the Department of Botany, Berhampur University (BOTB), Berhampur, Odisha. Plants are arranged alphabetically with the correct nomenclature, family and Odia name (Od), if available and the traditional medicinal uses of the plant.

Appendix I: Profile of the informants in the Mohana area, Gajapati, Odisha.

Name	Sex	Age	Village	Panchayat	Occupation	Category of healer
Sribatsa Nayaka	Male	73	Betarsingh	Mohana	farmer	Kaviraj
Simanchala Dalai	Male	33	Betarsingh	Mohana	Tailoring	Village headman
Bobita Chaudhury	Female	40	Betarsingh	Mohana	shopkeeper	Traditional old healer
Padman Paika	Male	45	Pindiki	Mohana	farmer	Dasudu
Narasingh Pattnayak	Male	46	Mohana	Mohana	Kavirajstore	Traditional old healer
Hari Chandra Bisoi	Male	50	Pindiki	Mohana	Forest watcher	Traditional old healer

Results

The Forests of Mohana area of Gajapati district are rich in medicinal plants and 73 plant species are reported in this study that are used by the tribal people of the area. These plant species constitute 59 dicot, 12 monocot, 1 pteridophyta and 1 gymnosperm species. These plants belong to 47 families, of which 37 are dicot, 8 monocot, 1 each Pteridophyta and Gymnosperm. These plant species come under 69 genera. Out of the 73 medicinal plants reported 26 are herbs, 12 shrubs, 6 climbers and 29 tree species. The highest number of medicinal plant species used are from Caesalpiniaceae (5 species) and Fabaceae (5 species) followed by Anacardiaceae, Apocynaceae, Asteraceae, Zingiberaceae and Euphorbiaceae (each 3 species) and Asclepiadaceae, Combretaceae,

Meliaceae, Mimosaceae, Orchidaceae, Poaceae, Rutaceae and Sterculiaceae (each 2 species).

The tribal people of this region utilize 73 medicinal plants for the treatment of 27 disease groups. Some important diseases treated by traditional people in this region are asthma, breast cancer, diabetes, diarrhea, dysentery, eczema, jaundice, malaria, poisonous bites, paralysis, piles, rheumatism, sexual diseases, stomach disorder and tuberculosis. Maximum 27 species are used against skin disease, followed by 15 species used against stomach disorder. For diarrhea, jaundice and diabetes 5 species each and dysentery, paralysis, contraception and for lactation 2 species each are used. They also use 6 species for curing poisonous bite like snake and insect. Tribal people use 7 species for teeth and oral infection; 3 species for

malaria and 1 species for cold fever. According to traditional healer, the common diseases in the area are jaundice, skin diseases, cold cough and asthma.

Enumeration

Adiantum philippense L. (Adiantaceae) Fern. Herb.

The root paste mixed with honey is used against allergy and piles. Whole plant pasted with water is applied on the body in burn injury.

Achyranthes aspera L. (Amaranthaceae) Od. Apamaranga. Herb.

Leaf along with salt applied on teeth to cure tooth infection. Leaf paste administered to stop vomiting.

Aegle marmelos (L.) Corr. (Rutaceae) Od. Bel. Tree.

Burned fruit pulp mixed with honey or ghee and dried ginger orally administered to cure diarrhoea. Three to four leaves are prescribed daily in empty stomach to help control diabetes. 10 g fresh root mixed with 21 black pepper are pasted and taken orally with raw milk in empty stomach twice daily for 21 days to cure rheumatic pain and inflammation.

Albizia lebbek (L.) Benth. (Mimosaceae) Od. Sirisi. Tree.

Seeds are grinded and mixed with honey and applied into the eye to cure conjunctivitis.

Amorphophallus bulbifer (Roxb.) Bl. (Araceae) Od. Dhala Oluo. Herb.

Raw rhizome paste is taken orally once or twice to cure pile and constipation.

Andrographis paniculata (Burm.f.) Wall. ex Nees (Acanthaceae) Od. Bhui nimba. Herb.

Fresh fruit paste mixed with honey and orally administered to cure malaria. Leaf decoction is taken orally for seven days to cure skin diseases and to kill intestinal worms. Leaf paste also helps in blood purification. Leaf paste and turmeric cure itches.

Asparagus racemosus Willd. (Liliaceae) Od. Satabari. Climber.

Rhizome is kept with water over night and in the morning mixed with sugar candy, and both rhizome and water are administered orally in empty stomach to cure colic pain, nervous debility, night mare and also cure imbalanced body temperature.

Atylosia scarabaeoides (L.) Benth. (Fabaceae) Od. Bana Kolathia. Herb.

Root paste is used to cure dysentery and for contraception. Root paste mixed with coconut oil is applied externally to check falling hair.

Azadirachta indica A. Juss. (Meliaceae) Od. Neem. Tree.

Leaves are used as antifungal, antibacterial, antiviral and contraceptive medicine. Also used for skin diseases. Bark and leaf paste used as a spermicide and contraceptive for woman. Seed oil is useful for acne treatment and also used effectively as mosquito repellent. Patients suffering from chicken pox are recommended to sleep on neem leaves. Leaf extract is a medicine for treating malaria and purifying blood.

Bauhinia vahlii Wight & Arn. (Caesalpiniaceae) Od. Siali. Woody Climber.

Seeds removed from burned fruit are orally administered to kill hookworm.

Calotropis gigantea R. Br. (Asclepiadaceae) Od. Arakha. Shrub.

In primary stage of snake bite, latex is used on the wound to reduce the poisonous effect. Latex mixed with turmeric on black spots in face and boils for cure. Latex is applied on carries teeth to get relief of pain.

Carica papaya L. (Caricaceae) Od. Amrutavanda. Tree.

Root paste (ca 20 g) mixed with raw cow milk taken orally to increase lactation in feeding mother.

Caryota urens L. (Arecaceae) Od. Salapa. Tree.

Fermented sap is used to wash the ear; also used against body pain, rheumatism and urinary disorder.

Casearia elliptica Willd. (Flacourtiaceae) Od. Khakada. Shrub.

Root and stem bark paste orally administered for muscular pain.

Cassia fistula L. (Caesalpiniaceae) Od. Sunari. Tree.

Juice extracted from fruit and bark is given orally to relieve rheumatic pain. Leaf paste is applied on feet (in between fingers) to cure fungal infection.

Cassia tora L. (Caesalpiniaceae) Od. Chakunda. Herb.

Paste of whole plant and leaf of neem (*Azadirachta indica*) and turmeric (*Curcuma longa*) applied on itches and scabies for cure.

Celastrus paniculata Willd. (Celastraceae) Od. Pengu, Lai Bahada. Shrub.

Paste of stem bark is pasted on burn injury. Seed oil is massaged to get relief from joint pain, paralysis and weakness.

Centella asiatica (L.) Urb (Apiaceae) Od. Thalakudi. Herb.

Leaves are administered orally in the morning to children to improve memory power. Plant juice is administered orally to cure sunstroke and tonsillitis. The plant is used for preventing pregnancy and to initiate menstrual cycle.

Chromolaena odorata (L.) R. King & Robins. (Asteraceae) Od. Gandhuri. Shrub.

Leaf paste is used as an antiseptic and applied on cuts to stop bleeding.

Cipadessa baccifera (Roxb.) Miq. (Meliaceae) Od. Pitamari. Tree.

Paste of stem bark and tender branches is use against allergy and fever. Root is used to induce vomiting.

Clerodendrum serratum (L.) Moon (Verbenaceae) Od. Rasna. Shrub.

Root is used against fever and piles.

Curculigo orchioides Gaertn. (Amaryllidaceae) Od. Talamuli. Herb.

Root paste with sugar is orally administered to cool the stomach. Also used for jaundice, rib muscle pain and scabies.

Curcuma angustifolia Roxb. (Zingiberaceae) Od. Palua, Chelandi. Herb.

Rhizome paste mixed with turmeric is applied on the affected area of insect bite.

Curcuma longa L. (Zingiberaceae) Od. Haldi. Herb.

Raw rhizome juice orally administered to kill hookworm. Rhizome paste along with neem (*Azadirachta indica*) leaf cure itches.

Cuscuta reflexa Roxb. (Convolvulaceae) Od. Nirmuli. Climber.

Paste of whole plant with leaves of turmeric and neem is massaged on the body of weak children for good health. Juice of the plant mixed with sugarcane (*Saccharum officinarum*) juice taken orally to cure jaundice.

Cycas circinalis L. (Cycadaceae) Od. Araguna. Shrub.

Juice of tender leaves useful to induce vomiting.

Cynodon dactylon (L.) Pers. (Poaceae) Od. Duba. Herb.

Whole plant paste is applied externally on cuts as an antiseptic. Whole plant mixed with sugar candy and honey to cure urinary disorder such as burning and difficult in urination. Paste of root and raw rice applied on forehead to cure headache and migraine.

Dillenia pentagyna Roxb. (Dilleniaceae) Od. Rai. Tree.

Bark decoction (25-60 ml) is prescribed to woman after delivery to check infection. Paste of bark applied on body to check swelling.

Dioscorea bulbifera L. (Dioscoreaceae) Od. Pitakanda. Climber.

Half boiled bulb taken to cure hookworm.

Diospyros melanoxylon Roxb. (Ebenaceae) Od. Kendu. Tree.

Fruit is used to stop diarrhoea and stomach disorder. Seed powder is administered against diabetes.

Elephantopus scaber L. (Asteraceae) Od. Totachera, Mayurachulia. Herb.

Leaves mixed with sugar candy prescribed against diabetes. Root paste with salt taken in empty stomach in morning for 21 days cure chronic abdomen and stomach pain.

Euphorbia hirta L. (Euphorbiaceae) Od. Chitacutae. Herb.

Fresh twigs of 10-15 g are made in to paste along with 15-20 g sugar candy and taken in 6-8 doses in the morning and evening for gonorrhoea.

Ficus religiosa L. (Moraceae) Od. Aswasta. Tree.

Stem bark decoction is used for wash and applied on the eczema for cure.

Garuga pinnata Roxb. (Burseraceae) Od. Sarupatri. Tree.

Galls formed on the leaf are pasted and the paste is applied around the gout for cure.

Globba racemosa Sm. (Zingiberaceae) Od. Bana- Haladi. Herb.

Whole plant paste along with water is taken orally to relief stomach pain.

Glycosmis pentaphylla (Retz.) DC. (Rutaceae) Od. Dubuduba. Shrub.

Bark dissolved in water overnight and the extract is taken in empty stomach to cure pile. Leaf and stem bark paste applied against excessive skin dryness.

Grewia tiliifolia Vahl (Tiliaceae) Od. Dhamana. Tree.

Luke warm bark paste is fomented on the affected area to cure paralysis.

Habenaria roxburghii (Pers.) R.Br. (Orchidaceae) Epiphytic orchid. Herb.

Paste of aerial root is administered orally against breast cancer. Aerial root decoction mixed with garlic and black pepper is applied on snake bite wound.

Helicteres isora L. (Sterculiaceae) Od. Modimodika. Shrub.

Paste of fruits is applied on boils.

Hemidesmus indicus (L.) R.Br. (Asclepiadaceae) Od. Sugandhi. Herb.

Leaves mixed with aniseed (*Pimpinella anisum*) and boiled with 20 ml water. The decoction is prescribed as a medicine for diabetes. One tea spoon root powder with honey applied for three to four days to small kids to cure mouth infection.

Holarrhena pubescens (Buch.-Ham.) Wall. ex G. Don (Apocynaceae) Od. Keruana. Tree.

Bark with boiling water cure diarrhoea, stomachache and leucorrhoea.

Ichnocarpus frutescens (L.) R. Br. (Apocynaceae) Od. Dudhi-Lata. Climber.

Root decoction with honey taken orally help increase milk production for women and also relief general weakness. Leaf paste applied on wounds and sores between fingers for cure.

Imperata cylindrica (L.) Rausch. (Poaceae) Od. Dabuchana. Herb.

Paste of whole plant is applied on the affected area to cure itches and scabies.

Indigofera cassioides Rottl. ex DC. (Fabaceae) Od. Giridi.

Shrub.

Paste of leaf and black pepper is orally given to relief pain.

Lannea coromandelica (Houtt.) Merr. (Anacardiaceae) Od. Mahi. Tree.

Stem bark paste is applied and then bandaged with stick in bone fracture. Decoction of bark is used for toothache.

Laportea interrupta (L.) Chew (Urticaceae) Od. Bichuati. Herb.

Fruits and leaves are rubbed on bald-head to grow hair. Paste of leaf of this plant and *Hibiscus rosa-sinensis* applied on boils for cure.

Madhuca indica Gmel. (Sapotaceae) Od. Mahula. Tree.

Raw flowers are taken orally to cure rheumatism. Seed oil is used for skin diseases and headache, mainly used against hair fall and also prevent skin crack in winter.

Mangifera indica L. (Anacardiaceae) Od. Amba. Tree.

Paste of bark with black pepper along with 50 g water is taken two times a day with empty stomach to cure diarrhoea.

Mimosa pudica L. (Mimosaceae) Od. Lajakuli. Herb.

Paste of whole plant applied on boils for cure. Paste of root fried in ghee is applied on teeth to relief toothache

Momordica charantia L. (Cucurbitaceae) Od. Tusi kalara. Climber.

Leaf paste is applied on forehead to get relief from headache. Fresh juice of leaf and fruit prescribed against diabetes. One cup of leaf juice is taken in empty stomach in the morning to cure ringworm and leprosy.

Nyctanthes arbor-tristis L. (Oleaceae) Od. Ganga siuli. Tree.

Leaves mixed with sugar candy (or honey) and black pepper and orally taken to cure malaria.

Ocimum tenuiflorum L. (*O. sanctum* L.) (Lamiaceae) Od. Tulsi. Herb.

Two to 4 leaves are taken in morning in empty stomach for seven days to prevent fever. Leave with honey also used for asthma, bronchitis, cough and whooping cough. Tribal people cut the stem in small pieces and use as neck ring, for the balance of body temperature and mental peace.

Oroxylum indicum (L.) Vent. (Bignoniaceae) Od. Phonophonia. Tree.

Leaf paste applied on boils and small pox for relief. Root and flower paste is taken orally help cure leucorrhoea. Stem bark paste taken orally for tuberculosis. Dried seed powder is used by woman to induce conception.

Phyllanthus emblica L. (Euphorbiaceae) Od. Amla. Tree.

Fruits used to cure acidity, purify the blood, benefit the eyes, stimulate hair growth and also cure all stomach problems.

Phyllanthus fraternus Webster (Euphorbiaceae) Od. Badiamla. Herb.

Fresh fruit take orally help prevent conjunctivitis.

Pongamia pinnata (L.) Pierre (Fabaceae) Od. Karanja. Tree.

Fruit paste is applied on female genital organ to cure genital tract infections. Seed oil is massaged on the head to reduce high blood pressure. Seed oil help cure leprosy and skin irritation. Young twigs used as tooth brush for oral hygiene. Bark extract applied on the affected area to cure skin diseases.

Pterocarpus marsupium Roxb. (Fabaceae) Od. Piasal. Tree.

Stem bark extract orally taken to cure jaundice.

Rauvolfia serpentina (L.) Benth. ex Kurz (Apocynaceae) Od. Patal-garuda. Herb.

Root paste applied to cure snake bite and centipede bite. Root mixed with black pepper taken orally to cure stomachache.

Saraca asoca (Roxb.) de. Wilde. (Caesalpiniaceae) Od. Ashoka. Tree.

Bark boiled with raw milk and taken orally to control diabetes.

Bark paste taken orally to cure menorrhagia (scant menses), dysmenorrhea (painful menses) and useful for bleeding diseases. Leaf paste taken orally to cure depression for female. *Schleichera oleosa* (Lour.) Oken (Sapindaceae) Od. Kusuma. Tree.

Warm seed oil applied to cure itches, scabies and acne. Kusum oil is used in hair dressing and to promote hair growth. Oil massages relief rheumatic pain.

Semecarpus anacardium L. f. (Anacardiaceae) Od. Kalabhalia. Tree.

Fruit paste applied against poisonous insect bites.

Shorea robusta Gaertn. f. (Dipterocarpaceae) Od. Sal. Tree.

Jhuna (oleoresin) mixed with black pepper taken orally with water to cure diarrhoea. Bark paste is used as a primary medicine for insect and dog bite. Bark paste is applied as an antiseptic on cut injuries to stop bleeding and quick healing. Decoction of stem bark with *Alangium salvifolium* roots, *Madhuca indica* root bark and *Syzygium cumini* stem bark is taken in the morning in empty stomach for 21 days to cure jaundice. Bark decoction is applied as drops for ear problem.

Sida cordata (Burm. f.) Borssum (Malvaceae) Od. Bisakhapuri. Herb.

Mixture of leaf and black pepper paste applied on the boils and wounds for cure.

Sterculia urens Roxb. (Sterculiaceae) Od. Genduli, Kodala. Tree.

Gum taken orally to cure amoebic dysentery.

Tamarindus indica L. (Caesalpiniaceae) Od. Tentuli. Tree.

Bark kept in water at least for 10 hours; in morning the extracted water is taken to cure rheumatism.

Tephrosia purpurea (L.) Pers. var. *purpurea* (Fabaceae) Od. Bana Kolothia. Shrub.

Grinded root mixed with honey taken to cure stomachache.

Terminalia bellirica (Gaertn.) Roxb. (Combretaceae) Od. Bahada. Tree.

Decoction of fruit taken to stop vomiting, it delays ageing, improves mental condition and increases resistance against diseases. Seed oil and fruit paste applied on painful part of the body for relief.

Terminalia chebula Retz. (Combretaceae) Od. Harida. Tree. Fruits used for acidity, digestive disorders and indigestion. Stem and fruit are chewed for mouth wash.

Tridax procumbens L. (Asteraceae) Od. Bisalyakarani. Herb.

Whole plant paste applied on the painful part of the body to relief pain.

Vanda tessellata (Roxb.) Hook. ex G. Don (Orchidaceae) Od. Rasna, Epiphytic orchid. Herb.

Leaf decoction is taken orally to cure rheumatism. Leaf paste applied on the affected part of the body in bone fracture.

Viscum articulatum Burm. f. (Loranthaceae) Od. Madanga. Herb.

Leaf paste is taken orally to cure hypertension. Used as a substitute for *Vanda tessellata*.

Woodfordia fruticosa (L.) Kurz (Lythraceae) Od. Dhatuki. Shrub.

Paste of leaf and flower is pasted on cuts and wounds for cure. Stem bark with water taken orally to cure jaundice.

Ziziphus oenoplia (L.) Mill. (Rhamnaceae) Od. Konteikoli. Shrub.

Leaf paste with raw milk applied on head twice daily before sunrise and after sunset for one month cure madness.

Discussion

The local healers collect the medicinal plants free from the

forest and thus forest plant resources provide some traditional occupation to local people. This occupation provides some income to local healers. Some of the informations reported in this paper are new as they are not reported earlier. Most of the medicines used in the area are prepared from fresh materials collected from the wild and they are used mostly either in the form of juice or paste. The plant parts used for medicine preparation were bark, flowers, rhizomes, roots, leaves, seeds, gum and whole plant. Some plant materials were collected during the period of availability, stored and used in time of necessity. The traditional medicines prepared in this study were mostly from a single plant or a combination with other plants. This system of medicine is found to be refined and included in Ayurved system but it has its own indigenous concepts based on practical experience during disease treatment^[28]. The World Health Organization (2002) currently encourages, recommends and promotes traditional herbal medicines in national health care programs. Traditional herbal drugs are easily available at low cost and safer than other chemically produced drugs. Therefore, large scale cultivation and propagation of medicinal plants is needed to meet market demands and to utilize them in a sustainable manner^[29]. With modernization and improved economic condition, tribal and rural people depend more and more on modern medicines rather than relying on herbal medicine as it was time consuming to prepare the traditional medicines as well as find the medicinal plants in the forest^[30].

Medicinal plants such as *Rauvolfia serpentina*, *Saraca asoca*, *Oroxylon indicum* and *Pterocarpus marsupium*, which are rare in this region should be identified for conservation and protection. Steps should be taken to conserve *Rauvolfia serpentina*, which is available in the forests of the area. Moreover, the local people should be encouraged for large scale cultivation of the species by the Government and non-Government agencies. These medicinal plants are important as about three fourth of the biologically active plant derived compounds presently in use globally have been discovered through research of folk and ethno-medicinal uses^[31].

The information provided in this paper shall help the chemists, pharmacologists, herbalists, research scholars and scientists for further critical pharmaceutical studies and screening of the plants for the development of eco-friendly medicine for better health.

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