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RESEARCH ARTICLE

Ethno-medicobotany of Yavatmal District (M.S.) India

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ABSTRACT

Yavatmal district is inhabited by about 14 tribal communities. First hand ethnomedicinal information was collected directly from field survey of tribal villages and forest areas of the district. Present paper deals with ethno medicinal uses of 78 plant species belonging to 47 families used locally for prevention and treatment of various diseases. Sixty two species are used in mono-herbal treatments, while 29 are used in poly-herbal formulations. Observations regarding exploitation of these species are also reported, which will help in conservation and restoration of the species.

Keywords: Ethno–medicobotany, Mono–herbal treatments, Poly–herbal formulations, Conservation, Yavatmal district.

INTRODUCTION

Medicinal plants have been in the focus as life saving drugs right from the beginning of the human civilization. Medicinal plants have been the subject of research in both systematic and advanced areas of plant sciences. The tribals and rural people have the knowledge of medicinal and other uses of plants growing in the forests. Tribal medicine men know the exact preparation of the medicine and diagnosis of the diseases (Harshberger, 1896).

Much of this wealth of knowledge is totally becoming lost as traditional culture is gradually disappearing and because it is mostly oral (Hamilton, 1995). Therefore, effort should be initiated for the documentation and computerization of useful medicinal plants and their traditional knowledge (Mehrotra & Mehrotra, 2005).

It is estimated that 70 to 80% of the world population rely chiefly on traditional health care system and largely on herbal medicines (Shanley and Luz, 2003). Even today most of the rural and tribal people have to depend on traditional health care system. Some affluent people also prefer traditional health care system because they strongly believe in it.

District Yavatmal is situated in the eastern part of the Maharashtra between north latitudes 19^0 23` and $20^0$ 48` and longitudes 77^0 19` and $79^0$ 07. `It occupies an area of 13,582 Sq. Km with forest cover of 2956 sq. Km. Average rain fall is 1089.7 mm. The district is inhabited by several tribes. These are Andh, Banjara, Bahurupi, Bhil, Chitrakathi, Gond, Gopal, Kolam, Kolhati, Rajgond, Pardhan, Panchal, Tambatkar and Wadar. Kolam tribe is on the verge of extinction; in 2001 the population was only 900. Population of Bhil is also decreasing (less than 5000).

Banjara is the most dominant tribe spread throughout Vidarbha region. Bhogaonkar and Chavhan (2013) have documented 177 plant species used as medicinal by Banjaras of Vidarbha. Since about 14 tribes inhabit the district, the region has rich tradition of folk knowledge. Bhogaonkar and Kadam have documented 13 monocotyledonous species used to treat various diseases (2005),use of 50 species as mono-herbal drugs (2006 a), 22 polyherbal formulations to treat reproductive disorders (2006 b), and 16 species used as snakebite antidote (2007) from Umerkhed region of Yavatmal district.

MATERIAL AND METHODS

Field survey was carried out during the year 2009-2012. Tribal medicine men (*Vaidus*), village heads and local people were interviewed to record different plant species used in folk remedies in Yavatmal district. Local names of the plants (given in italics), disease on which they are used, method of drug preparation and mode of use were noted. Plants were collected and identified with the help of standard floras (Cooke 1967, Naik 1998, Karthikeyan and Kumar, 1993, Yadav and Sardesai, 2002). Herbarium specimens made are deposited in the department of Botany, Govt. Vidarbha Institute of Science and Humanities, Amravati. For recent valid nomenclature The International Plant Index, The Plant List and Plants of the World Online (POWO) were referred.

ENUMERATION

Acacia catechu (Roxb.) Prain (Mimosaceae); Tree; '*Katha, Kath*'– a) Root pounded and boiled in water till only half the water remains. One cup of this decoction is given twice a day for one month in leucorrhoea.

b) A shelf fungus growing on bark of the tree is made into poultice and applied on boils developed on thy and back.

Acacia nilotica (L.) Del. (Mimosaceae); Tree; '*Babhul*'–

a) Bark decoction used for gargling in toothache.

b) To treat loose gums young tender leaves are chewed.

Aegle marmelos (L.) Corren. (Rutaceae); Tree; '*Bel*'–

a) Leaves pounded and paste applied on piles.

b) Leaves are pounded and mixed with curd. One spoonful of this mixture is taken orally twice for one month to treat piles; leaf paste applied on piles externally.

Ailanthus excelsa Roxb. (Simaroubaceae); Tree; '*Maharukh*' –Bark powder is used to brush in toothache and gum infection.

Alectra parasitica A. Rich. (Scrophulariaceae); Root parasite; '*Nirguda*'– Plants growing under *Vitex negundo* L. are collected. Decoction of aerial parts is given in bodyache.

Alocasia macrorhiza (L.) G. Don. (Araceae); Herb; '*Bhramrakshas*'– Half young leaf is mixed with 100gm Mung dal (*Phaseolus radiatus*) soaked in water and grinded. '*Wade*' are made, fried in Linseed oil. Daily one 'wada' is eaten in morning on empty stomach. This cures dysmenorrhea.

Amorphophallus commutatus L. (Araceae); Herb; '*Mogari–kanda*'– Rhizome of red petioled variety (Kala Suran) is used. 5gm of rhizome is mixed with old jaggary to make 6-7 tablets. One tablet a day is taken in morning on empty stomach in dysmenorrhea.

Amorphophallus sylvaticus (Roxb.) Kunth. (Araceae); Herb; '*SuranKand*' – Tuber paste applied on piles.

Andrographis paniculata (Burm f.) Nees. (Acathaceae); Herb; '*Bhuinimb*'– Five–six leaves are boiled in cupful of water till water is reduced to half. Decoction is given thrice a day for three days in fever. Fresh decoction prepared every time.

Annona squamosa L. (Annonaceae); Small tree; '*Sitaphal*' – Juice of leaves given to check the habit of liquor consumption.

Argyrea involucrate C.B. Cl. (Convolvulaceae); Large climber; '*Mhaisa-Kand*'– Half cup of tuber decoction given in the morning on empty stomach in typhoid and chronic fever.

Azadirachta indica A. Juss. (Meliaceae); Tree; '*Kadu-nimb*'– a) Leaves boiled in water. Decoction is given on swellings caused by accident.

b) Same juice is given for 3 days (one glass at a time) to treat typhoid.

Bauhinia variegate L. (Caesapiniaceae); Tree; '*Koylar*' – Vegetable made of tender leaves is eaten in rheumatism.

Blepharis repens (Vahl) Roth (Acanthaceae); Prostrate Herb; '*Hadsan*'– a) Young leaves are made into vegetable. This is given to eat in arthritis.

b) Leaf powder is mixed with fried gum of *Acacia nilotica* and Laddus prepared. One laddu given every morning before breakfast is believed to make the bones strong.

c) Leaves are shade dried and made into powder. Half spoonful powder is mixed with jaggery and made into tablet. This is put in mouth and slowly chewed. Supposed to help in proper bone growth.

Bombax cieba L. (Bombacaceae); Tree; '*Kate–Savar*'. – Bark is mashed in water. One cup filtrate is given thrice a day for 15 days in sperm debility.

Boswellia serrata Roxb. ex Colebr. (Burseraceae); Tree; '*Salai*'– Stem bark is finely pounded in water and filtered through thick cotton cloth. A cupful of decoction given a thrice a day for seven days is recommended in hemorrhagea.

Bridelia retusa (L.) Spreng. (Euphorbiaceae); Tree; '*Kate-ain*'- Bark burnt and finely mixed with coconut oil; applied on patches of eczema.

Butea monosperma (Lam.) Taub. (Fabaceae); Tree; '*Palas*'– a) Seed is levigated. Paste of one seed is divided into seven parts and given to the woman once a day for a month. This is supposed to enhance the fertility.

b) 10 gm of inner bark is soaked in water for 7 days and boiled with water to get ½ cupful of decoction. This decoction is mixed with ½ cup of cow ghee and divided into 7 parts. One part taken daily in the morning on empty stomach for piles.

Cadaba fruticosa (L.) Druce (Capparidaceae); Shrub; '*Kali–Takal*' – Handful of leaves are pounded with three black pepper seeds and boiled in a cupful of water till reduced to half. This is given as single dose. Five to seven doses are given as one dose every alternate day or after a gap of two days. This is to treat arthritis, body ache and body swellings. Supposed to produce body heat and hence not to be taken for longer period.

Calotropis gigantea (L.) Ait. (Asclepiadaceae); Shrub; '*PandhariRui*'- One gm root bark given in betel leaf to chew; 3 doses given in a day in fever.

Cassia fistula L. (Caesalpinaceae); Tree; '*Amaltas, Bahava*'- Vegetable of flowers eaten for swelling on knees due to rheumatism.

Celastrus paniculatus Willd. (Celastraceae); Large woody climber; '*Malkangani, Kanga*'– a) Vegetable of young fruits and leaves is eaten to keep oneself calm (supposed to act on nervous system) and to cure headache.

b) Patients of arthritis are recommended to eat the vegetable at least once a year. In stiffening of joints the vegetable is eaten at least three times in the month of *Shravan* (August).

c) Young fruits are coarsely crushed with stone and boiled in water. Filtrate is mixed with common salt and given in acidity.

Celosia argentea L. (Amranthaceae); Shrub; '*Kurdu*'– a) Seeds used on cancer.

b) Root paste applied in case of tooth decay.

c) Root powder used as tooth powder.

d) Root powder is kept in luke-warm water overnight. Water is used for gargling in tooth troubles.

Citrulus colocynthis (L.) Schrad. (Cucurbitaceae); Prostrate herb; '*Kadu Indravan*'– Seeds levigated and given to lick to reduce the swellings occurring in jaundice.

Cleome gynandra L. (Capparaceae); Herb; '*PandhariTilvan*'– Leaf juice put into ear in toothache and migraine.

Cleome viscosa L. (Capparaceae); Herb; '*PiwaliTilwan*'– Vegetable of young leaves eaten. Supposed to keep a person healthy (immunomodulatory).

Coccinia grandis (L.) Voigt. (Cucurbitaceae); Climber; '*Jangali Tondale*'– Leaves and young fruits of wild variety are chewed to treat mouth ulcers.

Corallocarpus epigeous (Rottl.) C. B. Cl. (Cucurbitaceae); Shrub; '*MirchiKand*'– Extract of root tuber given as antidote in snake bite.

Cordia dichotoma Forst. f. (Ehretiaceae); Tree; '*Gondan, Bhokar*'– Inner bark pounded in water and extract given to treat dysmenorrhea.

Cordia macleodii (Griff.) Hook. f. &Thoms. (Ehretiaceae); Tree; '*Gondan*'– Latex of fruits put into wound caused by sharp, rusted iron.

Crinum deflexum Ker-Gwal (Amaryllidaceae); Herb; '*Nagdavan*' –Paste applied on boils.

Cucumis melo L. var. **agrestis** Naud. (Cucurbitaceae); Herb; '*Kakadi*'– Seed levigate is given in kidney stone once a day till it gets expelled.

Cyperus rotundus L. (Cyperaceae); Herb; '*Lavhali*'– Tuber paste applied on scorpion sting; acts as anti-inflammatory.

Dregea volubilis (L. f.) Bth ex Hook. f. (Asclepiadaecae); Climber; '*Dudhi*'– Young fruit boiled in water and made into vegetable. Young fruits made into pickle. To be eaten only once a year; supposed to check the body ache.

Enicostema axillare (Lam.) Raynal (Gentianaceae); Herb; '*Nai, Nay*'– a) Juice of 5 gm of leaves is expressed. Then a white flint (Gargoti) is heated and immersed in the juice. This juice is given in morning on empty stomach once a day for 3 days. This is useful in stomach complaints and chronic fever.

b) Leaves are boiled, water discarded. Boiled leaves are given 'tadaka' with chilli and salt, and then mixed with curd. This is given with meals. Expels intestinal worms.

c) Leaves are boiled and water discarded. These leaves are pickled; given to expel intestinal worms.

d) Leaves are shade dried and powdered. A teaspoonful powder is taken with water once a week for bad mouth smell and pyorrhea. Also the powder is mixed with toothpowder for cleaning teeth.

e) Infants sometimes develop blisters around mouth; decoction of leaves is given to feeding mother thrice a day. If fresh leaves are not available then a spoonful powder is given thrice a day.

Ficus racemosa L. (Moraceae); Tree; '*Umbar*'- a) Fruits eaten to increase the appetite.

b) A cut is given in root and water exuding is collected. This is applied on skin affections externally.

c) Above collected exudates is also useful on kidney stone and other urinary troubles. About 50ml of exudates is given once a day for about 8 days.

Gloriosa superba L. (Liliaceae); Shrub; '*Kal-lavi*' –a) Tuber paste applied on cancerous tumers.

b) Paste is also applied on patches of eczema.

Holarrhena antidysentrica (L.) Wall. ex G. Don. (Apocynaceae); Tree; '*Indrajav*'– Seeds given in jaundice.

Hymenodictyon obovatum Wall. (Rubiaceae); Tree; 'Gidhya sag'– Bark powder is applied on wounds. Effective on deep wounds and old wounds.

Jasminum officinale L. (Oleaceae); Shrub; '*Chameli*'- Leaves chewed in mouth ulcers.

Lagerstromia parviflora Roxb. (Lythraceae); Tree; 'Lendi, Lenja'– Bark pounded in water. Decoction given thrice a day till temperature comes down to normal in typhoid.

Leea macrophylla Roxb. ex Horn. (Leeaceae); Shrub; '*Dhoba*' – Leaf decoction in hot water given thrice a day till temperature comes down to normal in typhoid.

Lepidagathis cristata Willd. (Acanthaceae); Herb; '*Ratangola, Gole*'– Inflorescence is burnt and finely mixed with coconut oil. Used as ointment in eczema.

Martynia annua L. (Martyniaceae); Shrub; '*Waghnakhi*'– a) Old stem is burnt and smoke inhaled through nose using hollow old stem of the same plant in migraine. Also useful in headache caused by cold.

b) Fruit pulp given in betel leaf to eat in tetanus with short intervals to reduce muscle spasm.

Maytenus emarginata (Willd.) Ding Hou. (Celastraceae); Shrub; '*Bharati*'– a) Fifty – 60 gm of root is mixed with lump sugar and divided into 3 parts. It is given 3times with curd in prostatities/ prostatocystis. (first dose at bed time, second at midnight and third very early in the morning). Same medicine given on leucorrhoea.

b) Leaves chewed in mouth ulcers.

Melia azadirach L. (Meliaceae); Tree; '*Bakan Nimb*' – 100 gm. bark is kept in water overnight and then pounded in the water to get 3 cupful of decoction. One cupful decoction is given on empty stomach; three such doses are given in dog bite.

Opuntia elatior Mill (Cactaceae); Shrub; '*Nagphani*'– Ripe fruits are put on low fire to burn out spines and skin is removed. Fruit pulp is eaten in cough and tonsillitis.

Pergularia daemia (Forssk.) Chiov. (Asclepiadaceae); Climber; '*Utranvel*' – One flower at a time is given twice a day to children through betel leaf for cough. Usually 2 – 3 days treatment is effective. Same treatment given in pneumonia also.

Pongamia pinnata (L.) Pierre. (Fabaceae); Tree; '*Karanj, Karanji*'– Stem bark is cooked in sufficient water for long time and filtered. Dry almonds and black grapes are mixed with filtrate and again the mixture is cooked. This is given to eat in the morning on empty stomach for three weeks to treat arthritis.

Psidum guajava L. (Myrtaceae); Tree; '*Jamb, Peru*'– Leaves are chewed and juice expressed swallowed. Useful on burning micturation due to heat in summer.

Solanum virginianum L. (Solanaceae); Shrub; '*BhuiRingani*'– In toothache leaves are burnt and smoke inhaled through mouth.

Soymida febrifuga (Roxb.) A. Juss. (Meliaceae); Tree; '*Rohan*'– 100 gm stem bark pounded/macerated in water to get three cupful extract. One cup extract given at bed time- total 3 doses given to clear cough in chest.

Syzygium cumini (L.) Skeels (Myrtacee); Tree; '*Jambhul*' – Bark paste applied on swellings.

Tecomella undulate (Sm.) Seem. (Bignoniaceae); Small tree; '*Raktarohida*' –Bark pounded in water and extract collected. Two spoonful extract given thrice a day to clear chest congestion due to cough.

Tectona grandis L. f. (Verbenaceae); Tree; '*Sag, Sagwan*'– a) If something toxic is eaten or there is food poisoning, then inner bark of tree is pounded in water and filtrate is given to drink. Causes violent vomiting.

b) Seed is levigated and paste given to lick in case of accumulated urine. Within few minutes urine passes out.

c) Seeds are pounded with ginger and spread on piece of soft cotton cloth. A seat is prepared of soft cloth; it is covered with cloth to which this paste is applied. Patient with prolapsed rectum is asked to sit on this. Also the paste is given to lick 3 times a day.

Terminalia arjuna (Roxb.) Wight & Arn. (Combretaceae); Tree; '*Arjun, Aanjan*'– a) Bark is powdered. One spoonful of powder with cow milk taken every morning for a month in asthama and heart problems. Instead of powder bark decoction also is used. b) 50 gm of bark is boiled in 3 cups of water till only ½ cup remains. The decoction is taken for 3 days (freshly prepared each time). Supposed to strengthen the heart.

Terminalia bellirica (Gaertn.) Roxb. (Combretaceae); Tree; '*Behada, Behela*'– Outer rind of fruit is dried and made into powder. This is used to rub on teeth and gums in gum and teeth problems and to make them strong.

Thespesia populnea (L.) Sol. ex Correa (Malvaceae); Small tree; '*Paras Pimpal*' – Two–three leaves crushed in small amount of water and juice expressed. Recommended twice a day for one month in rheumatism.

Tinospora cordifolia (Willd) Miers ex Hook. (Menispermaceae); Climber; '*Gulwel*'– Inner bark pounded with 500 ml. of water and boiled till only 100 ml water remains. This is filtered and 2 teaspoon given at night daily in arthritis and rheumatism.

Tribulus terrestris Edgew. & Hook. f. (Zygophyllaceae); Shrub; '*Gokharu*'- Root paste in milk given 3 times a day for pneumonia.

Typha angustifoliaL. (Typhaceae); Herb; 'Pan Kanis'- Root decoction with lump sugar given on sunstroke.

Ventilago maderaspatana Gaertn. (Rhamnaceae); Liana; '*Sakhalwel, Navrangi*'– a) Bark pounded in water; extract given in dysentery.

b) Decoction of inner bark given in diabetes.

Polyherbal Formulations-

1. For fractures leaf powder of *Blepharis repens* (Hadsan)is mixed with leaf powder of *Artabotrys hexpetalus* (Hirwa Chapha); one teaspoonful powder taken once a day orally and leaf paste applied on affected part to treat swelling due to fracture.
   Above mixture of dried leaves is mixed with fried *Acacia* (Babhul) gum and *Laddus* prepared. One laddu given in the morning daily on problems of bones and joints.
2. Bark powder of *Hymenodictyon obovatum* (Gidhya sag) and powder of *Dioscorea pentaphylla* (Ultaravan) are finely mixed (in equal proportion) with Linseed oil and

applied on wounds. If the wounds are severe along with external application bark powder of *H. obovatum* is given with milk (1 teaspoon full powder in a cup of cow milk) in morning for 4-6 days.

3. Rhizome paste of *Sansevieria roxburghiana* (Nagin) is applied on swellings due to bite of Russels viper (*Parad*). With this leaves of *Corallocarpus epigeus* (Mirchikand) are given to chew.
4. *Acacia nilotica* (Babhul) pods + *Ficus benghalensis* (Wad) and *Ficus religiosa* (Pimpal) sprouts + *Syzigium cumini* (Jambhul) bark are shade dried and mixed in equal proportion. This is used as toothpowder to strengthen the gums and treat sensitive teeth.
5. Bark of *Syzygium cumini* (Jambhul) + bark of *Wrightia tinctoria* (Dudhkuda) + bark of *Lagerstromia parvifolia* (Lenja) + root of *Solanum nigrum* (Kamuni–Black fruit variety only) + fruits of *Piper longum* (Lendi pimpali) and roots of *Piper longum* (Gathi Pimpali) – 10 gm each is cooked in water and filtered. Mixed with small amount of Almonds, dried black grapes (Kali Manuka) + Lump sugar and again cooked to get 3 cupful mixtures. Given in three doses in single night (one cup at a time).
6. Inner bark of *Syzygium cumini* pounded in water and filtered through fine muslin cloth (100 gm bark pounded to get one cupful of filtrate). It is then mixed with $1^{1/2}$ cup goat milk + Lump sugar and 4-5 seeds of *Cuminum cyminum* are pounded and mixed with milk. This is divided in 3 doses, given in single night. Given in typhoid in which tongue becomes black locally called 'Kala-madura'.
7. *Evolvulus alsinoides* (Vishnukant) whole plant + *Verbascum chinense* (Kutki) root + *Hymenodictyon obovatum* (Gidhya sag) bark + *Ixora parviflora* (Lokhandi) bark– 50 gm of each are boiled in water to make $1^{1/2}$cupfull of decoction. Filtered decoction is cooked with Ginger (Sunth) + *Piper nigrum* (Mire) + *Piper longum* (Pimpali) + *Vitisvinifera* fruits (Manuka) – 5 gm each. Divided into 3 parts and given in 3 doses in single night (bed time, midnight and early morning before sunrise). This is to cure typhoid and pneumonia.
8. Leaf juice of *Triumfetta pentandra* (Katri, Kutri) is mixed with bark decoction of *Acacia nilotica* (Babhul– bark pounded in cold water and filtered) and taken on empty stomach in the morning for 3 days on piles.
9. Dried leaf of *Tectona grandis* (Sag) is burnt on low fire till it becomes completely black; powdered and sieved through fine cloth. This is finely mixed with gum of *Diospyros melanoxylon* (Tembhurni). The mixture is put in to eye to dissolve cataract/corneal opacity.
10. Two and half leaves of *Ricinus communis* (Erand) and 2 leaves of *Pergularia daemia* (Utaranvel) are crushed, juice mixed with one cup of cow milk and taken in the morning on empty stomach for 3-5 days in jaundice. Spicy and oily food strictly avoided.
11. Inner bark of *Wrightia tinctoria* (Dudhkuda), *Dalbergia paniculata* (Phansi), *Azadirachta indica* (Kadunimb), *Semecarpus anacardium* (Bibba) are taken in equal amounts (5–10 gm. each); handful leaves of *Andrographis paniculata* (Bhuinimb) are boiled to get 2 cupful decoction. One cupful of decoction taken twice a day for two days in malaria.

Like any other region, wild population of medicinal plants is declining in Yavatmal district also. Following are the facts shared by the locals during the survey.

Some years ago *Adrographis paniculata* was abundant in the forests and also around villages. Indiscriminate uprooting has affected the populations to a great extent. Stripping off of the bark of *Hymenodictyon obovatum* and *Soymida febrifuga* has resulted in death of the trees; once common in the region, now have become rare. *Cochlospermum religiosum* flowers are offered to Lord Shiva on Mahashivratri. Offering one flower is supposed to be equivalent to offering One Tola (10 gm.) gold. On Mahashivratri to collect flowers branches are cut down. Also gum is collected by giving cut to the trunk. Mostly deep cuts are given to collect more gum. This has resulted in completely eradicating the population from some areas near towns. Until 2006- 2007 there was good business of gum of *Acacia catechu*, *Acacia nilotica*, *Anoegissus latifolia* and *Terminalia alata*. Now the business has almost closed down firstly as number of trees has reduced because of indiscriminate collection methods and secondly due to some unknown reasons gum secretion is also reduced considerably. Since last 10 – 15 years *Emblica officinale* has become rare in many regions. Due to handsome price offered to wild Amla, to get maximum collection trees were cut down just above the ground. Fruits were sold and rest of the part was used as fuel. Goats and sheeps much like to eat the branches and leaves of *Buchnania lanzan*. Most of the population was cut for fodder. *Blepharis repens* is used as medicine and young leaves and branches are also used as vegetable. Indiscriminate uprooting even before flowering is making it more and rarer in the region.

DISCUSSION

Present survey has resulted in reporting 78 species used medicinally to treat 40 ailments. Highest no. of species is used for toothache followed by piles, dysmenorrhoea, eczema and snakebite. Sixty two species are used as monoherbal drugs, while 29 species are used in polyherbal preparations. Destructive collection methods have resulted in making some species rare in the region. While

recognizing the medicinal importance of plants one should not forget that while collecting the plants no destructive methods should followed. There is need to create awareness and train the locals for proper collection methods.

CONCLUSION

Traditional knowledge system is still in practice to treat different diseases by the tribals of Yavatmal region. Use of plants as a source of drugs is in use over hundreds of years. These ethno–medicinal plants should be analyzed chemically for identification of their active constituents responsible for their efficacy by various pharmaceutical industries/ laboratories to give a lead to development of new herbal drug molecules. Traditional health practices also should be authenticated with modern techniques, so that rural and tribal people can get the health services at reasonable cost. At the same time efforts need to be made to conserve and restore the populations of medicinal plants.

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