



# AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: <http://www.ajptr.com/>

## Study On Under-Utilized Nutraceuticals Plants (Potherbs) of Tribal Belts of Jharkhand, India

Ajit Kumar Rawal<sup>1\*</sup>, H. P. Sharma<sup>1</sup>, Binod Singh<sup>1</sup>, Lalan Kumar Sharma<sup>1</sup>, N. K. Pandey<sup>1</sup>  
R.K.Pandey<sup>1</sup>

*1.Laboratory of Plant Physiology and Biotechnology, University Department of Botany, Ranchi University, Ranchi-834008, Jharkhand*

### ABSTRACT

Ethnic communities inhabiting Jharkhand state are living in true harmony with nature. They entirely depend on plants and plant resources for their livelihood. Plants use in tribal belt is as diverse as the ethnic diversity. The paper focuses on lesser known nutraceutical plants, usually not known to the modern society but form an important dietary part of the ethnic people and provide them both nutritional and health security. These vegetables are lesser known and under-utilized resources, which are rich both in nutrients and secondary metabolites, providing nutritional and health security (nutraceutical). These plant resources grow their own, thrive easily on inhospitable conditions without any input, give new taste and are free of chemical pesticides and insecticides. In view of the large scale utilization of land area in the name of various kinds of developmental activities there is an urgent need of enlisting wild nutraceutical potherbs and documentation of their therapeutic uses before it is too late. The present paper describes 35 plants species which are widely consumed amongst ethnic communities.

**Keywords:** Ethnic communities, Under-utilized, Potherbs, Secondary metabolites, Nutraceutical, Pesticides.

\*Corresponding Author Email: [rawalajit@gmail.com](mailto:rawalajit@gmail.com)

Received 29 September 2013, Accepted 19 November 2013

## INTRODUCTION

Many plants or plant parts are eaten as food. There are around 2,000 plant species which are cultivated for food, and many have several distinct cultivars. Maize, wheat, and rice account for 87% of all grain production worldwide. However, in addition to seeds and fruits vegetables are also considered as food items. Recently attention has been paid to nutraceuticals as an alternate food resource which gives both nutritional and health security.

The India is mainly an agricultural country but likely to face food insecurity in near future because of population explosion and relentless land uses in the name of various developmental activities. Agricultural lands are decreasing every day due to large scale land utilization; fertility of the soil is declining because of continuous uses of chemical fertilizers, pesticides and insecticides. Therefore, there is an urgent need to find out some alternate resources which could meet the food demand of burgeoning population.

Tribes constitute an important segment of the population of India, representing about 8 % of the total population. Majority of tribal population reside in eastern India comprises Bihar, Jharkhand, West Bengal, Odisha, Eastern Uttar Pradesh, Eastern Madhya Pradesh and Assam. Out of the six states the Jharkhand is very important because of rich plant biodiversity and ethnic diversity. The richness of plant biodiversity is attributed to its congenial edapho-climatic conditions. There are more than 33 tribes and indigenous people who have their own customs and cultures. These ethnic people live in the midst of forest and have small or marginal land holdings. They grow food grains for few months only, however, for the rest period they depend on wild plant resources, mainly potherbs, tubers or rhizomes. These resources grow on waste land, such as bank of the river, road side, fencing mound of agricultural lands, paddy fields and swampy habitats. These wild food plants are lesser known underutilized either be exclusively of nutritional values of or both nutritional and therapeutic values, thus ensure nutritional and health security (nutraceuticals). These nutraceuticals are very rich in terms of nutrients; proteins, carbohydrates, fats, vitamins, amino acids and minerals and secondary metabolites, such as alkaloids, saponins, phenols, flavanoids, pigments and many more which guarantees health security through their preventive and curative properties. These Nutraceuticals plants play a significant role in the food security of tribes.<sup>1</sup>

Recently due to its separation from the old Bihar and getting an independent nature as state, the Jharkhand is under various developmental programmes in the name of human welfare. Consequently, there is decline in forest cover and land area is shrinking at rapid pace forcing displacement of forest dwellers from their homelands where they were residing for thousands of

years. These people are compelled to adopt new alien professions forgetting their pristine cultural heritage.

In this perspective there is an urgent need to document valuable plant genetic resources in general and nutraceuticals in particular with reference to potherbs before it is too late. Moreover, attempts should be made for their restoration, protection and conservation.

### Study area:

Jharkhand State is the homeland of the tribes and is very rich in terms of ethnic diversity and natural resources. It extends between 22°00' to 24°37' N latitude and 83°15' to 87°01' E longitude (Figure 1). Forest occupies more than 29% of the state which is amongst the highest in India. The altitude of the Jharkhand plateau ranges between 1000 -3000 ft. above the mean sea level. Jharkhand is surrounded by five states, namely West Bengal, Chhattisgarh, Odisha, Uttar Pradesh and Bihar.

The Jharkhand state has total surface area of 79,714 Sq km including 24 districts, 212 blocks and 32,620 villages with a population density of 338 people per Sq km. It is inhabited by 32 tribal communities viz., Oraon, Munda, Mahli, Baraik, Bhumij, Goriat, Karmali, Bedia, Bhuiya, Lohra, Santhal, Ho, Gond, Kharia, Korba and various indigenous caste such as Mahto, Gonjhu, Ghansi, Teli, etc. According to 2001 census Jharkhand is having total population of 26,90,9428, comprising of 26.3% Schedule Tribes, 12% Schedule Caste, 27.9% Backward Classes and rest others.

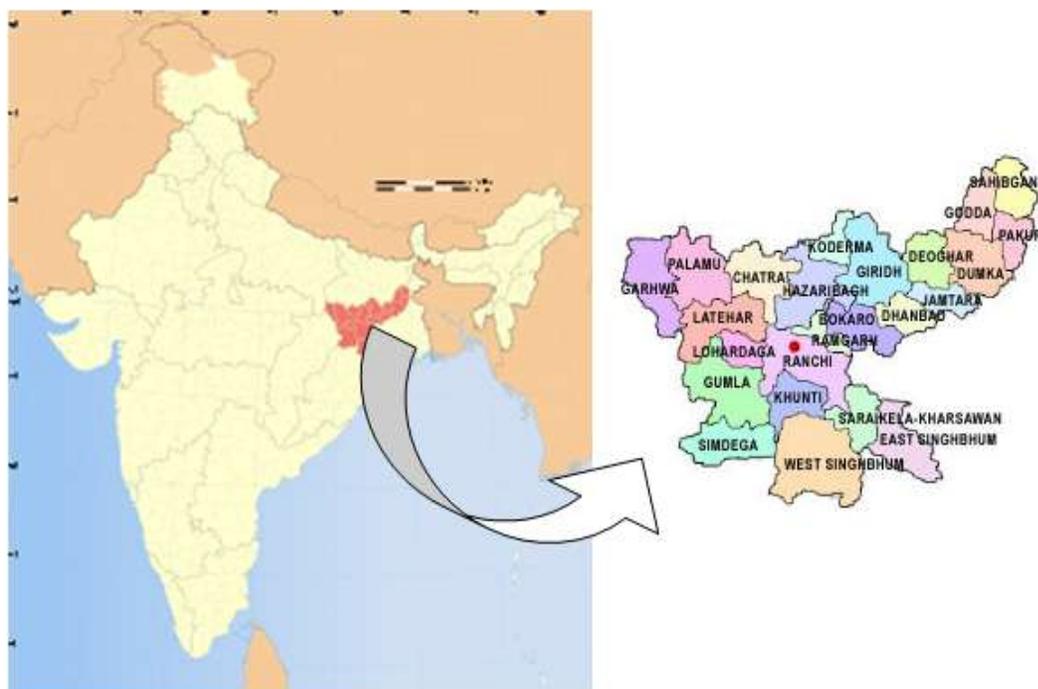


Figure 1: Map of the state of Jharkhand

## MATERIALS AND METHODS

The proposed investigation was carried out continuously for about three years, i.e. from 2009 to 2012. The plant materials of nutraceutical importance were collected from different areas of the Jharkhand. These plants were identified with their botanical names based on local names. Various taxonomists have also been consulted for identification of plants. For correct information and verification several books on Medicinal Plants were referred.<sup>2-6</sup> Herbaria were prepared adopting standard practice and preserved in the University Department of Botany, Ranchi University, Ranchi for reference. Plants *in situ* and herbaria were photographed.

For the survey work 25 villages were selected prioritizing the ethnic population especially the tribal groups. Surveys to villages were done at regular interval for collecting plant specimens, related therapeutic information and to have photographs of *in situ* plants. Local persons were instrumental to overcome the language problems and to win the confidence of informants (patients, vaidhyas, pahans and kabiraj) as they generally deny to share their ideas with the outsiders. Most of the remote villages were surveyed three times while those in the more accessible areas were visited several times with an aim to obtain authentic information and to collect plant specimens in their appropriate growing seasons. Tools used for routine visit to different place of significance are; detail map of the study area, questionnaire, digital camera, canvas bags and magnifying glasses.

## RESULTS AND DISCUSSION:

During a period of investigation about 150 nutraceutical vegetable were identified and their therapeutic values were recorded. In the present paper only 35 nutraceuticals (potherbs) have been arranged alphabetically and described with their botanical names, families, common names, english names, parts used and therapeutic properties.

1. Botanical name: *Alternanthera sessilis* (Linn.) R. Br.

Family: Amaranthaceae

Common name: Gudri sag

Nutritional value: Leaves of the plant is cooked with spices and eaten with rice as vegetable.

Medicinal uses: Used in treatment of fracture, eye complaints and malaria. It helps in increasing lactation in mother and controls fever.

2. Botanical name: *Amaranthus spinosus* Linn.

Family: Amaranthaceae

Common name: Kataili Chaulai, Kanta bhaji

Nutritional part: Leaf and tender shoots are eaten by tribes.

Medicinal uses: Considered sudorific and febrifuge, recommended for eruptive fever, also used as lactagogue; leaves emollient. Infusion of shoots used in eczema.

3. Botanical name: *Antidesma diandrum* Roxb.

Family: Euphorbiaceae

Common name: Matha sag

Nutritional part: Dried powdered leaves mixed in preparation of 'dal' or 'mar'.

Medicinal value: It is used in dysentery and indigestion.

4. Botanical name: *Apium graveolens* Linn.

Family: Apiaceae

Common name: Ajmoda, Celery sag

Nutritional part: Leaves of plant are used as sag.

Medicinal uses:

- Plant emmenagogue and helpful in kidney related diseases.
- Removes infection of urinary tract.
- Increases digestive power.
- Useful in treating asthma, cold and cough.
- The root is diuretic and carminative.
- It is useful in dropsy and colic problems.
- Seeds are stomachic, tonic, astringent and laxative.
- Seeds are stimulant, anthelmintic and antispasmodic.
- It is also useful in vomiting, rheumatism and in fever with cough

5. Botanical name: *Basella alba* var. *rubra* Linn.

Family: Chenopodiaceae

Common name: Poi sag

Nutritional part: leaves and young stems are cooked as vegetable.

Medicinal value: laxative, diuretic, aphrodisiac and tonic.

6. Botanical name: *Bauhinia purpurea* Linn.

Family: Caesalpiniaceae

Common name: Koinar Sag

Nutritional value: Leaves and flowers are eaten as vegetables.

Medicinal uses: Roots carminative. Bark used in diarrhoea. Flower is laxative and anthelmintic.

7. Botanical name: *Begonia picta* Sm.

Family: Begoniaceae

Common name: Lundi ara

Nutritional part: leaves and young stems are cooked as vegetable. The sour tasting leaf stalks and stems are pickled.

Medicinal uses:

- The juice of the plant is drunk to relieve headaches.
- The crushed leaves are used as a poultice on sores on nipples.
- The root juice is used as eyewash to treat conjunctivitis.
- It is also consumed in the treatment of peptic ulcers.

8. Botanical name: *Boerhaavia diffusa* Linn

Family: Nyctaginaceae

Common name: Khapra Sag

Nutritional value: The leaves are eaten as vegetable.

Medicinal uses: Leaf decoction useful in alleviating swelling of limbs during pregnancy. Leaf juice is applied to cure eye infection. Leaves in combination with other plants are useful in nephritis syndrome and low blood pressure.

9. Botanical name: *Bryonopsis laciniosa* (Linn.) Naud. syn. *Bryonia laciniosa* Linn.

Family: Cucurbitaceae

Common name: Shivalingi, Toktoyan sag

Nutritional part: leaves are cooked as sag and fruit is edible.

Medicinal uses:

- Seeds are anti-inflammatory and spasmolytic.
- Used for vaginal dysfunctions, as a fertility promoting drug.
- Powdered seeds, also roots, are given to help conception in women.
- Plant is also used in venereal diseases.

10. Botanical name: *Cassia tora* Linn.

Family: Caesalpinaceae

Common name: Chakor

Nutritional part: Leaves are cooked as sag.

Medicinal value: Effective in intestinal disorder, popular drug for Jaundice, cures night blindness.

11. Botanical name: *Catharanthus pusillus* Murr.

Family: Apocynaceae

Common name: Marchi Sag

Nutritional part: Tender leaves are eaten as sag.

Medicinal uses:

- Whole plant is used in paralysis, epilepsy and ulcers.
- The plant shows oncolytic property.
- Decoction of leaves is used in treatment of lumbago.

12. Botanical name: *Celosia argentea* Linn.

Family: Amaranthaceae

Common name: Sirgiti sag, Siliyari sag

Nutritional part: Tender stem and leaves are cooked as sag.

Medicinal uses:

- Flowers are used in menorrhagia and blood-dysentery.
- Seeds are antidiarrhoeal and also used in stomatitis.
- Whole plant show antibacterial, antiscorbutic and cooling effect.

13. Botanical name: *Celosia cristata* Linn.

Family: Amaranthaceae

Common name: Murga sag

Nutritional part: Leaves of the plant is cooked with spices and eaten with rice as vegetable.

Medicinal value:

- Flowers astringent, used in diarrhea and excessive menstrual discharge.
- Seeds used in diarrhea, demulcent, useful in painful micturition, cough and dysentery.

14. Botanical name: *Centella asiatica* Linn.

Family: Apiaceae

Common name: Beng sag

Nutritional part: Leaves consumed as sag.

Medicinal value: Decoction is used in treating leprosy, useful in tuberculosis and popular brain tonic.

15. Botanical name: *Cleome viscosa* Linn.

Family: Capparaceae

Common name: Hurhuria sag

Nutritional part: Leaves of the plant is cooked as vegetable.

Medicinal value: The plant is anthelmintic and used to increase sweating to reduce fever.  
The leaf juice is digestive and good for ear pain.

16. Botanical name: *Coccinia cordifolia* Cogn.

Family: Cucurbitaceae

Common name: Kudrum sag

Nutritional part: Both leaves and stem are consumed.

Medicinal value: Juice from leaves used in diabetes. Paste of leaves externally applied in eruption of skin.

17. Botanical name: *Enhydra fluctuans* Lour.

Family: Asteraceae

Common name: Tita sag, Hingcha

Nutritional part: Bitter in taste, consumed as sag. Dried leaves are stored and used throughout year.

Medicinal uses:

- Leaves are blood purifier and appetizer.
- Tonic for eye sight.
- Leaf with honey cures anemia.
- Acts as blood purifier.
- Leaf has antibilious, laxative, demulcent and antidermatosis property.
- Used in dyspepsia, diseases of the nervous system and cutaneous affections.
- Helpful in treating dysentery and diarrhea.

18. Botanical name: *Euphorbia granulata* Forsk.

Family: Euphorbiaceae

Common name: Kantha ara

Nutritional uses: Stem and leaves are cooked as vegetable.

Medicinal uses:

- Plant has blood purifying ability.
- Used as cooling agent to cure heatstroke.

19. Botanical name: *Ficus glabella* Blume

Family: Moraceae

Common name: Putkal

Nutritional part: Leafy buds are eaten as vegetable or are dried for preservation to be used throughout the year either in 'dal'(pulse) or 'mar' (rice cooked water). Fresh leaves are used in preparation of 'chatni' (condiment).

Medicinal value: Leaves are very effective in gastritis, dysentery and other stomach disorders.

20. Botanical name: *Glinus oppositifolius* (Linn.) D.C.

Family: Aizoaceae

Common name: Gima sag

Nutritional uses: Slightly bitter in taste, consumed as sag.

Medicinal uses:

- Acts as blood purifier.
- Effective in treating piles.

21. Botanical name: *Hibiscus cannabinus* Linn.

Family: Malvaceae

Common name: Thepa sag

Nutritional part: Leaves are sour in taste and consumed as sag. Fruit are used to make chatani and pickles.

Medicinal uses:

- Leaves have uretic property.
- It is useful in stomachache.
- Sag stops loose motion.
- Seed is nervine tonic and analgesic.
- Leaf is purgative.
- The juice of flowers, mixed with sugar and black pepper, is given for biliousness.

22. Botanical name: *Hygrophylla auriculata* K. Schum.

Family: Acanthaceae

Common name: Kantakaliya

Nutritional part: Only leaves are eaten.

Medicinal value: useful in jaundice, arthritis, cough, anaemia and gastric problems.

23. Botanical name: *Leucas aspera* Spreng .

Family: Lamiaceae

Common name: Guma sag

Nutritional part: Leaves are used as sag during rainy season.

Medicinal uses:

- Flowers are given with honey for coughs and colds to children.
- Leaves juice is used as an external application for psoriasis, chronic skin eruptions and painful swellings.
- Extract of leaves shows antibacterial activity.
- Found to be useful in tuberculosis.

24. Botanical name: *Limnophila conferta* Benth.

Family: Scrophulariaceae

Common name: Muchari, Hemcha sag

Nutritional part: Fresh leaves are cooked as sag.

Medicinal uses:

- The plant is employed to treat various types of skin diseases.
- Very useful in conditions of inflammation.

25. Botanical name: *Melochia corchorifolia* Linn.

Family: Sterculiaceae

Common name: Dela sag

Nutritional part: Leaves are consumed as sag.

Medicinal uses:

- Leaf and root are antidiarrheal.
- Leaf is applied as poultice for swellings of abdomen and sores.
- Leaf and stem boiled in oil is used to prevent bad consequences from bites of water snakes.
- A simple decoction of the leaves is used to stop vomiting and as a mixture for treating urinary disorders.
- The plant is also used to relieve gastralgia and headaches.

26. Botanical name: *Moringa oleifera* Linn.

Family: Moringaceae

Common name: 'Munga', Drumstick Tree.

Nutritional part: Whole plant is useful. It is mainly valued for tender pods. The leaves and flowers are also eaten as vegetables.

Medicinal value: All parts of the tree is used in the treatment of ascites, venomous bites, rheumatism and as cardiac and circulatory stimulant. Root paste is used in muscular pain. Leaves are used in scurvy and catarrhal infection, also used as emetic and helpful in hypertension. Seeds oil applied in rheumatism. Bark of the stem is anthelmintic and applied to alleviate pain due to excessive lactation. Root and stem bark have also antifertility activity.

27. *Ophioglossum reticulatum* Linn.

Family: Ophioglossaceae

Common name: Sugga sag, Jibhia

Nutritional part: Fresh leaves are cooked as sag.

Medicinal uses:

- The paste of the leaves is used in headache.
- Rhizomes are used to treat boils.
- Leaves help to heal wounds and stop bleeding.
- Plant used as hair tonic.

28. Botanical name: *Oxalis corniculata* Linn.

Family: Oxalidaceae

Common name: Amti Sag, Indian Sorrel.

Nutritional part: Leaves are eaten as salad and cooked as vegetable. Seeds consumed at the time of scarcity.

Medicinal value: Fresh juice of plant given in dyspepsia, piles, anaemia and tympanitis.

Leaves mixed in pulse is giving sound sleep. Infusion of leaves used to cure opacity of cornea.

29. Botanical name: *Peucedanum graveolens* Linn.

Family: Apiaceae

Common name: Suwa sag

Nutritional uses: Tender part of the plant is cooked as sag mixed with palak and other vegetables.

Medicinal uses:

- This sag is good appetizer.
- Found to increase lactation.
- Helpful for pregnant women to get rid of anemia.

30. Botanical name: *Polygonum plebeium* R. Br.

Family: Polygonaceae

Common name: Chimti Sag.

Nutritional value: A pot herb, eaten as vegetable.

Medicinal value: Its therapeutic uses are bowel disorder and pneumonia.

31. Botanical name: *Rumex maritimus* Linn.

Family: Polygonaceae

Common name: Jangli palak

Nutritional part: Leaves consumed as sag.

Medicinal uses:

- The paste of leaf is used as strong purgative.
- The leaf juice has cooling effect so it is used in high fever as antipyretic.
- Paste of leaf is used as refrigerant and applied to burns for getting immediate relief from pain.
- Seeds are used as aphrodisiac.
- Natives of this area eat tender leaves as sag because it has cooling effect.
- Leaves are cathartic and externally applied to burns.

32. Botanical name: *Sesbania gradiflora* Pers.

Family: Fabaceae

Common name: Augast

Nutritional value: Tender leaves, flowers and pods are eaten as vegetable.

Medicinal uses:

- Juice of the root is given with honey as an expectorant.
- Bark tonic and febrifuge; decoction is taken in small dose in diarrhoea and dysentery. Pounded bark applied to scabies; used for ulceration of tongue and alimentary canal.
- Leaves aperient, tonic and diuretic. Juice of flower dropped in eyes to improve dimness of vision.
- Seeds emmenagogue.

33. *Sphaeranthus indicus* Linn.

Family: Asteraceae

Common name: Kunta sag

Nutritional part: Leaves along with flowers consumed as sag.

Medicinal uses:

- Root and seeds have the same property. They are used in stomachache and anthelmintic.
- The flowers are used as alternatives and tonic because it has cooling effect.
- Past of flower is useful in skin disease.
- The decoction of plant is diuretic and used in urethral discharges.
- Fresh juice of the plant is used as tonic.

34. *Trianthema decandra* Linn.

Family: Aizoaceae

Common name: Purni

Nutritional part: Consumed as sag.

Medicinal uses:

- Root is deobstruent.
- Used for treating asthma.
- Found effective in hepatitis and amenorrhoea.

35. Botanical name: *Vangueria spinosa* Roxb.

Family: Rubiaceae

Common name: Sarla sag

Nutritional part: Eaten as vegetable. It is delicious in taste.

Medicinal value: It used for giving strength, and cooling effect; expellant for phlegm and bile.

Foods and nutrients play a vital role in normal functioning of the body. They are helpful in maintaining the health of the individual and in reducing the risk of various diseases. Nutraceuticals are medicinal foods that play a role in maintaining well being, enhancing health, modulating immunity and thereby preventing as well as treating specific diseases.

The paper accounts for nutraceutical details of 35 plant species belonging to the 24 families. Plants are showing full range of habit, i.e. herb, shrub and trees. Majority of the plants are herbs followed by shrubs and a few are shrubby in nature. Most commonly edible parts of the plants

are leaves which are consumed with rice. Flowers, tender stem and pods are also consumed. Some vegetables are restricted to a particular area only due to their edapho-climatic conditions. For example, Beng sag (*Centella asiatica*) is found on moist soil, especially bunds and canals, Khapra sag (*Boerhaavia diffusa*) is found in waste land and road sides and Sunsunia (*Oxalis corniculata*) is found on swampy/aquatic habitats. Plants are found to be used in treating fracture, eye complaints, malaria, eczema, jaundice, night blindness, leprosy, tuberculosis, ear pain, diabetes, arthritis, cough, anemia, gastric problems, scurvy, rheumatism, hypertension, dyspepsia, piles, tympanitis, pneumonia, dysentery and indigestion. Plants are used as sudorific, febrifuge, laxative, diuretic, aphrodisiac, tonic, anthelmintic and brain tonic.

*Centella asiatica* commonly called as 'Beng sag' used in different kind of ailments, such as diarrhoea, dysentery, skin diseases, jaundice, gynecological problems and for enhancing memory. *Ficus glabella*, commonly called 'putkal sag' is very useful in gastritis and other types of stomach disorder. *Marsilea minuta*, commonly called 'sunsunia' is useful as refrigerant and helpful in insomnia. *Oxalis corniculata* (amti sag) is given in dyspepsia, piles, insomnia and anaemia. *Polygonum plebeium* (chimty sag) is used in pneumonia and bowel complaints. Leafy nutraceuticals with similar observations from different areas of the state of Jharkhand have also been reported by some workers.<sup>7-9</sup>

Rajasab and Isaq have discussed use of *Basella rubra* leaves in case of constipation and urinary disorders; *Amaranthus spinosus*, leaves poultice to treat bruises, abscesses, burns, wounds and inflammation; *Celosia argentea* seeds are used to treat diseases of blood and mouth sores and *Sesbania grandiflora* infusion of the bark is given during the first stage of malaria and flowers to treat headache, while juice from flowers used as an eye drop by people of North Karnataka.<sup>10</sup> However, in the state of Jharkhand tribal people use *Sesbania grandiflora* as expectorant while seeds are used to promote menstruation. Other workers have also reported nutraceuticals as therapeutic agents from different states of India and also from different countries.<sup>11-15</sup>

Majority of nutraceuticals are claimed to possess multiple therapeutic benefits though substantial evidences are lacking.<sup>16</sup>

## CONCLUSION:

Properly surveyed and documentation of lesser-known, under-utilized nutraceutical potherbs could be an important alternative as food resources and will also alleviate the burden on the main food crops and vegetables. Because of the therapeutic values their importance becomes many folds and would be proved as future functional food. Their growth readily on waste-land without

any input could be used for reclamation of waste lands. Such vegetables need to be focused amongst urban society so that they may develop immunity and curative power through their dietary menu. The development of agro technique will be means of revenue generation amidst the ethnic poor communities.

#### REFERENCE:

1. Kujur AA. *The Oraon habitat: A study in cultural geography* (The daughter of St. Anne, Ranchi); 1989: 5-7.
2. Chopra RN, Nayar SL and Chopra, I.C. *Glossary of Indian Medicinal Plants*. CSIR, New Delhi 1956.
3. Das N, Prajapati and Kumar U. *Agro's Dictionary of Medicinal Plants*. 2003
4. Eskin NAM and Tamir S. *Dictionary of Nutraceuticals and Functional Foods*. Boca Raton, USA: CRS Press; 2006.
5. Jain S.K. and Rao. *A handbook of field and herbarium methods*. New Delhi: Today and Tomorrow Publishers 1976.
6. Prajapati ND, Purohit SS, Sharma AK and Kumar T. *A Handbook of Medicinal Plants*. Agrobios (India), Jodhpur; 2003.
7. Kumar, S. and Kumari, B. Some less known "Sags" (leafy vegetables) utilized by the tribals and others of Panch Pargana area in Jharkhand. *Ethnobotany*, 2007; 19: 62-66.
8. Mahato, R. and Sahu, H.B. Traditional therapeutic knowledge on common sags among the indigenous people of Panch-Pargana (Jharkhand). *Int. J. Pl. Sc.* 2008; 3(2): 546-548.
9. Mairh AK, Mishra PK, Kumar J and Mairh A. Traditional botanical wisdom of *Birhore* tribes of Jharkhand. *Indian J Traditional Knowledge* 2010; 9 (3): 467-470.
10. Rajasab AH and Isaq M. Documentation of Folk Knowledge of Wild plants of North Karnataka. *Indian J Traditional knowledge*. 2004; 3(4): 419-429.
11. Choudhury, R., Datta, M., De, B. and Paul, S.B. Importance of certain tribal edible plants of Tripura. *Indian J Traditional Knowledge* 2010; 9 (2): 300-302.
12. Binu, S. Wild edible plants used by the tribals in Pathanamthitta district, Kerala. 2010.
13. Kamble S Y, Patil S R, Sawant P S, Sawant Sangita, Pawar S G, and Singh E A Studies on plants used in traditional medicine by *Bhilla* tribe of Maharashtra Indian. *J Traditional Knowledge*. 2010; 9 (3): 591-598.
14. Sinha R and Lakra. Wild tribal food plants of Orissa. *Indian Journal of Traditional Knowledge* 2005; 4(3): 246-252.

15. Sinha, R. and Lakra, Valeria. Edible weeds of tribals of Jharkhand, Orissa and West Bengal. Indian Journal of Traditional Knowledge 2007; 6(1): 217-222.
16. Rajsekharan A, Sivagnanam G and Xavier R. Nutraceuticals a therapeutic agents: A review. Research J. Pharm. Tech. 2004; 1(4): 328-340.

***AJPTR is***

- Peer-reviewed
- bimonthly
- Rapid publication

Submit your manuscript at: [editor@ajptr.com](mailto:editor@ajptr.com)

