

## **A BRIEF HISTORY OF ETHNOBOTANICAL STUDIES IN INDIA**

India has all the three elements that contribute to ethnobotanical richness of an area: these are **floristic diversity**, **ethnic diversity** and **rich cultural diversity**.

The Indian subcontinent represents, without a doubt one of the greatest emporia of ethnobotanical wealth. Much has been done in ethnobotanical research in India and there is lot more scope for it.

India is the land of tribal people. The tribal people of India mostly live in forests, hills, plateaus and naturally isolated regions and are differently termed as **Adivasi** (original settlers), **Adimniwasi** (oldest ethnological sector of population), **Adimjati** (primitive caste), **Anusuchit janjati** (scheduled tribe) and several names signifying their ecological or economic or historical or cultural characteristic.

Ethnobotany must have been the first knowledge, which the early man acquired by sheer necessity, intuition, observation and experimentation. Vast ethnobotanical knowledge exists in India from ancient time in Vedas and Samhitas. Work of Charak, Shushruta and Dhanwantari's attracted serious attention of people in India even during the early centuries.

Cattle grazers, shepherds and forest dwellers have the deep knowledge of medicinal plants and identify them by name, morphology and properties. The Ayurveda student should learn the name, property and morphological character of medicinal plants from these people with deep interaction.

Although the concept and definition of the science of Ethnobotany was cleared respectively by Powers (1874) and Harshberger (1895), the elements of this science appeared in India even before . Garcia da Orta (1563) published a book '*Coloquios dos simples'e drogas medicinas da India*'. It informed about 50 common taxa of medicinal significance and other utilities as gathered around Goa and in Malabar. Acosta (1578) also published a book '*Tractado de las drogas y medicinas de las Indias Orientalis*' on Indian Medicinal plants from Malabar. Van Reede, the compiler of '*Hortus Malabaricus*' (1678-1683) gave an excellent and accurate introduction of Malabar, its people and their customs, specially the virtues

of the medicinal plants. The science of Ethnobotany began taking shape during British regime. They surveyed wild and cultivated plants as a part of their floristic studies. William Roxburgh (1832) noted medicinal uses of herbs during his floristic investigations from south India. Sir George Watt, published '*Dictionary of the Economic Products of India*' (1889-1896). In this valuable publication he provided nearly 3000 local names of the plant products and their uses as obtained from various regions of India. His work reflects true 'Ethnobotany' and indigenous knowledge of Indian societies. Later, Bodding (1925, 1927 and 1940) published medicines used by Santhal tribe.

Ethnobotany got considerable attention since middle of the 20<sup>th</sup> century. Padmshri Dr. E. K. Janaki Ammal, as an official programmer in the Economic Botany Section of Botanical Survey of India, since its very inception in 1954 and studied subsistence food plants of certain tribes especially of South India (Janaki Ammal, 1956). She lit the lamp of 'Scientific Indian Ethnobotany' by creating an 'Ethnobotanical Section' at the Central Botanical Laboratory, B.S.I., Allahabad. She did loud thinking and a wish in her publications, which has been fulfilled later by Dr. S.K. Jain.



**DR. E. K. JANAKI AMMAL**



**DR. S. K. JAIN**

Dr. S. K. Jain made intensive studies in Central India and impressed Indian Scientists from different disciplines. He streamlined this science and trained many students. He did a very painstaking work moving in the tribal villages of India. Some of his important works are on the tribals of Madhya Pradesh, Bihar and Assam. He has compiled ethnobotanical works in India under the titles:

- ‘*Dictionary of Indian Folk medicine and Ethnobotany* (Jain, 1991),
- ‘*Notable plants of Ethnomedicine of India* (Jain et al., 1991),
- ‘*A Handbook of Ethnobotany*’ (Jain & Mudgal, 1999),
- ‘*Tribal Medicine*’ (Pal & Jain, 1998).

Dr Jain edited several books such as:

- Glimpses of Indian Ethnobotany (Jain, 1981) [This publication triggered the study of Ethnobotany in India;
- Bibliography of Ethnobotany (Jain et al., 1984);
- Bibliography of Indian Ethnobotany (Jain, 2002);
- Methods and Approaches in Ethnobotany (Jain, 1989);
- Contribution to Ethnobotany (Jain, 1990);
- A Manual of Ethnobotany (Jain, 1995);
- Ethnobotany in Human Welfare (Jain, 1996);
- Dictionary of Ethnoveterinary Plants (Jain, 1999);
- Bibliography of India Ethnobotany (Jain, 2002);
- Plants affecting Human mind (Jain, 2009).

*Dictionary of Economic Products of India* (Watt, 1896) and *Wealth of India* published by CSIR are the important source of ethnobotanical data. Cross-Cultural Ethnobotany of North-East India (Saklani & Jain, 1994), Applied Ethnobotany: A Case Study on the Kharias of Central India (Verghese, 1996), Ethnobotanical Wisdom of Gaddi tribe in Western Himalaya (Singh & Kumar, 2000), Ethnobotany and Medicinal plants of India (Maheshwari, 2000), A Lexicon of Medicinal Plants (Bakshi et al., 2001), Directory of Indian Economic Plants (Agarwal et al., 2003), A Hand Book on the Plant Sources of Indigenous Drugs (Ansary, 2005), Ethnic Indian Plants in Cure of Lung Ailments (Sood et al., 2007), A Handbook of Tibetan Medicinal Plants (Dekhang, 2008), Ethnobotanical Studies on Trees, Shrubs and

Climbers of Himalaya (Sood, 2009), Ethnobotany of Buldhana District, Maharashtra (Patil & Patil, 2006), Ethnobotany of Bhil Tribe (Singh & Jadav, 2011), Ethnobotany of the Tharus of Kheri district of Uttar Pradesh (Maheshwari et al., 1987), Ethnobotany of Tribal of Mirzapur District of Uttar Pradesh (Maheshwar et al., 1981), Ethnobiology (Sinha, 2001) are some important contribution.

A large number of Research Journals are being published from all over India, such as Ethnobotany, Bull of Pure & Applied Science, Vegetos, Jour. of Non Timber Forest Products, Nagarjun, Vanyajati, Folklore, Indian Medicinal Journal, Ethnomusicology, Jour. of Plant Sciences, Journal of Applied Biosciences, Indian Medicine, Jour. of Scientific Club, Proc. Of Nat. Acad. Science, India, Bull of Regional Research Laboratory; Jammu, Quart. Jour. of Mythol. Soc., Bull. Bot. Surv. India, Bull. Medico-Ethnobot. Research, Indian Forester, Indian Jour. of Bot. Res., Agric. Boil. Res., J. Res. Indian Med. Yoga Homoea, Ad. Pl. Sci., J. Envir. Conserv., Proc. Nati. Inst. Sci. India, Khadi Gramodyog, J. Anthropol. Soc. Bombay, Ind. Jour. Forestry, Indian Jour. Orthopaed., Indian med. J., Jour. Med. Arom. Pl. Sci., J. Trop. For., Geiobios, J. Asiatic Soc., Jour of Eco. & Taxo. Bot. etc.

In the early 1980's the Department of Environment and Forest, Government of India funded an All-India Coordinated Research Project on Ethnobiology. This work triggered the ethnobotanical study in India and work was carried out in over a dozen institutions under the Botanical Survey of India (BSI), Council of Scientific and Industrial Research (CSIR), some universities and other laboratories of India. A large area was covered in a quick survey and significant ethnobotanical data were recorded.

Over 10000 wild plant species used by tribals for meeting their varied requirements have been recorded so far. Out of 8000 wild plant species used by tribals for medicinal purposes, about 2000 are found to be new claims and worthy of scientific scrutiny. 4000 wild plant species used as edible by tribes, about 800 are new information and at least 250 of them are worthy of attention to be developed as alternative source of food that the world would need in the future. Similarly, over 600 wild plant species used by tribals for making fibre for cordage,

80 are promising for commercial exploitation, 500 species used as fodder, 100 are worth recommending for wider use, 325 wild plant species used by tribals as piscicides and pesticides; at least 180 are quite promising to be developed as safe biopesticides. Almost all the plants used as gum, resin, dye, incense and perfumes are worth investigating since there is a revived interest the world over for natural sources of these products.

The Central Council for Research in Ayurveda and Siddha, New Delhi had also launched a country-wide programme of ethno-medico-botanical surveys in the tribal pockets to gather data relating to folk medical lore, diseases and other health problems affecting the population. The Central Council for Research in Unani Medicine, New Delhi has also conducted ethnobotanical research in Unani herbal drugs. Similar studies have also been undertaken at the National Botanical Research Institute, Lucknow; Regional Research Laboratory, Jammu-Tawi; Botanical Survey of India, Calcutta; Birbal Sahni Institute of Palaeobotany, Lucknow; Bihar Tribal Welfare Research Institute, Ranchi; Central Institute of Medicinal and Aromatic Plants, Lucknow; Tropical Botanical Garden and Research Institute, Thiruvananthapuram; International Institute of Ayurveda, Coimbatore; Tribal Research and Training Institute, Gujarat Vidyapith, Ahmedabad; National Bureau of Plant Genetic Resources, New Delhi; M. S. Swaminathan Research Foundation, Madras; Indian Institute of Science, Bangalore; Department of Botany, Jiwaji University, Gwalior; H S Gour Vishwavidyalaya, Sagar; Rajasthan University, Jaipur; Gorakhpur University, Gorakhpur and many more college and Universities in India.

In the year 1995, the year of world indigenous people, Dr. S. K. Jain established an ethnobotanical Institute named, *Institute of Ethnobiology* in National Botanical Research Institute, Lucknow which gives the boost to the study of Ethnobotany in India. Later, this institute shifted to Jiwaji University, Gwalior, MP. Prof. Ashok Kumar Jain is the Honorary Director of this institute.

### **ETHNOBOTANICAL WORK COMPLETED IN BOTANICAL SURVEY OF INDIA [BSI]**

- ❖ All INDIA CO-ORDINATED RESEARCH PROJECT ON ETHNOBIOLOGY (AICRPE): a DST project under the umbrella of Man and Biosphere Programme was

completed in two phases (1982-88 and 1989-1994) in different regional centers like Howrah, Shillong, Gangtok, Allahabad, Coimbatore and Port Blair of BSI.

- ❖ In this project about 7,500 medicinal plant, 525 fiber and cordage yielding plants, 400 fodder plants, 300 pisci-cides were reported by all research centers including BSI.
- ❖ Conducted Ethnobotanical survey in Lower Subansiri, Upper Subansiri, Part of Dibang valley, Lohit and Tirap districts of Arunachal Pradesh amongst Adi, Khamti, Mizu, Chlikatta, Nocte, Singphos, Wanchos etc.
- ❖ Conducted Ethnobotanical survey in East Godavari, Karim Nagar, Prakasham, Srikakulam, Visakhapattanam, Vizianagram and Warangal districts of Andhra Pradesh among Bagatas, Chenchus, Jatapus, Khonds, KondaReddies, Koyas, Nukha, Doras, Porjas, Savaras, Sugalis and Valmikies.
- ❖ Conducted Ethnobotanical survey in Allahabad, Banda, Bijnor, Bulandshahar, Gorakhpur, Garhwal, Hamirpur, Jalaun, Jhansi, Kheri, Lalitpur, Mirzapur, Nainital, Saharanpur, Varanasi districts of undivided Uttar Pradesh amongst Agaria, Baiga, Bhuinya, Bhoxa, Gond, Kharwar, Kol, Korwa, Oraon, Panika, Parahia, Pathari, Saharia, Tharu, Jaunsari etc.
- ❖ Conducted Ethnobotanical survey in Santhal Pargana and Chhota Nagpur of undivided Bihar.
- ❖ Conducted Ethnobotanical survey in Koraput, Malkangiri and Phulbani district of Odisha.

### **RECENTLY COMPLETED PROJECTS:**

1. Ethnobotanical Study of Odisha (2006-2017): A total of 1158 plant species under 615 genera belonging to 142 families have been collected along with 8718 ethnobotanical information for food, medicine, veterinary, fodder, fuel, rope, gum, resin, tannin, dye, oil, insect repellent, insecticide, snake repellent, detergent, beverage, condiment, spice, fragrance, fish poison, fish catching, instrument, household article, agricultural implement, building/thatching hut material, magico-beliefs, religious, bio-fencing, and other purposes from 23 districts of Odisha.

2. Ethnobotanical study of Kaimur and Rohtas districts of Bihar (2018-19) : A total of 173 plant species comprising 405 ethnobotanical informations were collected for various purposes form Kaimur and Rohtas districts of Bihar.



3. Ethnobotanical study of West Champaran districts of Bihar (2018-19) : A total of 185 plant species comprising 417 ethnobotanical informations were collected from West Champaran district of Bihar.

#### 4. Work completed in Recent Past :

*Glimpses of Indian Ethnobotany* (1981);  
*Ethnobotany in India* (1983);  
*Bibliography of Ethnobotany* (1984);  
*A contribution to the Ethnobotany of Santhal Pargana* (1984);  
*Selected Poisonous Plants fro the Tribal Areas of India* (1985);  
*Economic Plants of India* Vol. I (1989) and Vol. II (1994);  
*Ethnobotany of Eastern Ghats in Andhra Pradesh, India* (1996);  
*Ethnobotany of Rajasthan* (1998);  
*Tribal Medicine* (1998);  
*Plants for Human Consumption in India* (1990);  
*A Handbook of Ethnobotany* (1999);  
*Ethnobotany of Totopara* (1999);  
*Ethnobotany of Dadra, Nagar-Haveli and Daman* (U. T.) (2001);  
*Madhya Himalaya ki Partamparaen evam paramparik gyan* (2004);  
*Ethnobotany of Mysore and Coorg, Karnataka State* (2007);  
*Ethnobotany of India with special reference to West Bengal* (2009) etc.

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*Ethnobotany is the study of the plants used by aboriginal people. It has significant contributions in bioprospecting, drug development and management of natural resources and cultural diversity. **Diversity of plants and tribes makes India an ideal place for ethnobotanical research.** Therefore, mapping of scholarly publication can be employed to identify the research trends on ethnobotany in India.*

***The ethnobotany research in India is increasing despite of emergence of new research areas and depletion of traditional knowledge.***

*Ethanobotany is the study of the plants used by aboriginal people (Harshberger, 1896). [Harshburger, JW. 1896. Purpose of Ethnobotany. Botanical Gazett. 21:146-154]. The use of plants is a part of complex social-ecological system;it indicates how relationship between nature and human evolve in time and space (Albuquerque et al., 2017). [Albuquerque, UP, Ramos, MA, Junior, WSF, De*

Medeiros, PM. 2017. *Ethnobotany for beginners*. Springer International Publishing, Switzerland.] *This knowledge is essential for the survival of human beings therefore orally transmitting from generation to generation. Classical ethnobotanists document the ways in which ethnic people use the plants* (Prance, 1991). [Prance, GT. 1991. What is ethnobotany today? *Journal of Ethnopharmacology* 32:209-216.]. *Since past few decades, ethnobotany has evolved as a multidisciplinary subject incorporating information from other subjects like, anthropology, chemistry, pharmacology, geography, ecology, environmental sciences, economics, linguistics , medicine, horticulture, etc. (Gaikwad et al., 2011). [Gaikwad, J, Karen Wilson JK, Subramanyam V. Joanne J. Ranganathan S. 2011. Combining ethnobotany and informatics to discover knowledge from data. Edited by Mahendra R, Acharya D, JL Rio. Ethnobotanical plants: revitalization of traditional knowledge of herbs pp. 444-457. Science Publishers, Enfield, New Hampshire, USA.].*

**Contribution of Ethnobotany are significant in drug development, germ plasm conservation, crop improvement, selection of new plants for domestication, assessment of cultural position of tribes, study of the distribution of plants, new lines of manufacture, resource management, early identification of species in trade, etc (Fransworth *et al.* 1985; Balick 1996; Henrich 2000). In absence of proper documentation, western pharmaceutical companies are stealing indigenous knowledge for commercial benefits. Further, traditional knowledge systems are rapidly fading away because biodiversity is depleting, tribes are vanishing, indigenous cultures and languages are disappearing.**

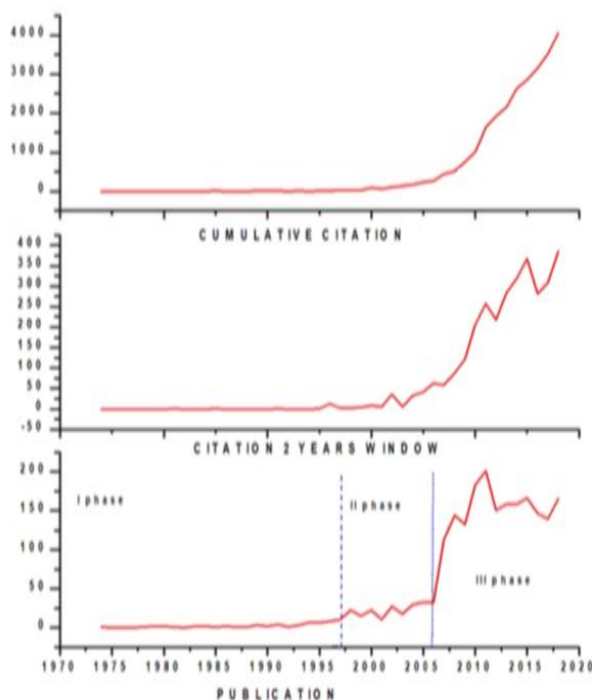
**Convention on Biodiversity (1992) addresses the issues of vanishing and stealing of indigenous knowledge system and establishes international protocols; it binds signatory nations for the following:**

- A. preservation and maintenance of traditional knowledge;**
- B. application of traditional knowledge;**
- C. equitable sharing of benefits from traditional knowledge.**

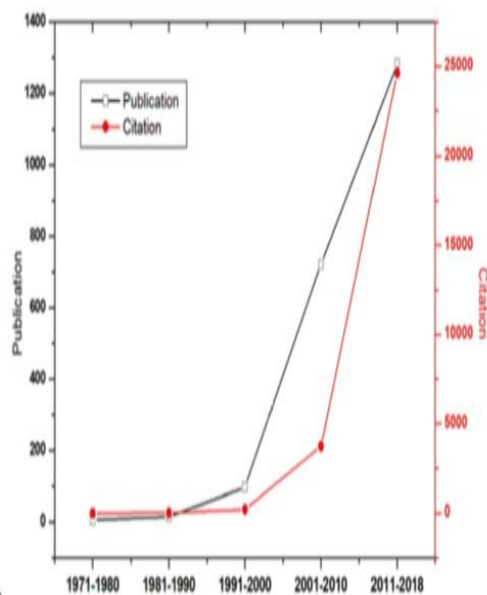
**Ethnobotany is vital for human beings, not only because its bioprospecting roles but also for management and maintenance of natural resources and cultural diversity.**



India is the home of 705 tribes and rich in plant diversity having 18386 of angiosperms, 79 gymnosperms, 1289 pteridophytes, 2748 bryophytes, 2511 lichens, 15115 fungi and 7357 algae (Dash *et al.* 2018; <http://tribal.nic.in/>). The diversity of tribes and plant wealth make india a perfect place to study the ethnobotany. About 150 years back, British Government in India had realised the fact and utilized traditional knowledge in economic activities. Initiatives for documentation of folk knowledge was taken by Sir George Watt (1873), he explored remote areas and published “Dictionary of Economic products of India” in six volumes (Chakravathy, 1975). In 1925, Boddington had documented medicinal plants of Santhal tribes (Boddington 1925; 1927; 1940; 1983) The actual research on Ethnobotany in India was started by Dr. S.K. Jain. He explored many tribal areas, and the first publication was appeared in 1963 (Jain, 1963). After that many researchers are involved in research on ethnobotany and publications are coming every year (Shah, 2008).



A: Trends of publications and citations in ethnobotany research



B: Decadal growth of publications and citations in ethnobotany research

## Trends of publication in ethnobotany

Table 1. Ten most preferred journals by Indian authors in Ethnobotany

Source Titles	IF	P	P (%)	C	C (%)	C/P
<i>Indian Journal of Traditional Knowledge</i>	0.92	368	17.334	2210	7.74	6.01
<i>Journal of Ethnopharmacology</i>	3.41	258	12.153	8156	28.55	31.61
<i>Pharmaceutical Biology</i>	2.49	63	2.967	702	2.46	11.14
<i>Current Science</i>	0.75	48	2.261	994	3.48	20.71
<i>Journal of Medicinal Plants Research</i>	NA	33	1.554	415	1.45	12.58
<i>Journal of Ethnobiology and Ethnomedicine</i>	2.27	31	1.46	1106	3.87	35.68
<i>Fitoterapia</i>	2.43	28	1.319	492	1.72	17.57
<i>Indian Journal of Pharmacology</i>	1.04	26	1.225	161	0.56	6.19
<i>Genetic Resources and Crop Evolution</i>	1.29	25	1.178	107	0.37	4.28
<i>Evidence Based Complementary and Alternative Medicine</i>	1.98	23	1.083	440	1.54	19.13

Abbreviations: IF, impact factor (JCR 2018), P, publications; C, citations; C/P, average citations

Table 2. The 10 most productive institutions in ethnobotany research

Organizations	Records	Citations	Impact	h-index
Council of Scientific & Industrial Research	207	3960	19.13	32
Indian Council of Agricultural Research	109	824	7.56	14
Jadavpur University	54	921	17.06	18
Botanical Survey of India	40	319	7.98	13
G B Pant National Institute of Himalayan Environment Sustainable Development	39	726	18.62	15
North Eastern Hill University	38	323	8.50	11
Indian Institute of Technology System	36	972	27.00	15
Jamia Hamdard University	34	376	11.06	12
Loyola College Chennai	34	1295	38.09	18

Assam University

32

202

6.31

8



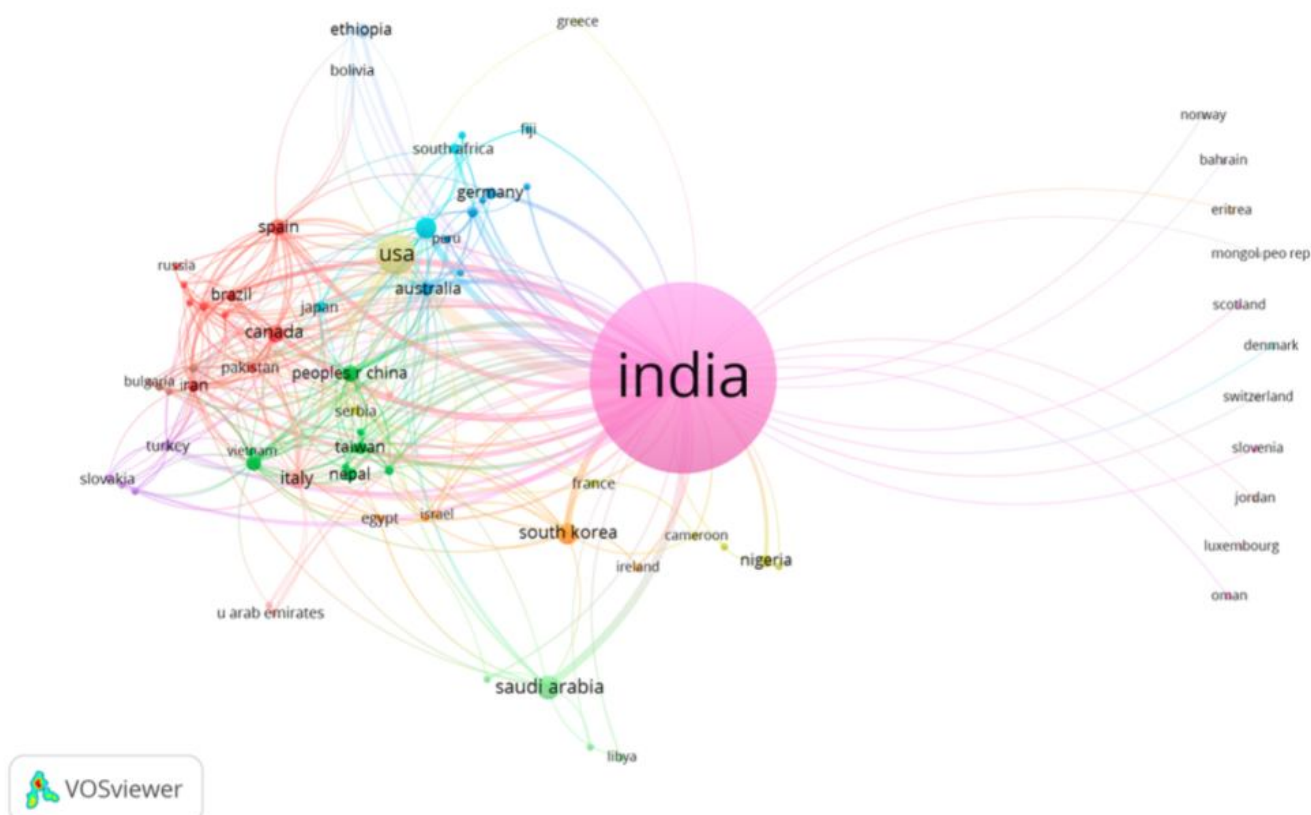


Figure 7. Collaboration network of India

Table 3. Major international collaborations with India in Ethnobotany research

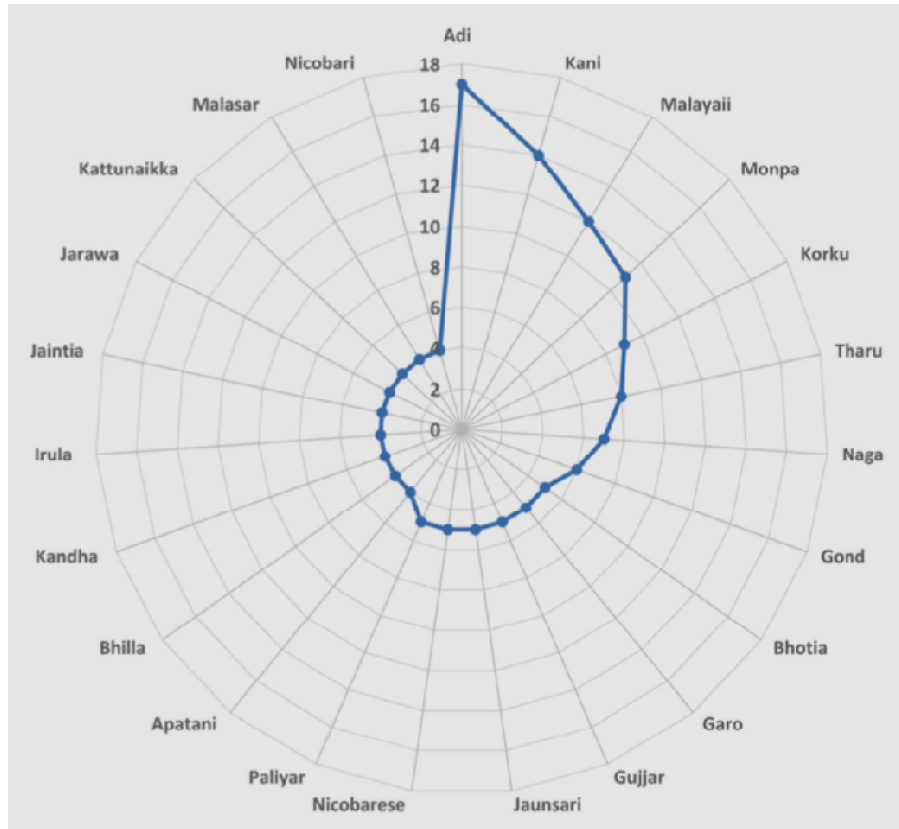
Country	Record	% age
USA	102	4.805
Saudi Arabia	36	1.696
England	28	1.319
South Korea	26	1.225
Italy	22	1.036
Canada	20	0.942
Spain	17	0.801
Peoples R China	16	0.754
Malaysia	15	0.707
Australia	13	0.612
Ethiopia	13	0.612
Nepal	12	0.565
Germany	11	0.518
Brazil	10	0.471
Taiwan	10	0.471

### Most studied tribes of India

The analysis demonstrated that publications are available on 105 tribes of India. Most studied tribe is *Adi* of Arunachal Pradesh (17 publications), followed by *Kani* tribe living in western Ghats of Kerala (14 publications), *Malayali* of Kerala (12 publications), *Monpa* of Arunachal Pradesh (11 publications), *Korku* of Madhya Pradesh (9 publications), *Tharu* tribes living on Indo-Nepal boarder areas (8 publications), *Naga* of Nagaland and Manipur (7 publications), *Gond* tribe living in many parts of India (6 publications), *Bhotia* of Himalayan Belt, *Garo* of Meghalaya, *Gujjar* living in many parts of Northern India, *Jaunsari* of Uttarakhand, *Paliyar* living in southern Western Ghat (5 publications each), etc (Fig. 8).

Title	Authors	Source Title	Publication Year	Total Citations
Medicinal plants of India with anti-diabetic potential	Grover, JK; Yadav, S; Vats, V	<i>Journal of Ethnopharmacology</i> , 81 (1): 81-100	2002	778
Ayurveda and traditional Chinese medicine: A comparative overview	Patwardhan, B; Warude, D; Pushpangadan, P; Bhatt, N	<i>Evidence-Based Complementary and Alternative Medicine</i> , 2(4): 465-473	2005	246
Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu, India	Muthu, Chellaiah; Ayyanar, Muniappan; Raja, Nagappan; Ignacimuthu, Savarimuthu	<i>Journal of Ethnobiology and Ethnomedicine</i> , 2	2006	209
Herbal medicine	Kamboj, VP	<i>Current Science</i> , 78(1): 35-39	2000	202
Ayurveda and natural products drug discovery	Patwardhan, B; Vaidya, ADB; Chorghade, M	<i>Current Science</i> , 86(6):789-799	2004	174
Ethnopharmacological approaches to wound healing-exploring medicinal plants of India	Kumara, B.; Vijayakumar, M.; Govindarajan, R.; Pushpangadan, P.	<i>Journal of Ethnopharmacology</i> , 114(2): 103-113	2007	173
Indian medicinal herbs as sources of antioxidants	Ali, Shahin Sharif; Kasoju, Naresh; Luthra, Abhinav; Singh, Angad; Sharanabasava, Hallihosur; Sahu, Abhishek; Bora, Utpal	<i>Food Research International</i> , 41(1): 1-15	2008	172
Indian medicinal plants as a source of antimycobacterial agents	Gautam, Raju; Saklani, Arvind; Jachak, Sanjay M.	<i>Journal of Ethnopharmacology</i> , 110(2): 200-234	2007	155
Medicinal and therapeutic potential of Sea buckthorn ( <i>Hippophae rhamnoides</i> L.)	Suryakumar, Geetha; Gupta, Asheesh	<i>Journal of Ethnopharmacology</i> , 138(2): 268-278	2011	154
Potential synergism of natural products in the treatment of cancer	Hemalswarya, S; Doble, M	<i>Phytotherapy Research</i> , 20 (4): 239-249	2006	152

### Top 10 highly cited article in ethnobotany research in India



### The 22 most studied tribes of India

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