



Role of Ethnomedicobotanical Survey in Advancement of Ayurveda

¹MN Shubhashree, ²V Rama Rao, ³Shiddamallayya Mathapati, ⁴Raghavendra Naik, ⁵Sulochana Bhat

ABSTRACT

Introduction: Ethnomedicobotanical survey focuses on understanding the relation between humans and plants and this endeavor involves multiple disciplines. Ethnomedicobotanical survey helps in obtaining first-hand information on the medicinal plants. Such surveys also provide important data on cultivation and conservation aspects and assist in chalking out socioeconomic programs.

Aim: (1) To explore the traditionally used medicinal plants under ethnomedicobotanical survey and include them under Ayurvedic pharmacopeia. (2) To discover new drugs and finding out alternate botanical source plants for rare and endangered species.

Materials and methods: Such an endeavor has been taken up by the Regional Research Institute for Metabolic Disorders (RARI-MD) previously known as Regional Research Institute, Bengaluru. Since the inception of survey of medicinal plants unit in 1971, various forest ranges of Karnataka like Shimoga, Chitradurga, Haveri, Davangere, Coorg, Bellary, South Canara, Gadag, etc., have been surveyed. Special tours have been undertaken in south and north divisions of Nilgiris, Andaman and Nicobar Islands, Madhya Pradesh, and Arunachal Pradesh.

Results: Twenty-seven districts have been covered and more than 42,049 herbarium specimens belonging to 2,619 plant species along with 734 dry drug samples have been collected and deposited in the herbarium of RARI-MD. Many new sources of drugs like *Aristolochia tagala* are suggested in the absence of *Aristolochia indica* (Ishwaree) based on ethnobotanical survey. Our Acharyas have stated that knowledge has to be updated by collecting information from all the possible sources. Acharya Charaka also opined that the first-hand information about a drug has to be collected from shepherds (*Ajapa and Avipa*). This article intends to present a bird's-eye view on the significance of the ethnomedicobotanical survey and contribution of RARI-MD in this area.

Keywords: Ayurveda, Ethnobotany, Ethnomedicobotanical survey, Medicobotany.

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INTRODUCTION

Traditional folk medicine is usually transferred from one generation to another by oral means and most often not documented. In India, large sections of population still rely on traditional herbal medicine. There are hundreds of different tribes and other ethnic groups in India. Each tribal group has its own tradition, folk language, beliefs, and knowledge about use of natural resources as medicines.¹ Since time immemorial, there has been a close association between human and plant life.² The relationship between the indigenous people and their surroundings forms the subject of ethnobotany, a science³ dealing with the study of plants used by tribes for food, medicine, and clothing.⁴ Tribal knowledge about plants forms the storehouse of information and plays a key role in improving the *Ayurvedic Materia Medica*. It also helps in collection of authentic drug material. Due to various human activities, such as deforestation, rapid industrialization, urbanization, and other developmental activities, both natural vegetation and traditional culture of planting trees in India are declining fast. There is an urgent need to document all ethnobotanical knowledge available with different ethnic and folklore communities before the traditional culture is completely lost.⁵ The term ethnobotany was first used in 1895 by Harshberger and refers to the study of "plants used by primitive and aboriginal people".⁶ However, the concept of ethnobotany is reflected in the ancient treatises of Ayurveda. Ayurveda emphasizes on the fact that there is nothing which is not a medicine, which implies that all plants have some medicinal uses. Charaka has stressed on having direct interaction with the persons who are intimately acquainted with the use of herbs for procuring ideal medicine.⁷ Sushruta et al⁸ also mention that medicinal herbs and plants should be recognized and identified with the help of shepherds, cow herd, and other foresters who are acquainted with the names and forms of plants. Dalhana, commentator of Sushruta, has also emphasized on identification of plants from the tribal people. In this context, he mentioned that it is very difficult to know about the poisonous plants and as such they may be known by interacting

^{1,4}Research Officer (Ayurveda), ^{2,3}Research Officer (Botany)
⁵Assistant Director

^{1,4}Regional Ayurveda Research Institute for Metabolic Disorders
Bengaluru, Karnataka, India

⁵Raja Ramdeo Anandilal Podar Central Ayurveda Research
Institute for Cancer, Mumbai, Maharashtra, India

Corresponding Author: MN Shubhashree, Research
Officer (Ayurveda), Regional Ayurveda Research Institute for
Metabolic Disorders, Bengaluru, Karnataka, India, Phone:
+919448016968, e-mail: shubhathejas@gmail.com

with tribal people in the Himalayan region. Probably, it is a hint about the poisonous aconites growing on high altitudes. These references in classics point toward the field surveys. He also mentioned places like *Uttarapatha*, *Magadha*, *Paschimadesha*, *Turushkadesha*, *Parasikadesha*, etc., where there is availability of medicinal plants. It gives us a glimpse of extensive field survey and wide range of local contacts that can bring out ethnomedicobotanical knowledge.⁹ Even today, in different parts of the country, certain communities of rural people entirely rely upon the traditional system of medicine for health care, especially for puerperal care (postnatal care/puerperal care). Such traditional practices preserve natural wealth of folklore medicine. Tribal knowledge is important not just for the tribal people themselves, but for the whole world. Excure from Brazilian vine *Chondrodendron tomentosum* Ruiz and Pavwas originally were used as a hunting poison, but both of them contain tubocurarine which is now essentially used in surgery as a muscle relaxant. Similarly, the Indian snake root, *Rauwolfia serpentina* (L.) Benth., ex-Curz was earlier employed for insomnia and mental disorders, today it provides the tranquilizer "Reserpine". Tribal societies and culture are disappearing with the changing ecosystems and hence it has become necessary to uncover the hidden and secret uses of flora for which ethnobotanical survey becomes an important part of investigation. In the present study, an attempt has been made to collect and document the declining folk knowledge of medicinal plants, which are used in the treatment of various disease conditions, in various forest ranges of Karnataka and other states of India. Database may be prepared for the commercial exploitation of bio-resources based on this valuable data.

MATERIALS AND METHODS

Ethnobotanical surveys have been conducted by medicinal plant unit of Regional Ayurveda Research Institute for Metabolic Disorders (RARI-MD), Bengaluru, in various forest ranges of Karnataka like Shimoga, Chitradurga, Haveri, Davangere, Coorg, Bellary, South Canara, Gadag, and special tours conducted in south and north divisions of Nilgiris, Andaman and Nicobar Islands, Madhya Pradesh, and Arunachal Pradesh, and this study is based mainly on the observations of the survey.

METHODOLOGY

The survey studies have been undertaken by botanists along with Ayurvedic physician and other assistants. The same district was visited two to three times in different parts of the year to understand the climatic influence on flora. Frequent field surveys have been carried out to

invent the "key informants" in the treatment of diseases in the study area. Ethnomedicobotanical data have been collected through conversation with traditional healers, tribal doctors, and old women in the field trips. Data have been collected through structured open-ended interviews with questionnaire in their local/Kannada language. During the interview local names, useful plant parts, method of preparation, and dosage were recorded. All medicinal plants recorded for the treatment of diseases were photographed in the field. The plant species is identified with the help of regional and local floras¹⁰⁻¹⁵ by pharmacognosy experts. As per the standard procedure, the voucher specimens were collected and herbariums have been preserved. The collected samples are deposited in the herbarium of RARI-MD, Bengaluru. Documentation of botanical name, status, family, vernacular name, habit and habitat, mode of preparation, administration of the drug, dosage as per age, clinical benefits was done with emphasis on use of single plant and polyherbal formulations. The collected information on the medicinal use of these herbs has been correlated to the technical information available in the Ayurvedic science. According to Ayurvedic classics, it is said that if plants are collected in their season, plants will have more medicinal value. Even time factor also plays a major role in attaining the optimum medicinal value in medicinal plants. Keeping all these things in view, survey and interview was carried out in different regions at different times.

RESULTS

Out of 28 districts in Karnataka, ethnomedicobotanical survey has been carried out in 27 districts out of which 6 are in Western Ghats. A total number of 9,854 field collections were made with pertinent phenological data useful to Indian System of Medicine (ISM). About 42,049 herbarium specimens belonging to 2,619 plant species have been collected and deposited in the herbarium of RARI-MD along with 734 dry drug samples in the museum (Table 1).

Special survey tours (out of state): Special tours were undertaken in Nilgiris (Ooty), Andaman and Nicobar Islands, Arunachal Pradesh, and Madhya Pradesh, and many medicinal plants of importance in ISM were collected.

Table 1: Status of ethnomedicobotanical survey conducted in RARI-MD, Bengaluru

Total number of plant specimens prepared for herbarium	42,049 specimens
Species collected	2,619 species
Total number of drug samples added to the museum	734 specimens

Table 2: New plant discoveries to Indian flora through ethnomedicobotanical study by RARI-MD, Bengaluru

Botanical name	Family	Place of report
<i>Marsdenia raziana</i> Yog.	Asclepiadaceae	Chikmangalur District
<i>Oldenlandia nudicaulis</i> Yog.	Rubiaceae	Chikmangalur District
<i>Thelasis pygmaea</i> Lindl. (new locality record)	Orchidaceae	Andaman and Nicobar
<i>Utricularia sampathkumarii</i> Yog.	Lentibulariaceae	Bengaluru
<i>Saurauia bracteosa</i> DC. (new locality record)	Sauruiaceae	Andaman and Nicobar
<i>Chilocarpus sunainianus</i> Yog.	Apocynaceae	Andaman and Nicobar
<i>Ilex tadiandamolense</i> Keshav. et Yog.	Aquifoliaceae	Kodagu District
<i>Litsea lakshmammaniana</i> Keshav. et Yog.	Lauraceae	Kodagu District
<i>Garcinia darwiniana</i> Keshav. et Yog.	Clusiaceae	Kodagu District
<i>Baliospermum raziana</i> Keshav. et Yog.	Euphorbiaceae	Kodagu District
<i>Hopea ponga</i> Mabb. var. <i>Cauveriana</i> Keshav. et Yog.	Dipterocarpaceae	Kodagu District
<i>Oberonia ranganniana</i> Keshav. et Yog.	Orchidaceae	Kodagu District
<i>Taeniophyllum khasianum</i> Yog.	Orchidaceae	Khasia and Juntia Hills, Assam

DISCUSSION

Improving the stagnant *Ayurvedic Materia Medica* is a challenging task and depends heavily on the collection and analysis of the information from traditional sources. Some of these benefits include discovery of new plants, identification of substitutes, unravelling the identity of Ayurvedic drugs as mentioned in classics, and discovery of new drugs. New plant discoveries to Indian flora through ethnomedicobotanical study acts as a bridge between botany and tribal knowledge regarding medicinal properties of plants. The search for new drugs and nutraceuticals invariably starts from the plants mentioned in the traditional source and has become a recognized tool.¹⁶ Identification and documentation of new plants plays a vital role in incorporating them in Ayurvedic pharmacopeia. It is found that a total number of 14 plant taxa, new to the Plant Kingdom, have been discovered and described by ethnobotanical surveys carried out by RARI-MD (Table 2).

Identification of Substitutes

Plant resources particularly medicinal plants are disappearing at an alarming rate, and not enough attention is being given to seek alternate sources or substitutes for many of these plants. Although scores of medicinal species have vanished from our country or are threatened with extinction, India is blessed with one of the richest floras in the world and still there are hundreds of species, which have equal value to some of the commonly used plants and some of them may even be superior in their properties as compared with those in common use.¹⁷ The quest for identifying and addition of plants of medicinal importance (drugs in Ayurveda) can be solved based on the ethnomedicobotanical survey in the forests with particular reference to find out and establish a new or allied source to the accepted source drug. For example, the drug Ishwaree derives the botanical source from the

roots of a twiner *Aristolochia indica* L., which has slender roots which are found scattered. As many plants have to be uprooted to procure the required quantity of roots, it becomes a difficult task for the physicians to obtain the drug. It has been learnt from the medicobotanical surveys that *Aristolochia tagala* occurring in the forests of Western Ghats can be used alternatively. The species occurs fairly abundantly and hence the collection of the drug is easy and the physician can meet the required demand.¹⁸

In many cases, the occurrence of the species is found to be in the Himalayas and thus the physicians in South India in particular are at a disadvantage to procure such species, e.g., *Tagara* (*Valeriana jatamansii* Jones Wall./*V. wallichii* DC.). To overcome such situation, medicobotanical surveys can help in detecting the allied species of the genus in South India. There are four species of *Valeriana* occurring in the hills of South India which remain unexploited. Preliminary studies on one species *V. arnottiana* at our center have revealed that the volatile oil used for drug is present in higher quantities than in *V. jatamansii* (Himalayan species). It is logical to explore the medicinal benefits of valerian species occurring in South India as a substitute for the one available in Himalayan region.^{19,20}

New Source/Identity for Ayurvedic Drug

As an example, the tribal people of Silent Valley and Idukki in Kerala use fruits of *Chittelam* in digestive complaints (personal observation). This drug has been identified as fruits of *Heracleum rigens* Wall. ex DC. of Apiaceae. Review of available literature has revealed that this plant has not been mentioned in Ayurveda and forms a new data to be added to *Materia Medica*. Such studies are carried out by Regional Research Institute, Bengaluru, in the tribal pockets of Nilgiris,²¹ and Andaman and Nicobar Islands.²² Arunachal Pradesh and Madhya Pradesh have brought out many plants/drugs that could be exploited by the ayurvedists.

New Drug Discovery

Based on the ethnomedicobotanical studies, a research paper "Origin and identification of Kuduhunchi, a hitherto unknown Ayurvedic drug, introduced by Rajanarahari" was published correlating the botanical identity of "*Momordica cymbalaria* Cogn. (= *Luffa atuberosa* Roxb.)."²³ The often cited case of antileukemic studies on "*Catharanthus roseus*" is not considered as an example of ethnopharmacology, which is a subdivision of ethnobotany, because the drug's traditional use is mentioned as antidiabetic and not as an antileukemic agent. This is an interesting example where a new action of the drug was discovered. *R. serpentina* (L.) Benth. ex-Curz, *Cannabis sativa* L., *Papaver somniferum* L., *Gymnema sylvestre* (Retz.) R. Br. ex Sm., *Picrorhiza kurroa* Royle ex-Benth., *Azadirachta indica* A. Juss., and *Curcuma longa* L. are examples of modern pharmacological confirmation of traditional uses of plants.

CONCLUSION

Ethnomedicobotanical surveys play a vital role in rescuing the disappearing knowledge and returning it to the local communities. This will help in conserving at least a part of ethnobotanical heritage as a living cultural ecosystem. Ethnobotanical studies give us information about the plants which are endangered. If the rates of harvest are high and not replaced with new plants of same species, plants will become extinct soon. Hence, there is an urgent need to record the traditional knowledge of various ethnic communities before this culture is wiped off completely due to the nonavailability of the drug. The use of medicinal herbs as food and medicine is common among the different communities under primary health care in rural areas. There is an urgent need for documentation of ethnomedicobotanical research before indigenous cultures and natural habitats are destroyed.

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हिन्दी सारांश

आयुर्वेद की प्रगति में प्रजातिचिकित्सावानस्पतिक सर्वेक्षण की भूमिका

प्रस्तावना: प्रजातिचिकित्सावानस्पतिक सर्वेक्षण मनुष्य और पादपों के बीच के संबंध को समझने पर केंद्रित है और इस प्रयास में कई विषय शामिल हैं। प्रजातिचिकित्सावानस्पतिक सर्वेक्षण औषधीय पौधों पर प्रथम जानकारी प्राप्त करने में मदद करता है। ऐसे सर्वेक्षण कृषि और संरक्षण के पहलुओं पर महत्पूर्ण आंकड़े भी उपलब्ध हैं और प्रजाति चिकित्सा वानस्पतिक सर्वेक्षण मनुष्य पादप सह संबंध पर केन्द्रित विभिन्न विषयों का सम्मिश्रित है। प्रजाति चिकित्सा वानस्पतिक सर्वेक्षण औषधीय पादप प्रथमतया: ज्ञान प्राप्त करने में मदद करता है। ऐसे सर्वेक्षण कृषिकरण एवं संरक्षण पहलुओं पर महत्पूर्ण आंकड़े प्राप्त कराते हैं जो सामाजिक-आर्थिक कार्यक्रमों को तैयार करने में सहायता करते हैं।

उद्देश्य: (1) प्रजातिचिकित्सावानस्पतिक सर्वेक्षण के अन्तर्गत पारम्परिक रूप से प्रयुक्त औषधीय पादपों का पता लगाना और उन्हें आयुर्वेदिक फार्माकोपिया के अंतर्गत शामिल कराना (2) दुर्लभ और लुप्तप्राय प्रजातियों के लिए वैकल्पिक वनस्पति स्रोत पादपों को पता लगाना तथा नवीन औषधि की खोज करना।

सामग्री और विधि: इस तरह का प्रयास क्षेत्रीय आयुर्वेदीय चयापचय विकार अनुसंधान संस्थान, जो कि पूर्व में क्षेत्रीय अनुसंधान संस्थान, बैंगलुरु के नाम से जाना जाता था, के द्वारा किया गया है। 1971 में औषधीय पादपों के सर्वेक्षण की ईकाई की स्थापना से कर्नाटक के शिमोगा, चित्रदुर्ग, हावेरी, दावणगेरे, कूर्ग, बेल्लारी, दक्षिण केनरा, गडद इत्यादि विभिन्न वनों का सर्वेक्षण किया गया है। नीलगिरि के दक्षिण व उत्तर भागों अ.डमान व निकोबार द्वीप समूह, मध्यप्रदेश तथा अरुणाचल प्रदेश के विशेष दौरे किए गए।

परिणाम: 27 जिलों का सर्वेक्षण किया गया तथा 734 शुष्क औषधि नमूनों के साथ 2619 पादप प्रजातियों से संबंधित 42049 से अधिक वनस्पति संग्रहालय नमूने एकत्रित किए गए और इन्हें क्षे.आ.च.वि.अ.सं. बैंगलुरु के वनस्पति संग्रहालय में जमा किया गया। प्रजाति वानस्पतिक सर्वेक्षण के आधार पर औषधियों के कई नए स्रोत सुझाए गए जैसे एरिस्टोलोचिया इण्डिका (ईश्वरी) के स्थान पर एरिस्टोलिचिया तगला। हमारे आचार्यों ने कहा है कि सभी सम्भावित स्रोतों से सूचनाओं को एकत्रित करके ज्ञान को आधुनिकतम (नवीनतम, अद्यतन) बनाना चाहिए। आचार्य चरक ने भी कहा है कि औषधि के बारे में प्रथम जानकारी चरवाहों (अजपा एवं अविद्या) से एकत्रित करनी चाहिए। इस लेख का प्रयोजन प्रजाति चिकित्सावानस्पतिक सर्वेक्षण के महत्त्व पर एक विहंगम परिदृश्य प्रस्तुत करना तथा इस क्षेत्र में क्षे.आ.च.वि.अ.सं. बैंगलुरु के योगदान को प्रस्तुत करना है।

कुंजी शब्द: आयुर्वेद, प्रजातिवानस्पतिक, प्रजातिचिकित्सा वानस्पतिक सर्वेक्षण, चिकित्सावानस्पतिक।

