

Ethno-botanical Studies on Medicinal Plants of South-East Region of Rajasthan

Aparna Pareek*¹, Shruti Shree Pareek² and Shalini Maheshwari³

^{1,2} Department of Botany, University of Rajasthan, Jaipur- 302 004, Rajasthan, India

³ Career Point University, Kota - 325 003, Rajasthan, India

Abstract

The branch of botany known as ethno-botany focuses on plants that have been used medicinally for a wide variety of conditions since prehistoric times. The indigenous people of India make extensive use of their broad understanding of medicinal plants. Native people believe that some plants can be effective in warding off certain ailments and they employ those plants. Within the scope of this investigation, we carried out an assessment on medicinal plants in the south-eastern part of the state of Rajasthan. For the purpose of the research, members of numerous indigenous communities who make therapeutic use of those plants were interviewed. 30 plants were studied for their plant parts, treatment, mode of administration, and their popularity. Study concluded that the selected plants were very popular in the selected areas for their therapeutic uses in different purpose and mode.

Key words: Ethno-botany, Medicinal plants, Native tribes, Therapeutic properties

Ethnology is the study of human populations and their direct interactions with plants and animals indigenous to their habitats. In 1896, J.W. Harshberger coined the term "ethnobotany" to refer to the study of plants that were traditionally utilized by native people. This field of study focuses on how plants have been utilized. In the year 1875, Stephen Power coined the term "aboriginal botany" to refer to the study of all aspects of the vegetative world that were utilized by the indigenous people of Australia for a variety of purposes, such as for the production of medication, food, textiles, clothing, and ornaments, among other things. The study of the relationship that exists between people from traditional communities and their plant environment is known as ethnobotany [1-2].

India is one of the countries that have the most extensive ethno-botanical knowledge because it has a large number of different ethnic groups, each of which has a long history, as well as a broad variety of plant life. There are over 550 distinct tribal settlements that are home to the world's more than 50 million indigenous people. The vast majority of these people make their homes in the hills, forests, and other places that are naturally isolated from one another. Ayurveda is a branch of supplementary and alternative medicine that can also be referred to as Ayurvedic medicine. Its roots can be traced back to India [3].

Plants have been used by humans as a means of treating and preventing disease ever since ancient times. People in India

have been using different sections of various medicinal plants to treat certain illnesses using a practice that includes the use of numerous medicinal plants ever since ancient times. It is estimated that thousands of plant species in India possess therapeutic properties. It has been estimated by Purohit and Vyas that there are approximately 70,000 different plant species that have been utilized in some form of herbal medicine at some stage in the course of human history. The traditional medical technique of Ayurveda in India dates back thousands of years and is sometimes referred to as the "science of life." Because it has been carried out for close to 5000 years, it is currently the most time-tested and all-encompassing form of medical treatment that is available. It is possible to trace this system all the way back to the Vedas, and more particularly to the Atharvaveda.

This study was carried out in South-East region of Rajasthan including all four districts of this region Bundi, Baran, Kota and Jhalawar. On the basis of Geography, Topography, Forest area, Rainfall pattern, Soil type and its components (as described in Introduction) we decided tribal localities and villages for survey. Besides the surveys, authentic Data were also gathered through secondary sources from the study area including forest officials, Government offices, Village health centers, Ayurvedic Doctors and Agriculture experts.

MATERIALS AND METHODS

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Correspondence to: Aparna Pareek, Department of Botany, University of Rajasthan, Jaipur - 302 004, Rajasthan, India, Tel: +91 9001541128; E-mail: shrutipareek10@gmail.com

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Collection of plant materials

During field visits of area plants used by aboriginals were identified by the help of local people. Plant materials for specimens like leaves, fruits, seeds, and bark were collected. Propagules were also collected to study their cultivation practices and strategies to conserve them in their natural habitats. Under this the floristic survey was conducted in Hadoti region of south-east Rajasthan. The floristic survey was done during different seasons to (Repeatedly three time in a year) so that identification of the plants can be done accurately. The information regarding traditional use of medicinal plants were collected through personal interviews of tribal men, women, ojhas, bhopas, local Vaidhayas etc.

The surveys were primarily involving detailed studies of one or two villages at a time by staying there for the whole day. In surveys tribal people and traditional communities, and medicines practiced by them were explored. Local Vaid, Bhopas, Mukhiyas and Bhagatsetcwere interviewed extensively for throwing light on the subject. The information was also gathered from non-tribal people, such as forest officials, government physicians, nurses, veterinary doctors, non-governmental organizations (NGOs), college students from rural areas, and so on. These individuals have sufficient knowledge regarding the ethnobotanical uses of plants as a result of their long association with local people and long stays in rural areas. In order to collect data, structured open-ended questionnaires have been drafted and confirmed with the assistance of industry professionals.

Identification of the collected plants

The entire collected flora was brought to laboratory, identified them and classified to their respective species level. A list of medicinal plant will be prepared on the basis of information collected from informers. About 30 plants were selected for further study considering their:

- Potential use for normal and therapeutic purpose.
- Consumption by tribals in various forms.
- Availability of selected plants in different seasons.

The collected plants were taken to the laboratory for identification. All plants were further confirmed by Prof. P. S. Chauhan, Department of Forestry, College of Horticulture and Forestry, Jhalawar, India. The specimens of the plants were further taken to Herbarium, Department of Botany, University of Rajasthan, Jaipur to avoid any error in identification. Different references concerning with the medicinal plants of Hadoti were also reviewed for comparison of flora. (Table 1) indicated the plants which were survey during the study.

Table 1 Selected list of plant material for collection

Common name	Botanical name
Safed Musli	<i>Chlorophytum borivilianum</i>
Ashawgandha	<i>Withania somnifera</i>
Jungle Jalebi	<i>Pithecellobium dulce</i>
Arjuna	<i>Terminalia arjuna</i>
Amrita / Giloe	<i>Tinospora cordifolia</i>
Kali Musli	<i>Curculigo orchiodesGnaert</i>
Adoosa, vasaka	<i>Adhatoda vasica</i>
Sahanjana	<i>Moringa oleifera</i>
Kaith	<i>Feronia lemonica</i>
Naag Bala/ Gangdi	<i>Grewia latifolia</i>
Chirongi	<i>Buchnanian lenzen</i>
Jevanti	<i>Leptodenia reticulata</i>
Badi Kateli	<i>Solanum ferox</i>
Guggal	<i>Commifora mukul</i>
Gambhari	<i>Gmelina arborea</i>
Tinsh/Tinsh	<i>Ougeinia oojenesis</i>

Chakramad /Pawad	<i>Cassia Tora</i>
Masarohini /Atiruha	<i>Somyida febrifuga</i>
Malkangni	<i>Celestrus peniculatus</i>
Madanphal	<i>Rendia dumentorum</i>
Vidhara	<i>Argyreia speciosa</i>
KaalMegh	<i>Andrographis paniculata</i>
Salai guggal	<i>Boswellia serrata</i>
Mandukparni	<i>Centella asitica</i>
Maha-bilvaparni	<i>Naringi crenulata</i>
Kadaya	<i>Sterculia urenus</i>
Akol	<i>Alangium salvifolium</i>
Vijaysaar/Beeja	<i>Pterocarpus marsupium</i>
Mulethi	<i>Glycorrhiza glabra</i>
Gudmaar	<i>Gymnema sylvestre</i>

RESULTS AND DISCUSSION

Interviews were based on questions prepared in English language and simultaneously translated into Hindi. During Interviews information was collected regarding informants age, sex, locality, occupation, education etc. along with traditional knowledge about medicines used by them, local name of diseases and plants. Questions were also asked regarding soil type, landforms, cultivation practices, habitat, and storage method. The questions regarding the preparation of medicinal formulation, the materials used during preparation, the condition of preparation, the method of storage, the additives or ingredients used during preparation and administration, the dosages administered, and the route of administration received the majority of the attention and concentration during the interview.

Interviews also focused on side effects of medicines if taken in excess and antidote for the same. The season, month, best time for collection and preparation of medicines, conservation methods, source of knowledge and ways of transferring traditional knowledge to the next generation were also discussed in detail. Healer's year of experience and opinion regarding the changes they observed during last 10 years were also the major interview points targeted. All the collected data has been analyzed using Microsoft Office Excel spreadsheet (2007) and Statistical Package for Social Science (SPSS) version 20 software to calculate sum, percentages, tabulate and draw graphs.

Table 2 Plant parts and number of species used

Plant part used	No. of informants	Percent	No. of Species
Leaves	139	92.67	26
Flower	44	29.33	3
Stem	26	17.33	3
Rhizome	19	12.67	1
Root	94	62.67	7
Pod	29	19.33	1
Whole plant	36	24.00	4
Fruit and pulp	73	48.67	4
Oil	41	27.33	4
Latex, resin and gum	49	32.67	3
Bark	126	84.00	12

It was observed in present research that people of the study area harvest different plant parts for the preparation of traditional remedies (e.g., leaves, roots, seeds, barks, and fruit etc.). It was found, among 30 plant species, 26 species (92.67%) were used for their leaves as reported in (Table 2), which was significantly followed by bark (84.00%), root (62.67%) and fruit and pulp (48.67%). As shown in (Table 2), only 36

informants claimed the use of Latex, resin and gum (32.67%) significantly followed by flower (29.33%), oil (27.33%) and whole plant (24%) used by tribal communities. This was based on belief that leaf contains more concentration of the active ingredients and rich in antioxidants. One possible explanation for this is that they are readily available, contain a significant quantity of compounds, and can be extracted and utilized in a variety of forms with relative ease. When compared to the utilization of other plant components such as roots and flowers, for example, the consumption of plant leaves does not have an adverse impact on the life cycle of the plant. The abundant green colour of the leaves can be attributed to the favourable circumstances regarding rainfall. Local people of the study area used leaves of selected 30 plants to treat different ailments as asthma, cough, dysentery, night blindness, cancer, paralysis, jaundice, snakebite and other microbial infections reported in study. Interestingly flowers were used from mainly three plants Gambhari, Kutaj and Sahajna to align different diseases like Leprosy, obesity and rheumatic arthritis whereas stem part was used from Ahwagandha, Kutaj and Chirongi. Rhizome part was used from kali musli to cure sexual ability and complexion improvement whereas Gaangdi is used to treat fractured bones. Pod was used from Jungle Jalebi to cure diabetes, mouth ulcer and constipation. Some of the species like Vidhara, Tins, Ashwagandha and Kalmegh, Badi kateli were used as whole plant to cure different critical diseases. Fruit and pulp were widely used from Bel, Gambhari but extracted in fewer amounts from Ashwagandha, Madanphal, Tinish, Gangdi, and Kaith. Plant oil is very useful in ayurveda, its uses were described in various shastra, and people of study area utilize these oils to improve fertility and to cure ear problems especially from Bel, Chirongi, Pawad and Malkangni. Plants like Kutaj, Salai Guggal and Chirongi were popular among tribals to extract latex, gum and resin. During this study we found that seeds are an important plant part used as medicine, in this the ranking is Chakramad, Chirongi, Pawad, Adusa, Kutaja, Tins, Jungle jalebi and Madanphal. The bark was reported in three forms bark (Gambhari, Mahabilvaparni, Guggal, Kutaj, Madanphal,

Salar, Vidhara and Jungle jalebi), stem bark (Bel, Arjun, Tins and Sahjana) and root bark (Bel) [4].

Previous research also revealed the different insight of medicinal plant used by tribes in their daily life. In present study it was found that leaves are the plant part used by highest informants for medicinal purpose in the area. But this finding is different from the same type of study conducted by [5] in which roots 31.4% were reported as the most widely used plant part followed by leaves 24.4%. The research done by [6] showed that roots 42% as a most widely used plant part and [7] also found use of root 35.8% highest than other parts. However, the various researchers [8-9] found that traditional medicines used leaves the most. In this regard, [10] reported that use of roots, rhizomes, bulb, bark, and stem in medicines has a serious effect on the survival of the plant itself. Some other researchers [11-12] also reported that using leaves, flowers in traditional preparation is more sustainable and do not harm the plant in long run.

Ethno-botanical data were collected by interviewing 260 local informants and 35 traditional health practitioners (THPs) from different localities of Kota, Bundi, Baran, and Jhalawar districts through different sampling techniques. During study quantitative and qualitative data were retrieved by conducting interviews, guided excursions, and focus group discussions. Information regarding healers was obtained from Forest department, health offices and other people.

Out of the total informants, 75% claimed the use of medicinal plants for different treatment like inflammatory conditions such as fever, cough, asthma, joint pain, and swellings. While others were mentioned the reason for their choice as they believe in the safest way and low adverse effects associated with the herbal formulations. The majority of the users 80% claimed that they use these herbal preparations at the initial stage of a disease before using any other medications and without any consultation, while 15% have mentioned the simultaneous usage of other medications. Only 5% informants claimed that they use home remedies as last option when other methods were not yielding any results.

Table 3 Effect and popularity of different plants

S. No.	Plant name	Effect and Popularity		
		Popularity	No. of Informants Percentage	Normal distribution
1	<i>Terminalia arjuna</i>	149	99.33	0.0055
2	<i>Chlorophytum borivilianum</i>	148	98.67	0.0057
3	<i>Commiphora mukul</i>	145	96.67	0.0064
4	<i>Solanum ferox</i>	143	95.33	0.0068
5	<i>Buchnanania lenzan</i>	141	94.00	0.0073
6	<i>Cassia tora</i>	134	89.33	0.0091
7	<i>Grewia latifolia</i>	112	74.67	0.0142
8	<i>Naringi crenulata</i>	103	68.67	0.0155
9	<i>Andrographis paniculata</i>	94	62.67	0.0159
10	<i>Soyimida febrifuga</i>	91	60.67	0.0159
11	<i>Celestrus paniculatus</i>	86	57.33	0.0156
12	<i>Holarrhena antidysenterica</i>	79	52.67	0.0147
13	<i>Curculigo orchides</i>	78	52.00	0.0145
14	<i>Leptadenia reticulata</i>	71	47.33	0.0132
15	<i>Centella asiatica</i>	71	47.33	0.0132
16	<i>Gemelina arborea</i>	57	38.00	0.0098
17	<i>Boswellia serrata</i>	55	36.67	0.0093
18	<i>Argyria speciosa</i>	55	36.67	0.0093
19	<i>Ougeinia oogenesis</i>	39	26.00	0.0054
20	<i>Randia dumetorum</i>	31	20.67	0.0039

Data were collected regarding local names of plants used, diseases treated, preparation methods, mode of administration, dosage, and the habitats. Cultivation strategies, conservation practices, and indigenous knowledge transfer systems were also included in this study.

Through the data obtained from popularity percentage analysis, incidence of *Terminalia arjuna* (Arjuna) (99.3%) were highest popularity ratio among all and the primary source of medicine followed by *Chlorophytum borivillium* (Safed musli) (98.0%) and *Commiphora mukul* (Guggal) (96.66%). Bark of Arjuna is a total solution for heart ailments thus it is very popular among tribals but overexploitation of bark from young trees makes them threatened [13]. Guggal is highly popular due to its properties to cure many diseases. Gum or resin of the Guggal is sold at very high prices in the market and used in various formulations is the main reason for becoming critically endangered [14] *Chlorophytum borivillium* is cultivated commercially in various parts of India [15]. Farmers are growing *Chlorophytum borivillium* (Safed Musli) is in Hadoti region now but vulnerable in wild due to overharvesting and no propagules left for next seasons. *Buchanania lenzen* (Chirongi) is also a red listed plant because its seeds are in high demand due to their medicinal properties as well as their uses as a dry fruit. *Solanum ferox* (Badi Kateli) is popularly used in Dashmularisht in Ayurveda for various diseases including swine flu and Dengue. It grows in wild but due to use of its roots in medicinal preparation the plant is threatened. *Leptadenia reticulata* (Jeevanti) is another threatened climber species that tribals reported highly effective but due to less availability of this small climber it is becoming less popular now a days. Tribals reported that earlier pregnant women and malnourished children were feed *Leptadenia reticulata* (Jivanti) as a vegetable to overcome Anaemia. Saharia tribe is main inhabitant of Shahabad Forest and they reported Resin of *Boswellia serrata* (Salai guggal or Dhoop) is very effective in Auto-immune diseases and globules made by drying resin is used as a painkiller by them. But main forest patch where this tree was in large numbers had been disturbed due to Infrastructural development. Now this tree is available in dense forest only and movement of wild animals like tiger and panthers made difficult the access of resin (Dhoop) for Saharias of this area. *Randia dumentorum* (Madanphal) is another species that we found in our research very effective but Meena tribals reported that now it is rarely seen in the Jhalawar forest area. *Holarrhena antidysentrica* (Krishn kutuj) is also widely used by tribals in various diseases like fever, dysentery, diabetes etc. An interesting fact tribals reported about it is used to make curd with latex of its leaves. Same interesting finding related with the plant *Cassia tora* (Chakramad /Pawad) has been reported by tribals of Baran area. Here people call it "Gao ka Thakur" (Head of the village) because of its utility as food, fodder, fuel and medicine. We find out that most of the cases in this area were reported by tribals were related with skin and oil extracted out from seeds of *Cassia tora* is highly effective to cure these

diseases. *Andrographis paniculata* (Kalmegh) and *Centella asiatica* (Mandookparni) are usually grown in the shady areas near water resources like riverbanks, ponds, Shallow water puddles during monsoon. But now encroachments destroyed their habitat so less availability is affecting medicinal values of these plants. Tribals reported that with first shower of monsoon small saplings of *Curculigo orchids* (Kali musli) was clearly seen on the slopes of hills in forest area of Rameshwar Mahadeo in Bundi and Shahabad Forest area but overharvesting to get maximum yield left no propagules for next season which is against the established tribal methodology of harvesting medicinal plants for their uses. These facts are alarming and thought provoking for the government agencies concerned with conservation of medicinal plants. *Soymida febrifuga* (Mansarohini) and *Gmelina arborea* (Gambhari) are having high rank among tribal medicines but study revealed very fewer trees are left in nearby areas so it is difficult to use them in preparations of herbal formulations. Bhagats and Ayurvedic doctors reported that it was mandatory for every hamlet to grow these two trees around in earlier times, but unfortunately both the species are threatened now in Hadoti region. Tribals of Ganeshpura and Mundiyyar Khoh has reported that root powder of *Grewia latifolia* (Gaangri/Nagbala) is used in Bone fractures since long by their fore fathers. This plant was found abundant in dry areas like Chambal Bihars but dying of this shrub due to extraction of roots made this species endangered.

Argyria speciosa (Vidhara) and *Celestrus paniculatus* (Jyotishmati / Malkangni) are highly effective medicinal plants reported by tribals but less availability restricts its uses. *A. speciosa* is highly valued as a vitalizer and nootropic. Seed oil of *C. paniculatus* is effective in paralysis and arthritis. It's utility as a nootropic medicine is also reported by tribals. Medicinal uses of *Ougeinia oojeinesis* (Tinish / Tinsa) is reported by very few people though the use of hard wood for making Wheels of chariot and curd churning pots is reported by aged persons. Arrival of modern agriculture tools and transportation facilities obsolete uses of bulk cart and chariots and the plant become endangered. Use of Sagwan as best timber wood is perfect example of ignorance for our local flora. Tinish can be used as quality and durable wood for furniture as well as its medicinal values. *Ougeinia oogenesis* is a tree species that can tolerate high temperature and less availability of water, so this species could be the perfect choice instead of Teakwood which needs more water to flourish.

This study revealed an interesting fact that aged tribals of Sitabari and Shahabad Forests in spite of being illiterate knew that *Aegle marmelos* and *Naringi crenulata* (Mahabilvparni / vinyasa) belongs to the same family. As earlier is considered form of Lord Shiva and later is form of Goddess parvati. Modern Taxonomy too put both species in same family Rutaceae. Uses of bark as face pack sunblock and improved fertility in women is considered as blessings of goddess Parvati. But young tribals are not aware of these facts and this is the reason of extinction of *Naringi crenulata*.

Table 4 Frequency of occurrence reported by Informants

S. No.	Frequency of occurrence	No. of Informants	Percentage	Normal distribution
1	Rarely seen	90	60.00	0.0038
2	Vulnerable	13	8.67	0.0152
3	Endangered	20	13.33	0.0175
4	Presently Safe	17	11.33	0.0166
5	Not Known	10	6.67	0.0141

Data in (Table 4) shows that the frequency of occurrence of selected 26 species on the basis of distribution in the Hadoti region. 60% of the species were reported as rarely seen due to

overharvesting in the study area. 13.3% Plant species were reported Endangered and 8.66% of the species were the most vulnerable in that area and the fight for their survival and

rest 11.33% of species were presently saved and found huge amount in the Hadoti region and mostly used by the aboriginals living here and depends on the forest for their food and medicine.

The survey revealed that major stack of ethno-medicines were taken internally, around 65% of informants reported this fact. During study several different methods were found for preparation of medicines used by them to treat human ailments. The most common was Infusion Reported by 131 informants followed by Extracts 115 informants powder form 104 informants direct eating 69 informants and poultice 37 informants. According to our study, in traditional herbal drugs, Infusion can be considered one of the common forms of herbal formulation because it is very easy to prepare simply by boiling plant parts like leaves, tender stem or seeds in water. Ethno-medicines were prepared as pellets, juice, band and fumes in very few cases.

The use of water as dilutant was reported in most of the medicines by locals. Some other useful dilutant were reported milk preferably cow milk, clarified butter and different oils like *Ricinus communis*, *Seasamum indicum*, and *Azadirachta indica*. Interestingly sugar is also reported in some of the medicines to reduce bitterness of some plant parts used for children. Tribals reported uses of medicines either based on single plant or a combination of several plant parts. During extensive study of the area, it was found that medicine men of these ethnic groups collected medicinal plants for their uses from different habitats. Mainly wild plants were collected for drug preparations but in few cases cultivated plants were also

used for the treatments. Wild plants were collected in appropriate seasons from nearby hills, dense forest area, barren lands and riverbanks etc. This knowledge of collecting plant material from wild in appropriate season and their place of occurrence is pass on from generation to generation and often kept secret. Preparations are given in the form of powder, paste, juice, decoction, infusion and hot application or Poultice etc.

In order to verify its accuracy and credibility, the data that were collected were run through a series of repeated inquiries with a variety of regional herbalists during a number of different seasons. In any event, no information was acknowledged because it lacked independent verification from genuine plant species. The plants that were collected in this manner were identified with the assistance of the flora of Rajasthan, and herbarium specimens were produced in accordance with the methodology described by Lawrence [16] and Jain and Rao [17].

For the preparation of drugs, the healers mainly use two methods. Firstly, drug preparation was done by shade drying and then pounding of the plant parts for preparation of powder and used to make decoction. Direction of supervision and dosage 63% percent of the healer remedies were applied orally while 23% were applied on the skin and 6% administrated through the nasal passage. As study was conducted in forest areas, significant cases of snake bite were reported by locals. So, it was found that, 80% remedies used as anti-venom were given orally in form of infusion or decoction and 20% were applied locally on the affected area. Most of the time durations of treatments were 2-3 days [18].

Table 5 Mode of treatment used by informants

S. No.	Plant form used for treatment	No. of Informants	Percentage	Normal distribution
1	Infusion	131	87.33	0.0063
2	Extract	115	76.67	0.0102
3	Powder	104	69.33	0.0129
4	Paste	82	54.67	0.0158
5	Raw / Direct consumption	69	46.00	0.0152
6	Oil and poultice	37	24.67	0.0084
7	Decoction	20	13.33	0.0045

Liquid formulations were usually given by measuring in spoon, cup or number of drops. During study it was found that the recommended dosage differs among informers for treating the same health problem. The reason must be that the doses for liquid preparations were prescribed through estimation in terms of cups, drops or spoons, depending upon the age of the patients being treated. Study found that there is no standardized measure followed on the dose of herbal remedies. This lack of agreement among the informants on doses of certain remedies prescribed and lack of precision on the dose is the main challenge for validation of their claims. The toxicity of some medicinal plants and their potential to do harm is also a big problem for traditional medicine to be standardized [19-21].

Common health problems like seasonal diseases usually treated with single fresh plant. However, for serious health problems mixtures of different plants sometimes fresh but mostly dried powders were used. This fact also supported by their belief on the synergic effect of one plant on the other because combinations of more than one plant cure diseases fast. Herbal practitioners like Ayurvedic doctors reported same plants used in Ayurveda like tribals use them but Ayurveda recommend a fixed formula for every ailment. So, decoctions are more common mode of administration by Ayurvedic doctors. Whereas tribals use most of the medicines directly by chewing them fresh or dried in the form of powders or infusions which is easy to make. Ayurvedic practitioners use formulas of

doses in a certain ratio that varies with the age of patients as described in Ancient Ayurvedic Texts like Charak Samhita, Sushrut Samhita, Aditya Hridaya Strotam with advancement of modern practices, Ayurvedic doctors also started using Grams, Milliliter etc. instead of Ratti, Masha, and Tola etc., measuring methods of olden times. During this study we found that tribals mostly uses single plant preparations whereas Ayurvedic doctors uses more than one plant preparations to cure the diseases. By validating tribal information From Local Ayurvedic doctors and Other Medicinal men gives us a clear knowledge about medicinal uses of plants that are locally available [22]. All the collected data were analyzed to fulfil requirements to justify object 2 mentioned at the beginning of the study. We prepared an account of 240 medicinal plants used by aboriginals in floristic survey and out of them selected 30 plants for data analysis on different parameters. These parameters were decided to find out plants with higher popularity and effect, their conservation status, occurrence, cultivation practices etc., in the study area. Out Of these selected 30 plants 6 Plants has been selected for analysis of antioxidant Potential. All 6 plants were used extensively by locals in the past because of their high effectiveness but now they become endangered. So, it has been imperative to study their antioxidant potential to validate tribal claims about being highly effective and to make conservation strategies accordingly to save them in their natural habitats [23].

CONCLUSION

From the aforementioned investigation, it can be concluded that the South-East region is rich with ethno-

medicinal knowledge of using various plant parts for therapeutic purposes which may be used to explore these medicinally important plants to find out bioactive compounds for formulation of new drugs.

LITERATURE CITED

1. Jain SK. 1987. Ethnobotany in the context of National priorities and health care programmes. A Manual of Ethnobotany.
2. Nadaf M, Amiri MS, Joharchi MR, Omidipour R, Moazezi M, Mohaddesi B, Mottaghipisheh J. 2023. Ethnobotanical diversity of trees and shrubs of Iran: A comprehensive review. *International Journal of Plant Biology* 14(1): 120-146.
3. Chopra AS. 2003. Āyurveda. *Medicine Across Cultures: History and Practice of Medicine in Non-Western Cultures*. pp 75-83.
4. Vijayalakshmi M, Ruckmani K. 2016. Ferric reducing anti-oxidant power assay in plant extract. *Bangladesh Journal of Pharmacology* 11(3): 570-572.
5. Hunde D, Asfaw Z, Kelbessa E. 2006. Use of traditional medicinal plants by people of 'Boosat' sub district, Central Eastern Ethiopia. *Ethiopian Journal of Health Sciences* 16(2): 141-155.
6. Yineger H, Yewhalaw D. 2007. Traditional medicinal plant knowledge and use by local healers in Sekoru District, Jimma Zone, Southwestern Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 3(1): 1-7.
7. Teklehaymanot T, Giday M. 2007. Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, Northwestern Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 3(1): 1-11.
8. Regassa R, Bekele T, Megersa M. 2017. Ethnobotanical study of traditional medicinal plants used to treat human ailments by Halaba people, southern Ethiopia. *Journal of Medicinal Plants Studies* 5(4): 36-47.
9. Alemayehu G, Asfaw Z, Kelbessa E. 2015. Ethnobotanical study of medicinal plants used by local communities of Minjar-Shenkora District, North Shewa Zone of Amhara Region, Ethiopia. *Journal of Medicinal Plants Studies* 3(6): 1-11.
10. Mesfin F, Demissew S, Teklehaymanot T. 2009. An ethnobotanical study of medicinal plants in Wonago Woreda, SNNPR, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 5(1): 1-18.
11. Tlemcani S, Lahkimi A, Eloutassi N, Bendaoud A, Hmamou A, Bekkari H. 2023. Ethnobotanical study of medicinal plants in the Fez-Meknes region of Morocco. *Jr. Pharm. Pharm. Research* 11: 137-159.
12. Lulekal E, Asfaw Z, Kelbessa E, Van Damme P. 2013. Ethnomedicinal study of plants used for human ailments in Ankober District, North Shewa Zone, Amhara region, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 9: 1-13.
13. Ramesh P, Palaniappan A. 2023. *Terminalia arjuna*: A cardioprotective herbal medicine—relevancy in the modern era of pharmaceuticals and green nanomedicine- A review. *Pharmaceuticals* 16(1): 126.
14. Radheshyam JB, Singh R, Maurya PS, Singh R. 2022. A review on: Herbal, pharmacogenetic and pharmacological studies on Guggulu. *Jr. Pharmaceut. Research* 7(1): 139-144.
15. Vyas R, Kesari KK, Slama P, Roychoudhury S, Sisodia R. 2022. Differential activity of antioxidants in testicular tissues following administration of *Chlorophytum borivilianum* in gamma-irradiated Swiss Albino mice. *Frontiers in Pharmacology* 12: 3991.
16. Lawrence GHM. 1951. *Taxonomy of Vascular Plants*. Macmillan Co., New York. pp 823.
17. Jain SK, Rao RR. 1977. *A Handbook of Field and Herbarium Methods*. Today & Tomorrow's Printers and Publishers, New Delhi.
18. Singh GS. 1999. A contribution of ethnomedicine of Alwar district of Rajasthan. *Ethnobotany* 11: 97.
19. Choudhary K, Singh M, Pillai U. 2008. Ethnobotanical survey of Rajasthan- An update. *Am. Eurasian Jr. Botany* 1(2): 38-45.
20. Sharma H, Kumar A. 2011. Ethnobotanical studies on medicinal plants of Rajasthan (India): A review. *Journal of Medicinal Plants Research* 5(7): 1107-1112.
21. Meena KL, Yadav BL. 2010. Some ethnomedicinal plants of Southern Rajasthan. *Indian Journal of Traditional Knowledge* 9(1): 169-172.
22. Sharma L, Khandelwal S. 2010. Traditional uses of plants as cooling agents by the tribal and traditional communities of Dang region in Rajasthan, India. *Ethnobotanical Leaflets* 14: 218-224.
23. Katewa SS, Chaudhary BL, Jain A, Galav PK. 2003. Traditional uses of plant biodiversity from Aravalli hills of Rajasthan. *Indian Jr. Traditional Knowledge* 2(1): 27-39.