VOLUME 11 ISSUE 2 2025

ISSN 2454 – 3055

INTERNATIONAL JOURNAL OF ZOOLOGICAL INVESTIGATIONS

Forum for Biological and Environmental Sciences

Published by Saran Publications, India

International Journal of Zoological Investigations Vol. 11, No. 2, 471-483 (2025)

International Journal of Zoological Investigations
Contents available at Journals Home Page: www.ijzi.net
Editor-in-Chief: Prof. Ajai Kumar Srivastav
Published by: Saran Publications, Gorakhpur, India

ISSN: 2454-3055

Investigation into Ethnomedicinal Plants in the Karur District of Tamil Nadu, Southern India

Auxilia A.[1*], Francis Xavier T.[2] and Kannan M.[3]

[1]Department of Botany, Holy Cross College (Autonomous) (Affiliated to Bharathidasan University), Tiruchirappalli, Tamil Nadu, India
[2]Department of Botany, St. Joseph's College (Autonomous) (Affiliated to Bharathidasan University), Tiruchirappalli, Tamil Nadu, India
[3]Vivekanandha College of Arts and Science for Women, Thiruchengode, Namakkal, India

**Corresponding Author*

Received: 2nd October, 2024; **Accepted:** 2nd February, 2025; **Published online:** 9th September, 2025

https://doi.org/10.33745/ijzi.2025.v11i02.044

Abstract: The present study investigates the use of plants in traditional herbal medicine for treating diverse human ailments among local communities in Karur district. It aims to evaluate the consistency of knowledge among informants concerning medicinal plants suitable for various ailment categories and identify the most commonly used plant species for each category within the study area. Field research conducted between May 2014 and March 2015 involved documenting ethnomedicinal practices through interviews with local traditional healers, utilizing a semi-structured questionnaire to collect information on plant names, parts used, preparation methods, and other ingredients. Analysis using factors like Informant Consensus, Use Value, Fidelity Level, Relative Importance, and Novelty Index revealed a total of 65 medicinal plant species from 60 genera across 34 families, with herbs being the most common (46%), followed by trees and shrubs (21.5%). Leaves were the primary plant part used (69%), with paste being the prevalent method of preparation. These plants were employed to treat ailments categorized under 17 disease categories, with gastrointestinal ailments having the highest number of species used (22). Notably, *Boerhaavia diffusa, Citrullus colocynthis, Nyctanthes arbor-tristis, Cocculus hirsutus*, and *Corallocarpus epigaeus* were identified as the most frequently used medicinal plant species in the study area, indicating their popularity among local communities.

Keywords: Consensus, Use value, Fidelity level, Relative importance, Novelty index

Citation: Auxilia A., Francis Xavier T. and Kannan M.: Investigation into ethnomedicinal plants in the Karur district of Tamil Nadu, Southern India. Intern. J. Zool. Invest. 11(2): 471-483, 2025.

https://doi.org/10.33745/ijzi.2025.v11i02.044

Introduction

Human beings have used medicinal plants for the treatment of diverse ailments for thousands of years (Sofowara, 1982; Hill, 1989). India has a rich culture of medicinal herbs and spices, which

includes about more than 2000 species and has a vast geographical area with high potential abilities for Ayurvedic, Unani, and Siddha traditional medicines but only very few have been studied chemically and pharmacologically for their potential medicinal value (Gupta *et al.*, 2005; Sandhu and Heinrich, 2005). According to the World Health Organization, most populations still rely on traditional medicines for their psychological and physical health requirements (Rabe and Van Stoden, 2000), since they cannot afford the products of Western pharmaceutical industries (Simon *et al.*, 1996), together with their side effects and lack of healthcare facilities (Govindarajan, 1980). Rural areas of many developing countries still rely on traditional medicine for their primary health care needs and have found a place in day-to-day life. These medicines are relatively safer and cheaper than synthetic or modern medicine (Iwu *et al.*, 1999; Idu *et al.*, 2007; Mann *et al.*, 2008; Ammara *et al.*, 2009). People living in rural areas from their personal experience know that these traditional remedies are valuable source of natural products to maintain human health, but they may not understand the science behind these medicines, but knew that some medicinal plants are highly effective only when used at therapeutic doses (Maheshwari*et al.,* 1986; Van Wyk*et al.,* 2000). Traditional use of medicine is recognized as a way to learn about potential future medicines. Researchers have identified number of compounds used in mainstream medicine which were derived from "ethno medical" plant sources (Fabricant and Farnsworth, 2001). Plants are used medicinally in different countries and are a source of many potent and powerful drugs (Srivastava *et al.*, 2006; Mahesh and Sathish, 2008).

In the developed countries, 25 per cent of the medical drugs are based on plants and their derivatives (Principe, 1991). Ethnobotany is not new to India because of its rich ethnic diversity. Jain (1991) reported that there are over 400 different tribal and other ethnic groups in India. The tribals constitute about 7.5 per cent of India's population. During the last few decades there has been an increasing interest in the study of medicinal plants and their traditional use in different parts of India and there are many reports on the use of plants in traditional healing by either tribal people or indigenous communities of India (Natarajan and Paulsen, 2000; Harsha *et al.*, 2002; Chhetri *et al.*, 2005; Saikia *et al.*, 2006).

The objective of this study was to interact with local people, traditional healers and document their knowledge on medicinal plants, their usage and the types of diseases cured etc. Karur is one of the 32 districts in Tamil Nadu, India and the traditional healing systems are still used by some local healers here. The present day local healers are very old. Due to lack of interest among the younger generation as well as their tendency to migrate to cities for remunerative jobs, wealth of knowledge in this area is declining. So far no systemic ethnobotanical survey has been made in this area and this is the first report on the medicinal plants used by local traditional healers.

Materials and Methods

Study area and People

Tamil Nadu is endowed with a rich biodiversity. The main natural habitat types are forest, mountains, rivers, wetlands, mangroves and beaches. Tamil Nadu has a geographical area of 1, 30,058 km^2, which constitutes about 4 per cent of the country's total area. Tamil Nadu lies between 11° .00 to12°.00 north latitudes and 77°.28 to 78°.50 East longitudes. The total forest cover of Tamil Nadu is 21482 km^2 (16.52%) (Annamalai, 2004).

Karur district lies between 10.63 and 11.14 North latitude and 77° .90 and 78°.61 East longitude (Fig. 1). Karur town is located in the bank of Amaravathi river. The districts receive the rain under the influence of both southwest and northeast monsoons. The average annual rainfall of this district is 635.68 mm. Farmers of district of Karur are mainly engaged in the cultivation of rice. Other crops grown in the region are millets, cereals, pulses, sugarcane, groundnut and cotton.

Data collection

Local traditional healers having practical

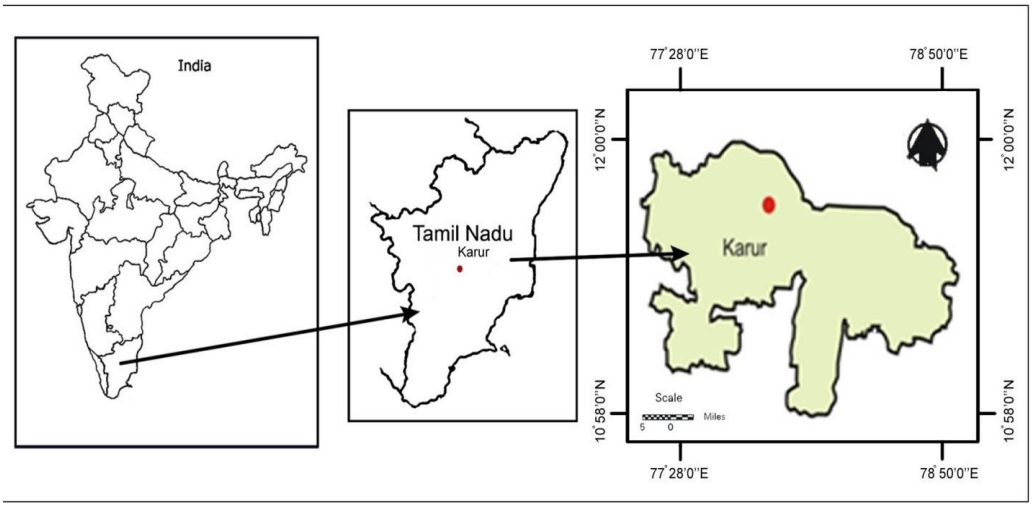

Fig. 1: Map showing the location of Karur District, Tamil Nadu, India.

knowledge of plants in medicine were interviewed in 5 villages of the district during May 2014 – March 2015. During the course of the study, methods of selecting the informants depend upon the distribution of local people having folk knowledge. They were requested to collect specimens of the plants they knew or to show the plant species on site. These informants were traditional healers themselves and had knowledge of the medicinal use of the plants. A total of twenty-five resource persons or informants or local traditional healers were identified to get the ethno medicinal information through direct interviews/ conversations. Information gathered from the traditional healers on local name of the plant, plant part used for curing, method of preparation, any other plants/agents used as ingredients, modes of administration, etc., were recorded for each collected ethno medicinal plants. The collected specimens were identified and authenticated with the help of valid references (Gamble and Fischer, 1921–1935; Henry *et al.*, 1987, 1989; Matthew, 1991; Bor, 1960) and further validated through herbarium referencing at the Department of Botany, St. Joseph's College, Tiruchirappalli, Tamil Nadu, India. Angiosperm phylogenic group III (APG III, 2009) was followed to classify the species. Nomenclature and correct author citation for all the species were thoroughly checked in (Tropicos, 2012) database.

Ailment categories

Based on the information obtained from the traditional healers in the study area, all the reported ailments were categorized into 17 categories viz. Circulatory system/ cardiovascular diseases (CSCD), General health (GH), Respiratory systems diseases (RSD), Poisonous bites (PB), Gastro-intestinal ailments (GIA), Genito urinary ailments (GUA), Endocrinal disorders (ED), Skeleto-muscular system disorders (SMSD), Central Nervous system (CNS), Cooling agent (CA), Dental care (DC), Kidney stone (US), Dermato-logical infections/diseases (DID), Liver problems (LP), Eye infection (EI), Hair care (HC), and Fever (Fvr).

Data analysis

Informant consensus factor (Fic)

The informant consensus factor (Fic) was used to see if there was agreement in the use of plants in the ailment categories between the plant users in the study area. The Fic was calculated by the following formula (Heinrich *et al.,* 1998):

$$Fic = \frac{Nur - Nt}{Nur - 1}$$

Where Nur refers to the number of use-reports for a particular ailment category and Nt refers to the number of taxa used for a particular ailment category by all informants. The product of this factor ranges from 0 to 1. A high value (close to 1.0) indicates that relatively few taxa are used by a large proportion of the informants. A low value indicates that the informants disagree on the taxa to be used in the treatment within a category of illness.

Use value (*UV*)

The relative importance of each plant species known locally to be used as herbal remedy is reported as the use value (UV) and it was calculated using the following formula (Phillips *et al.,* 1994):

$$UV = \frac{\sum U}{n}$$

Where UV is the use value of a species, U is the number of use reports cited by each informant for a given plant species and n is the total number of informants interviewed for a given plant. The UV is helpful in determining the plants with the highest use (most frequently indicated) in the treatment of an ailment. UVs are high when there are many use-reports for a plant and low when there are few reports related to its use.

Fidelity level (*FL*)

To determine the most frequently used plant species for treating a particular ailment category by the informants of the study area we calculated the fidelity level (FL). The FL was calculated using the following formula (Friedmen et al., 1986):

$$FL\ (\%) = \frac{Np}{N} \times 100$$

Where Np is the number of use-reports cited for a given species for a particular ailment category and N is the total number of use-reports cited for any given species. Generally, high FL s are obtained for plants for which almost all use-reports refer to the same way of using it, whereas low FLs are obtained for plants that are used for many different purposes (Srithi *et al*., 2009).

Relative importance (*RI*)

We calculated the relative importance (RI) of each medicinal plant based on the normalized number of pharmacological properties (PH) attributed to it and the normalized number of body systems (BS) it treated. Data on medicinal uses were organized according to the PH attributed to each taxon (e.g. analgesic, anti-inflammatory etc.) and to the specific body systems treated (e.g. skin diseases, fever, asthma etc.). The RI was calculated using the following formula (Bennett and Prance, 2000):

$$RI = \frac{RelPH+RelBS}{2} \times 100$$

Where RI is the relative importance, PH is the number of reported pharmacological properties for the given plant, Rel PH is the relative number of pharmacological properties (PH of a given plant/maximum PH of all reported species), BS is the number of body systems treated and Rel BS is the relative number of body systems treated (BS of a given plant/maximum BS of all reported species).

Results and Discussion

Documentation of Indigenous Ethnomedicinal Knowledge

In the present study, it was noted that 65 species from 60 genera and 34 different families are used as herbal solution for the treatment of more than a few ailments. Among them, 30 species were herbs, 14 species were shrubs, 14 species were trees and 7 species were climber (Fig. 2).

Life form and parts used

Among the life form and parts used, it is found that the herbs were the primary source of medicine (46%) followed by trees and shrubs (21.5%) and climber (10.7%). The frequent use of herbs among the indigenous communities is a result of wealth of herbaceous plants in their environs (Tabuti *et al*., 2003; Ayyanar and Ignacimuthu, 2005). Among the different plant part used, the leaves (74%) were most frequently used for the preparation of

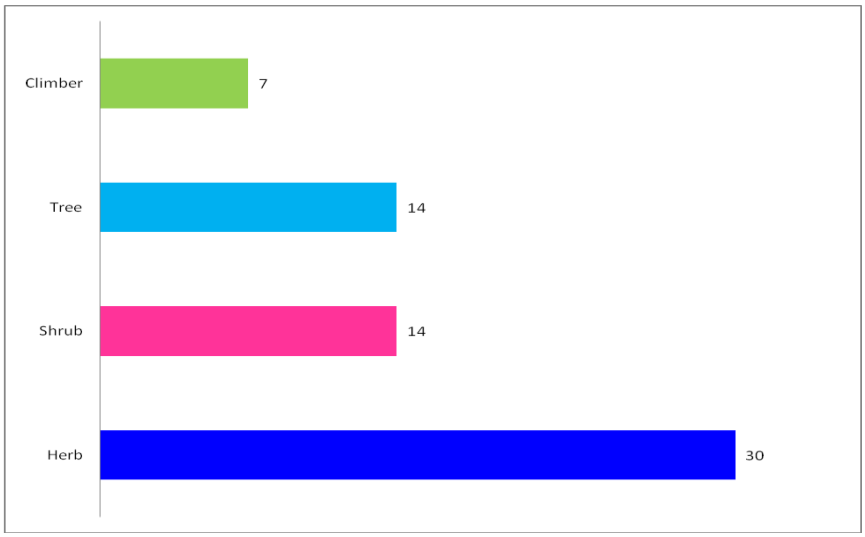

Fig. 2: Analysis of habit with respect to no. of species.

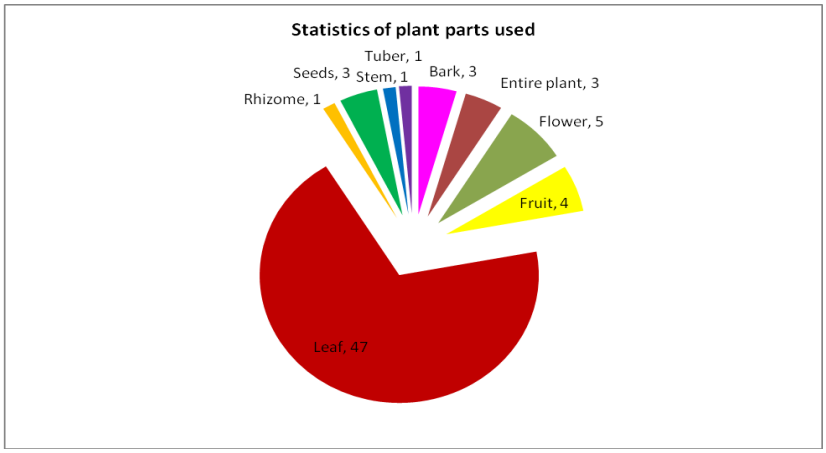

Fig. 3: Statistics of Plant parts used.

medicine solely or mixed with other plant parts. It was followed by flowers (7%), fruits (4%), bark (4%), entire plant (4%), seeds (4%), rhizome (1%), stem (1%) and tuber (1%) (Fig. 3). Many indigenous communities elsewhere also utilized mostly leaves for the preparation of herbal medicines (Cakilcioglu and Turkoglu, 2010; Gonzalez *et al*., 2010). The reason for why leaves were used mostly is that they are collected very easily than underground parts, flowers and fruits etc. (Giday, 2009) and in scientific point of view leaves are active in photosynthesis and production of secondary metabolites (Ghorbani, 2005). Figure 4shows the number of plants used for treating various diseases. Some remedies consist of single herbs but more than two herbs are reported in several preparations.

Karur local healers too frequently use some adjuvants such as honey, cow milk, calotropis latex, salt, gingelly oil, buttermilk, lemon juice, turmeric to improve the acceptability and medicinal property of certain remedies. The oils were commonly used for the preparation of paste/medicated oil. They were using specific plant parts and specific dosages for the treatment of diseases and the dose given to the patient depended on age, physical status and health conditions. Before giving treatment the condition

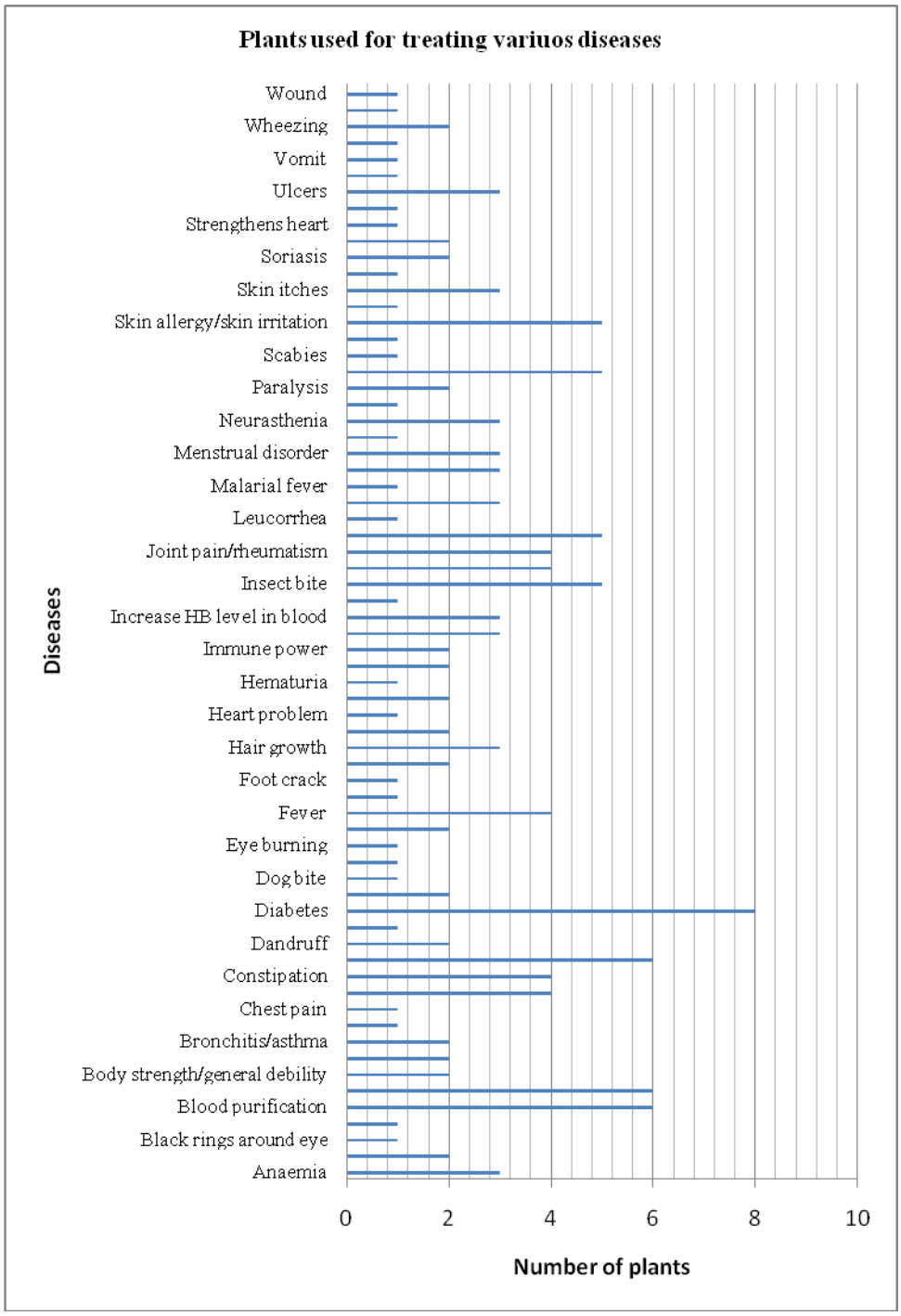

Fig. 4: Plants used for treating various diseases.

of the patient was observed deeply and then they gave the prepared medicines.

Plant use values

The most commonly used plant species was *Boerhavia diffusa* with 31 use reports by 26 informants giving the highest use value of 1.24; it is attributed to its use in the treatment of kidney stone, anaemia and jaundice, and it is well recognized by all the informants as most medicinal value. Other important plants with high use value was *Citrullus colocynthis* with 30 use reports by 26 informants giving the second highest use value of 1.2. *Citrullus colocynthis* is

mainly used in the treatment of various diseases, and it is well recommended plants by all informants. The plant with very low use value was *Anethum graveolens* (5 use reports by 26 informants with a use value of 0.2).

In general, scarce availability of the plants in the study area leads them to low UV. In the present study, plants reported with a low use value were *Anethum graveolens* (5 use reports by 26 informants), *Cassia senna* (6 use reports by 26 informants), *Cissus quadrangularis* (7 use reports by 26 informants), *Aristalochia bracteata* (7 use reports by 26 informants).

Informant consensus factor

Generally Fic of local knowledge for disease treatment depended on the availability of the plant species in the study area (Rajakumar and Shivanna, 2009). The Fic values in our study area ranged from 0.6 to 1. The use categories with more than 100 use reports were gastro intestinal ailments (177 use reports 22 plant species), dermatological infections/diseases (132 use reports 13 plant species). The least agreement between the informants was observed in Central nervous system and general health with a Fic of 0.6 and 0.72 followed by cooling agent (0.78), circulatory system (0.82), skeleton-muscular system (0.83), genitor-urinary ailments (0.85). Thus the study indicates the degree of knowledge shared by the users in the study area regarding the use of medicinal plants in the treatment of ailments are high. Gastro-intestinal ailments had the lowest Fic of 0.88, but this ailment category rank first in the number of use reports (177) and the number of taxa (22) and dermatological infection/ diseases had the lowest Fic of 0.9, but this ailment category rank second in the number of use reports (132) and the number of taxa (13) attributed to this category. It may be lack of communication among the informants in the study area who are practicing these ailment categories (Rajakumar and Shivanna, 2009).

Fidelity level

We analyzed the categories with major agreements to highlight the most important plants in each category of the reported plants, 20 species had highest fidelity level of 100% most of which were used in single ailment category with multiple informants. The maximum FL for the plants indicate the 100% choice of the interviewed informants for treating specific ailments and this could be an indication of their healing potential. In support to our study, 100% FL was reported in *Tridax procumbens* for swelling among the herbal healers in Tirunelveli hills of Western Ghats, India (Ayyanar and Ignacimuthu *et al*., 2011).

Relative importance

The plants with more number of pharmacological properties (PH) were *Tephrosia purpurea* (23 PH); it has a normalized PH value (relative number of pharmacological properties) of 1.00 (23/23). *Cassia auriculata* was employed in 7 body systems and have normalized BS value (relative number of body system treated) of 1.00 (7/7). *Moringa oleifera* and *Phyllanthus emblica* had the highest RI value of 66.5 followed by *Ficus racemosa* (61.5), *Cassia auriculata* (60.5), *Tribulus terrestris* (57.5), *Andrographis paniculata* (57), *Tephrosia purpurea* (57), *Sphaeranthus indicus* (57), *Cynodon dactylon* (57). These plants were also used to treat more body systems and were considered as the most resourceful taxa in the study area. A number of the remedial properties validate and authenticate the usages of these species for curative purposes in the study area.

Identification of New claims and reliability of reported uses

In the comparative analysis of present study reports with neighboring regions of Eastern Ghats, adjoining regions of India as well as other countries, there are 54 plant species have new medicinal uses (Figs. 5, 6). Medicinal plants which were used frequently in repetitive manner in any ailments could be more likely to have various bioactive compounds (Trotter and Logan, 1986; Senthilkumar *et al*., 2013). Many of the ethno-medicinal plants reported during present investigation were proved for various biological

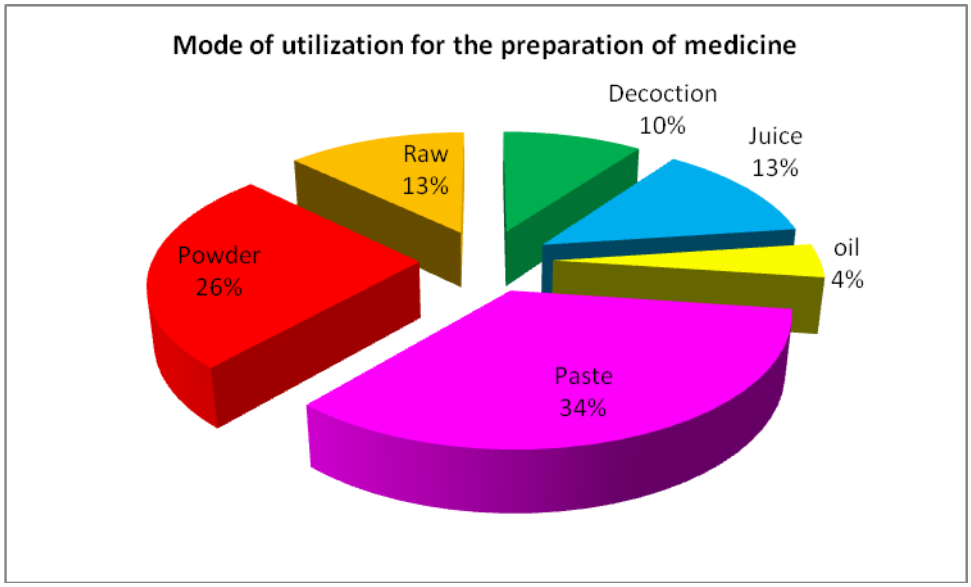

Fig. 5: Categories of Karur local healers mode of utilization for the preparation of medicine.

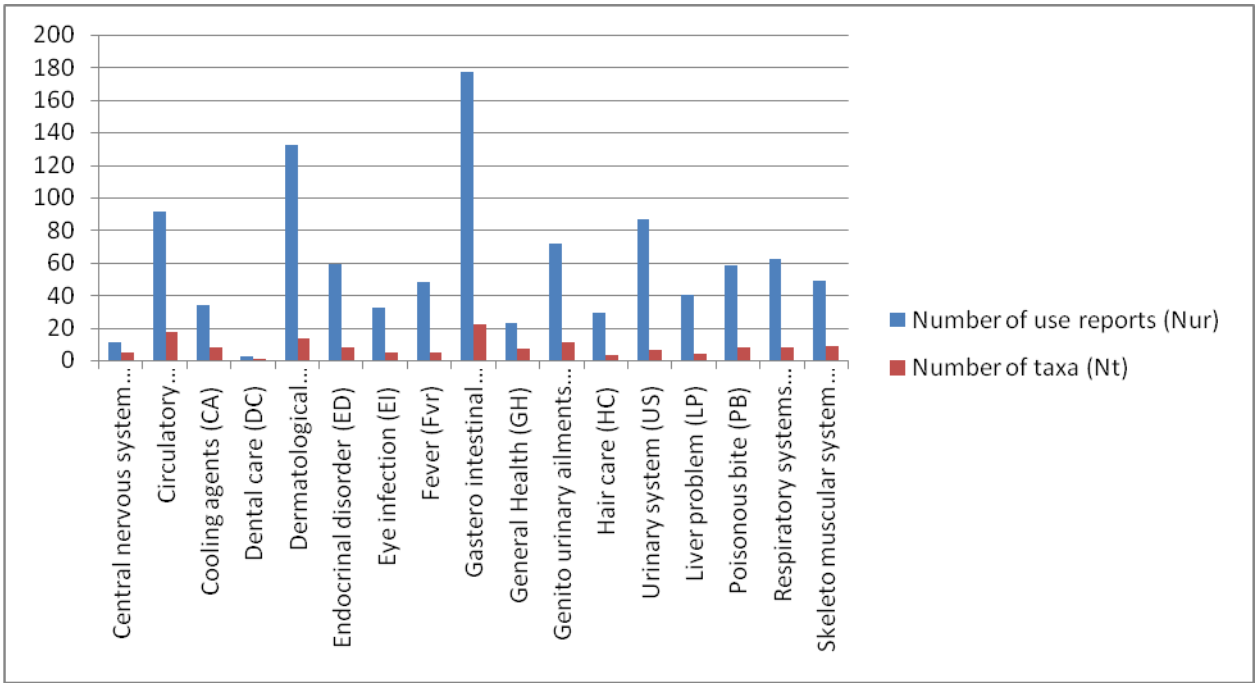

Fig. 6: Categories of ailments treated by Karur local healers arranged by number of use reports.

activities and bioactive compounds with therapeutical properties. Among them *Cardiospermum halicacabum* is a scientifically proven ethnomedicinal plant of study area is used for anti arthritic activity (Jeyadevi *et al.*, 2012). The anti-arthritic activity of ethanol extract of *Cardiospermum halicacabum* (EECH) was evaluated against CFA (Complete Freund's Adjuvant) induced arthritis in albino wistar rats by Complete Freund's Adjuvants. Oral doses of 250 and 500 mg/kg exhibited a significant protective effect in mice. Diclofenac sodium was used as reference standard. The LC/MS/MS analysis indicated the presence of anti-inflammatory compounds Luteolin-7-Oglucuro-nide, apigenin-7- Oglucuronide and Chrysoeriol. These findings lend pharmacological support to the reported folkloric use of *Cardiospermum*

halicacabum in the treatment and management of painful arthritic inflammatory conditions.

Similarly *Cassia auriculata* was scientifically evaluated for its hypoglycemic action using animal model (Singaravelu *et al*., 2013). *In vivo* studies were made to assess the antidiabetic activity of the isolated compound (5 mg/kg b.w.) namely propionic acid. The level of blood glucose returned to near normal concentrations in diabetic rats treated with isolated compound and with reference glibenclamide. The hepatotoxic effect of *Citrulluscolocynthis* was also supported by Mukerjee *et al*. (2012). In their study, they evaluated the hepato- protective activity of the ethanolic extract of the roots of *Citrullus colocynthis* in rats using Carbon tetrachloride (CCl_4) model. Two pure compounds were isolated such as Cucurbitacin-B and Colocynthin. Both were found active in CCl_4 model at 50 mg/kg dose whereas drug Silymarin showed reduction at 25 mg/kg dose level.

The *Syzygium cumini* has been in use by the local healers in Karur district as a means of treating diabetes. This claim is proven scientifically by administration of ethyl acetate and methanol extracts (200 and 400 mg/kg) which showed significant decrease ($p<0.05$) in blood sugar level. The isolated compound, mycaminose at a dose level of 50 mg/kg also showed significant decrease ($p<0.05$) in blood sugar level of diabetic rats (Kumar *et al*., 2008). *Aegle marmelos* is another medicinal plant which is reported in the present study for the management of gastric ulcers. This was also scientifically supported by the studies made by Sharma *et al*. (2011) on ulcer healing potential of *Aegle marmelos* fruit seed. The ethanolic extract at the doses of 200 and 400 mg/kg had shown more than 70% protection from ulcer in indomethacin induced ulceration and aqueous extract of *Aegle marmelos* seed at 200 mg/kg b.w. and 400mg/kg b.w., had also shown significant effects. This was due to the presence of 400% more quercetin equivalent substances than in aqueous extract and further supported that *Aegle marmelos* was found to possess antiulcerogenic as well as ulcer healing properties.

Novelty index

The present study results were comparatively analyzed with neighboring regions of India as well as with aligned countries. For comparative analysis, published research articles were selected randomly. In neighboring regions of India all studies published from 2011-2015 were taken for analysis while from aligned countries seven research articles from 2006-2014 were analyzed. It was noted that majority of the medicinal plants reported in the present investigation are confined to the neighboring regions in India. Many of the plants reported in the present investigation were also widely distributed in aligned countries due to their adaptability in different ecological zones. In comparative analysis many new medicinal uses were reported. Among all medicinal plants reported in Karur district, Tamil Nadu, India, there are 26 (40%) medicinal plants (*Acalypha alnifolia*, *Anethum graveolens*, *Aristolochia bracteata*, *Barleria cuspidata*, *Cassia auriculata*, *Cassia senna*, *Clausena dentata, Cocculus hirsutus*, *Commelina benghalensis*, *Corallocarpus epigaeus*, *Enicostema axillare*, *Erythrina indica*, *Ficus racemosa*, *Hybanthusennea spermus, Hygrophila auriculata*, *Mukiamader aspatana*, *Murraya koenigii, Nyctanthes arbor-tristis, Ormocarpum sennoides*, *Pisonia grandis*, *Randia dumetorum*, *Rhinacanthus nasutus*, *Rosa indica, Solanum trilobatum*, *Sphaeranthus indicus* and *Tragia involucrata*) were recorded first time in the present study. Quantitative data between the medicinal plant uses in the present study and previous reports in the seven selected aligned countries were analyzed.

Conclusion

Our study reveals that plants are still a major source of medicine for the local traditional healers of our surveyed area, as modern health care facilities are still not sufficient. This report may represents a useful and long- lasting document, which can contribute to preserve knowledge on

the use of medicinal plants in this region and also stimulate the interest of future generations on traditional healing practices. The information provided in the study is limited and there is a scope to initiate further ethnobotanical study among the communities to gather information as far as possible. The ethnomedicinal plants observed in the present study with high fidelity level, informant consensus and use values should be investigated scientifically for various bioassays and toxicity. The medicated claims incorporated in the study need to be evaluated through phytochemical and pharmacological investigations to discover their potentiality as drugs.

Ethical Statement

The authors confirm that all ethical issues have been dealt with the research ethics guidelines provided by the Department of Botany, Holy Cross College (Autonomous) (Affiliated to Bharathidasan University), Tiruchirappalli, Tamil Nadu, India.

Author Contributions

Each author has equally collaborated in designing the research, conducting thorough analysis, and drafting the manuscript. All authors have read and agreed to the published version of the manuscript.

Acknowledgements

Authors wish to thank Rev. Dr. M. Pavulraj Michael SJ, Rector, Rev. Dr. K. Amal SJ, Secretary, Rev. Dr. M. Arockiasamy Xavier SJ, Principal, St. Joseph's College, Tiruchirappalli for providing laboratory facilities to carry out this research work. The authors gratefully acknowledge the Department of Science and Technology, Government of India, for providing support through the Fund for Improvement of S&T Infrastructure (FIST) programme at Holy Cross College (Autonomous), Tiruchirappalli.

Conflict of Interest

The authors declare no conflicts of interest.

References

Ahmad I, Ibrar M, Barakatullah and Niaz A. (2011) Ethnobotanical study of Tehsil Kabal, Swat District, KPK, Pakistan. J Botany 11: 368572.

Ammara H, Salma R, Farah D and Shahid M. (2009) Antimicrobial activity of some plant extracts having hepatoprotective effects. J Med Plant Res. 3(1): 20-23.

Annamalai R. (2004) Tamil Nadu biodiversity strategy and action plan – Forest Biodiversity. Tamil Nadu Forest Department, Government of India, Chennai.

APG III (2009) An update of the angiosperm phylogeny group classification for the orders and families of flowering plants. Botanical J Linnean Soc. 16: 105-121.

Aron N and Mehalingam P. (2014) An ethnobotanical study of medicinal plants used by the Paliyars aboriginal community in Virudhunagar District, Tamil Nadu, India. Indian J Traditional Knowledge 13(3): 613-618.

Arti S, Kumar SV, Pooja S and Sangeeta C. (2014) Studies on traditional knowledge of ethnomedicinal plants in Jawalamukhi, Himachal Pradesh, India. Int Res J Biol Sci. 3(10): 6-12.

Arunachalam K and Parimelazhagan T. (2011) Ethnomedicinal observations among Hooralis tribes in Kadambur hills, (Kalkadambur) Erode District, Tamil Nadu. Global J Pharmacol. 5(3): 117-121.

Ayyanar M and Ignacimuthu S. (2005) Traditional knowledge of Kanitribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. J Ethnopharmacol. 102: 246-255.

Ayyanar M and Ignacimuthu S. (2011) Ethnobotanical survey of medicinal plants commonly used by Kanitribals in Tirunelveli hills of Western Ghats, India. Ethnopharmacol. 134: 851-864.

Bennett B and, Prance GT. (2000) Introduced plants in the indigenous pharmacopoeia of northern South America. Econ Bot. 54: 90-102.

Bhaskar A and Samant LR. (2012) Traditional medication of Pachamalai Hills, Tamil Nadu, India. Global J Pharmacol. 6(1): 47-51.

Bor NL. (1960) The grasses of Burma, Ceylon, India & Pakistan. Pergamon Press, London.

Cakilcioglu U and Turkoglu I. (2010) An ethnobotanical survey of medicinal plants in Service (Elazig-Turkey). J Ethnopharmacol. 132: 165-175.

Chhetri DR, Parajuli P and Subba GC. (2005) Antidiabetic plants used by Sikkim and Darjeeling Himalayan tribes, India. J Ethnopharmacol. 99: 199-202.

Divya VV, Karthick N and Umamaheshwari S. (2013) Ethnopharcological studies on the medicinal plants used by kani tribes of Thachamalai hill,

Kanyakumari, Tamil Nadu, India. Int J Adv Biol Res. 3(3): 384-393.

Fabricant D and Farnsworth N. (2001) The value of plants used in traditional medicine for drug discovery. Environ Hlth Perspectives 109 (1): 69-75.

Friedmen J, Yaniv Z, Dafni A and Palewitch D. (1986) A preliminary classification of the healing potential of medicinal plants, based on a rational analysis of an ethno pharmacological field survey among Bedouins in the Negev desert, Israel. J Ethnopharmacol. 16: 275-287.

Gamble JS and Fischer CEC. (1921–1935) Flora of the Presidency of Madras. Vol. 1-3, Adlard and Son Ltd., London.

GhorbaniA. (2005) Studies on pharmaceutical ethnobotany in the region of Turkmen Sahara, north of Iran (Part 1): general results. J Ethnopharmacol. 102: 58-68.

Giday M, Asfaw Z and Woldu Z. (2009) Medicinal plants of the Meinit ethnic group of Ethiopia: an ethnobotanical study. J Ethnopharmacol. 124: 513-521.

Gonzalez JA, Garcia-Barrriuso M and Amich F. (2010) Ethnobotanical study of medicinal plants traditionally used in the Arribes del Duero, Western Spain. J Ethnopharmacol. 131: 343-355.

Govindarajan VS. (1980) Turmeric--chemistry, technology, and quality. Crit Rev Food Sci Nutr. 12(3): 199-301.

Gruyal AG, Rosario R and Palmes ND. (2014) Ethnomedicinal plants used by residents in Northern Surigao del sur, Philippines. Natural Prod Chem Res. 2(4): 1-5.

Gupta MP, Solis PN, Calderon AJ, Guinneau–Sinclair F, Correa M, Gladames C, Guerra C, Espinosa A, Alvenda GL, Robles G and Olampo R. (2005) Medical ethnobotany of the tribes of Bocas del Toro, Panama. J Ethnopharmacol. 96: 389-401.

Harsha VH, Hebbar SS, Hegde GR and Shripathi V. (2002) Ethno medical knowledge of plants used by Kunabi Tribe of Karnataka in India. Fitoterapia 3: 281-287.

Heinrich M, Ankli A, Frei B, Weimann C and Sticher O. (1998) Medicinal plants in Mexico: Healers' consencus and cultural importance. Social Sci Med. 47: 1863-1875.

Henry AN, Chitra V and Balakrishnan NP. (1987) Flora of Tamil Nadu, India. Series I: Analysis. Botanical Survey of India, Coimbatore.

Henry AN, Kumari GR and Chitra V. (1989) Flora of Tamil Nadu, India. Series I: Analysis. Botanical Survey of India, Coimbatore.

Hill AF. (1989) Economic botany: A text book of useful plants and plant products, 2nd edn., Mc Graw Hill Book Company, Inc., New York, pp. 560.

Hussain K, Farrukh Nisar M, Majeed A, Nawaz K and Bhatti KH. (2010) Ethnomedicinal survey for important plants of JalalpurJattan, District Gujrat, Punjab, Pakistan. Ethnobotanical Leaflets 14: 807-825.

Idu M, Omogbai EKI, Aghimien GEI, Amaechina F, Timothy O and Omonigho SE. (2007) Preliminary phytochemistry, antimicrobial properties and acute toxicity of *Stachytarpheta jamaicensis* (L.) Vahl. leaves. Trends Med Res. 2: 193-198.

Iwu MW, Duncan AR and Okon CO. (1999) New antimicrobial of plant origin. In: Perspective on new crops and new uses, (ed.) Janick J., Alexandra Press, VA.

Jain SK. (1991) Dictionary of Indian folk medicine and ethnobotany. Deep Publications, New Delhi.

Jaya Priya VK and Gopalan R. (2014) Ethnomedicinal studies in selected medicinal plants of Dhoni forest, Western Ghats, Kerala. Asian J Pharmaceut Clin Res. 7(3): 3-6.

Jeffrey Bose MF, Aron S and Mehalingam P. (2014) An ethnobotanical study of medicinal plants used by the Paliyarsaboriginals community in Virudhunagar District, Tamil Nadu, India. Indian J Traditional Knowledge 13(3): 613-618.

Jeyadevi R, Sivasudha T, Ramesh Kumar A and Kumar LD. (2012) Antiarthritic activity of the Indian leafy vegetables *Cardiospermum halicacabum* in Wistar rats and UPLC- QTOF-MS/MS identification of the putative active Phenolic components. Inflammation Res. 62 (1): 115-126.

Kaur I, Sharma S and Lal S. (2011) Ethnobotanical survey of medicinal plants used for different diseases in Mandi District of Himachal Pradesh. Int J Res Pharm Chem. 1(4): 1167-1171.

Kingston C, Jeeva GM, Kiruba S, Mishra BP and Kannan D. (2009) Indigenous knowledge of using medicinal plants in treating skin diseases in Kanyakumari District, South India. Indian Jf Traditional Knowledge 8(2): 196-200.

Kumar A, Ilavarasan R, Jayachandran T, Deecaraman M, Aravindan P, Padmanaban N and Krishnan MRV. (2008) Anti diabetic activity of *Syzygium cumini* and its isolated compound against Streptozotocin – induced diabetic rats. J Med Plants Res. 2(9): 246-249.

Lokho A. (2012) The folk medicinal plants of the Mao Naga in Manipur, North East India. Int J Scientif Res. Publications 2(6): 1-8.

Mahesh B and Satish S. (2008) Antimicrobial activity of some important medicinal plant against plant and human pathogens. World J Agri Sci. 4 (S): 839-843.

Maheshwari JK, Singh KK and Saha S. (1986) Ethnobotany of tribals of Mirzapur District, Uttar Pradesh. Economic Botany Information Service. NBRI, Lucknow.

Manikandan S. (2013) Ethnomedicinal flora of Ivanur Panchayat in Cuddalore District, Tamil Nadu, India. Int J Res Plant Sci. 3(2): 39-46.

Mann A, Banso A and Clifford LC. (2008) An antifungal property of crude plant extracts from *Anogeissus leiocarpus* and *Terminalia avicennioides*. Tanzania J Health Res. 10(1): 34-38.

Matthew KM. (1991) An excursion flora of Central Tamil Nadu. Rapinat Herbarium, Tiruchirappalli.

Maurya R and Dongarwar N. (2012) Studies on the uses of wild trees of Nagpur district. Int J Life Sci Pharma Res. 2(1): 21-24.

Mesfin K, Tekle G and Tesfey T. (2013) Ethnobotanical study of traditional medicinal plants used by indigenous people of Gemad District, Northern Ethiopia. J Med Plants Stud. 1(4): 32-37.

Morilla LJG, Sumaya NHN, Rivero HI and Madamba MRSB. (2014) Medicinal plants of the Subanens in Dumingag, Zamboanga del Sur, Philippines. International Conference on Food, Biological and Medical Sciences (FBMS-2014) Jan. 28-29, 2014 Bangkok (Thailand).

Mukerjee A, Mishra SB and Saraf S. (2012) Anti hepatotoxic potential of *Citrullus colocynthis* root extract, fractions and isolated compounds. J Exp Sci. 3(9): 43-45.

Muthu C, Ayyanar M, Raja N and Ignacimuthu S. (2006) Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu, India. J Ethnobiol Ethnomed. 2: 43.

Nandagopalan V, Anand SP, Lakshmi Praba A, Selvakumari U and Doss A. (2011) An ethnobotanical study in the Pudukottai District, South India. Asian J Exp Biol Sci. 2(3): 412-421.

Nasir TW, Mohammed MA and Jaya Raju N. (2011) Ethnobotanical survey of medicinal plants in the South East Ethiopia used in traditional medicine. J Complement Med Drug Discov. 1: 153-158.

Natarajan B and Paulsen BS. (2000) An ethnopharmacological study from Thane district, Maharashtra, India: Traditional knowledge compared with modern biological science. Pharma Bio. 38: 139-151.

Patale C, Nasare P and Narkhede S. (2015) Ethnobotanical studies on the medicinal plants of Darkasa hill range of Gondia District, Maharashtra, India. Int J Res Plant Sci. 5(1): 10-16.

Phillips O, Gentry AH, Reynel C, Wilkin P and Galvez-Durand BC. (1994) Quantitative ethnobotany and Amazonian conservation. Conserv Biol. 8: 225-248.

Prabu M and Kumuthakalavalli R. (2012) Folk remedies of medicinal plants for snake bites, scorpion stings and dog bites in Eastern Ghats of Kolli hills, Tamil Nadu, India. Int J Res Ayurvedha Pharm. 3(5): 696-700.

Principe P. (1991) Monetising the pharmacological benefits of plants. US Environmental protection Agency, Washington, D.C.

Quershi RA, Ghufran MA, Sultana KN, Ashraf M and Khan AG. (2006) Ethnobotanical studies of medicinal plants of Gilgit District and surrounding areas. Ethnobotany Resd Applications 5: 115-122.

Rabe T and Vanstoden J. (2000) Isolation of an antimicrobial sesquiterpenoid from *Warbugia salutaris*. J Ethnopharmacol. 73(1-2): 171-174.

Rahul J. (2013) An ethnobotanical study of medicinal plants in Taindol village, District Jhansi, Region of Bundelkhand, Uttar Pradesh, India. J Med Plants Stud. 1(5): 59-71.

Rajakumar N and Shivanna MB. (2009) Ethnomedicinal application of plants in the eastern region of Shimoga District, Karnataka, India. J Ethnopharmacol. 126: 64-73.

Rajamanoharan PRS. (2014) An ethnobotanical survey of medicinal plants in Sillalai, Jaffna, Northern Province, Srilanka. Int J Herbal Med. 1(6): 22-30.

Saikia AP, Ryakala VK, Sharma P, Goswami P and Bora U. (2006) Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. J Ethnopharmacol. 106(2): 149-157

Sandhu DS and Heinrich M. (2005) The use of health foods, spices and other botanicals in the Sikh community in London. Phytother Res. 19(7):633-642.

Sankaranarayanan S, Bama P, Ramachandran J, Kalaichelvan PT, Deccaraman M, Vijayalakshmi M, Dhamotharan R, Dananjeyan B and Sathya Bama S. (2010) Ethnobotanical study of medicinal plants used by traditional users in Villupuram district of Tamil Nadu, India. J Med Plants Res. 4(12): 1089-1101.

Sathyavathi R and Janardhanan KJ. (2011) Folklore medicinal practices of Badaga community in Nilgiri Biosphere Reserve, Tamil Nadu, India. Int J Pharma Res Develop. 3(2): 50-63.

Senthilkumar K, Aravindhan V and Rajendran A. (2013) Ethnobotanical survey of medicinal plants used by Malayali tribes in Yercaud Hills of Eastern Ghats, India. J Natural Remedies 13(2):118-132.

Shah A, Shah A, Marwat SK, Gohar F, Khan A, Bhatti KH, Amin M, Ud Din N and Zafar M. (2013) Ethnobotanical study of medicinal plants of Semi tribal area of Makerwal&Gulla Khel, Pakistan. American J Plant Sci. 4: 98-116.

Sharma GN, Dubey SK, Sati N and Sanadya J. (2011) Ulcer healing potential of *Aegle marmelos* fruit seed. Asian J Pharm Life Sci. 1(2): 172-178.

Shrivastava S and Kanugo VK. (2013) Ethnobotanical survey of Surguja district with special reference to plants used by Uraon tribe in treatment of diabetes. Int J Herbal Med. 1(3): 127-130.

Simon A, Allais DP, Duroux JL, Basly JP, Durand-Fontanier S and Delage C. (1998) Inhibitory effect of curcuminoids on MCF-7 cell proliferation and structure-activity relationships. Cancer Lett. 129(1): 111-116.

Sindhu S, Uma G and Kumudha P. (2012) Survey of medicinal plants in Chennimalai Hills, Erode Districts, Tamil Nadu. Asian J Plant Sci Res. 2(6): 712-717.

Sisubalan K, Velmurugan S, Malayaman V, Thirupathy S, Ghouse Basha MH and Ravi Kumar R. (2014) Ethnomedicinal studies on villages of Thenpuranadu, Tamil Nadu, India. Spatula DD. 4(1): 41-47.

Smita R, Sangeeta R, Kumar SS, Soumya S and Deepak P. (2012) An ethnobotanical survey of medicinal plants in Semiliguda of Koraput District, Odisha, India. Botany Res Int. 5(4): 97-107.

Sofowora A. (1982) Medicinal plants and traditional medicine. John Wiley & Sons Ltd. New York, pp. 179.

Srithi K, Balslev H, Wangpakapattanawong P, Srisanga P and Trisonthi C. (2009) Medicinal plant knowledge and its erosion among the Mien (Yao) in northern Thailand. J Ethno Pharmacol. 123: 335-342.

Srivastava L and Vietmeyer V. (2006) Medicinal plants: An expanding role in development. World Bank Technical Paper. No. 320.

Tabuti JRS, Lye KA and Dhillion SS. (2003) Traditional herbal drugs of Bulamogi, Uganda: plants, use and administration. J Ethnopharmacol. 88: 19-44.

Teklehaymanot T and Giday M. (2007) Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, North Western Ethiopia. J Ethnobiol Ethnomed. 3(12): 1-11.

Tropicos (2012) Electronic database. http://tropicos.org/

Trotter RT, Trotter RT and Logan MH. (1986) Informants consensus: a new approach for identifying potentially effective medicinal plants. In: Plants in Indigenous Medicine and Diet, (ed.) Etkin N.L., Redgrave Publishing Company, Bedford Hill, NY, pp. 91–112.

Van Wyk BV, Gericke N and Van Oudtshoorn B. (2000) Medicinal plants of south africa. Briza Publications. Pretoria, South Africa, pp. 274.

Venkatachalam M, Singaravelu G, Govindaraju K and Jong SA. (2013) PTP 1B inhibitory action of a phytochemical propanoic acid 2(3- acetoxy-4,4,14-trimethyl androst – 8-en – 17-yl). Curr Sci. 105(6): 827-831.