CHAPTER-12

SUMMARY AND CONCLUSIONS

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The Present research work was carried out in Shivpuri & Raghogarh regions of Madhya Pradesh. Comparative ethnobotanical study of these two geographic regions has not been done before. To fulfill the above gap ethnobotanical surveys were conducted from Jan 2012 to Oct. 2015. The Present research work was carried out in 60 villages of Shivpuri & Raghogarh regions. During the ethobotanical survey a total of 100 informants were interviewed. The Present study is mainly focused on use of different plant species in different use categories. The present study was designed to document and compare the traditional knowledge of tribal and rural people of Shivpuri & Raghogarh regions. The summary of different chapters is as follows.

1. Introduction:-

This chapter is dedicated to introduction of ethnobotany, general account of study region, tribals of study regions, comparative ethnobotany quantitative analysis and qualitative phytochemical analysis.

Ethnobotany is the study of the relationship between plants and people 'ethno' – study of people and 'botany' – study of plants. Ethnobotany is considered a branch of ethnobiology. Ethnobotany studies the complex relationship between (uses of) plants and cultures. The focus of ethnobotany is on, how the plants have been used, managed and perceived in human societies and includes uses of plants for food, medicines divination, cosmetics, dying, and textiles, for building tools, currency, clothing, rituals, social life and music.

Ethnobotany is a rapidly expanding science. In the last nearly three decades it has considerably expanded, both in its concept and scope. Beginning with study of plants used by tribals for food, medicine and shelter it now includes studies like conservational practices of tribals, ethnopharmacology, ethnomusicology, ethnopharmacognosy, ethnogynaecology, etc. The literature on the subject is piling up at a very rapid pace.

Shivpuri is the northern district of Madhya Pradesh state with beautiful landscape consisting of small hills and deciduous forests. Shivpuri has a total area of 10,278 square kilometers and a population of 1,726,050 (Census 2011).

The Shivpuri district is inhabited by a large number of Sahariyas. The population of Sahariyas is about 227802.Which is about 13.19 percent of the total population. (Census 2011) The traditional occupation of Sahariyas is working in forest and agriculture. The

name Sahariya probably means inhabitants of the jungle. They have faith in good and bad powers of plants, taboos, sacred plants and worship them on folklore.

Raghogarh in Guna district of Madhya Pradesh is the gate way of Malwa and Chambal region. It is located on the north-eastern part of Malwa plateau. Western boundary of Raghogarh is well defined by Parvati River. Parbati is the main river flowing along the western boundary touching Raghogarh district of Madhya Pradesh, Jhalawar and Kota districts of Rajasthan.

As per the 2011 India census Raghogarh has a total population of 160397 the Raghogarh tehsil of Guna district is inhabited by large number of Sahariyas. The total number of Sahariyas is 15775 which are about 9.83 percent of total population.

Sahariya is the major tribe in both Shivpuri and Raghogarh regions. In Shivpuri the Sahariyas are living since a long time and they prefer to live near forest areas. In Raghogarh the Sahariyas are comparatively less in number and most of them are migrated from Guna, Shivpuri and Sheopur regions. They earn their livelihood as labourer in forest and agriculture working. In Shivpuri a number of clans of Sahariya tribe are residing in different blocks. These clans are Parmar, Devaria, Piper Barodia, Mohania, Pallia etc. In Raghogarh only a few clans are residing in different villages. These clans are Bajulla, Karoria, Sonaria, Piper Barodia etc. The economic status of Sahariya tribe in both regions is similar but Sahariyas living in Shivpuri are mostly dependent on forest produce for their source of income and they have good knowledge about medicinal plants. They have a long cultural heritage.

Comparative ethnobotany is an important avenue to study the effects of ecological and cultural constrains on plant use patterns among the culturally identical or distinct groups. Comparative ethnobotany has always been an essential avenue contributing to the understanding of plant use patterns and factors that affect the use of plants among different populations inhabiting different environments (Ladio *et al.*, 2007). During the last two decades, there have been a number of comparative ethnobotanical studies stretching out from many regions of the world.

During the present study a comparative ethnobotanical study was undertaken to document plant species used for medicine, food, fodder, insectide, insect repellent, cordage, mat, basket brooms, gums, resin, agricultural implements and house building material, oil and oil seeds, musical instruments dyes, social and religious ceremonies.

During the present research work a total number of forty villages of Shivpuri and twenty villages of Raghogarh were visited to collect the ethnobotanical data. During the field

visits 60 key informants from Shivpuri and 40 informants from Raghogarh were interviewed. The field work was carried out from January 2012 to October, 2015.

In the last two decades many researchers formulated different indices in ethnobotany. These indices have been applied to ethnobotanical data gathered from various types of interviews or questionnaires in order to evaluate cultural preference and importance of different plant species to societies. In the present study quantitative analysis of ethnobotanical data have been done. For quantitative analysis different quantitative tools like Informant Consensus Factor (ICF), Fidelity Level (FL %), Importance Value (IVs)**,** Preference Ranking Method and Direct Matrix Ranking Method were employed to analyze the collected data.

The medicinal plants are important source for curing human diseases and play important role in healing because of the presence of phytochemicals in them. The phytochemicals are bioactive chemicals of plant origin. They found in different plant parts like leaves, bark, roots, flowers, fruits and seeds etc.

The qualitative analysis of phytochenmicals is very essential for identifying compounds present in the medicinal plants.

In the present study qualitative analysis was undertaken to investigate the phytochemical constituents of leaves of ten medicinal plants viz. *Bauhinia variegata* Linn. (Caesalpiniaceae), *Calotropis procera* (Ait.) R.Br. (Asclepiadaceae), *Catharanthus roseus* (Linn.) Don. (Apocynaceae), *Lantana camara* (Linn.)Var. (Verbenaceae), *Mangifera indica* Linn. (Anacardiaceae), *Moringa oleifera* Lamk. (Moringaceae), *Ocimum sanctum* Linn. (Lamiaceae), *Pithecellobium dulce* (Roxb) Benth. (Mimosaceae), *Solanum nigrum* Linn. (Solanaceae),*Tinospora cordifolia* (Willd.) Mier.ex Hook. f. and Th. (Menispermaceae).

2. Review of Literature:-

This chapter is devoted to detailed account of ethnobotanical works done in india and abroad. The review of literature is arranged under five heads starting from historical review of ethnobotany, worldwide ethnobotanical studies, ethnobotanical studies of India, studies on comparative ethnobotany, studies on qualitative phytochemical analysis of medicinal plants.

3. Aim and objectives:-

This chapter is focused on aim and objectives of research work.

4. Historical account of Shivpuri and Raghogarh regions:-

This chapter is focused on important events of history of Shivpuri district. The district derives its names from lord 'Shiva'. In 3rd century B.C. Shivpuri was a part of Nanda and Mourya empires. In the beginning of the first century A.D. the Gwalior region, along with Shivpuri were under the rule of the Earlier Nagas. Padmavati or modern Padam Pawaya, Mathura and Kantipuri were the headquarters of Naga rulers. The earlier Nagas were supplanted by the Kushana rulers in the first century A.D. The later Nagas remained politically and socially prominent in this area during the 3rd and 4th centuries till their downfall at the hands of Samudragupta. During British period the history of Shivpuri coincides with that of Gwalior State. The 1804 the Shivpuri was taken over by Scindias. In 1859 the great freedom fighter Tatya Tope was hanged here.

The State of Raghogarh was carved out of the State of Guna. Initially Guna sees to be the part of Avanti Kingdom founded by Chand Pradyota Mahesena. Later on Shishusangh added the kingdom of Avanti which included Guna to the growing empire of Magadha. In the beginning of the 18th Century Chanderi was the part of Malwa and remaining portion of Guna formed the part of Raghogarh State. Later on Raghogarh was split into three State of which Garah and Dharnawada State among the three diamants of Raghogarh family. After the great revolt of 1857, Guna District thus passed under the control of Gwalior State with Raghogarh as its mandatory chief.

5. Physiography of Shivpuri and Raghogarh regions:-

This chapter is focused on location, physiographic division and forest of Shivpuri district. The Shivpuri district is divided into five physiographic regions. It is drained by three important rivers namely the Betwa, Sindh and Kuno. The total area of forests of Shivpuri is 102405 hectare. The natural forests of Shivpuri are divided into three main types. These are southern tropical dry deciduous forests. Northen tropical dry deciduous forests and Northern tropical thorn forests. The Madhav National park and Karera Sanctuary of Shivpuri is well known for its wild life and biodiversity.

The District of Guna is divided into 6 divisions from a topographical point of view. The Raghogarh Tehsil forms a part of the Sindh Valley and the wider part of the Malwa plateau. The valley and the open plateau together occupy the eastern part of the Raghogarh Tehsil.

Raghogarh town is situated on uneven ground, surrounded by hillocks (Raghogarh protected forest) from three sides. It is situated on semi arid geological

formation. The strata found are – Hard Kopra at a depth of 6 feet. The rock formation is Deccan trap massive basalt ovarian by alluvial plain.

The drainage pattern of the area is generally towards north and northwest, because of higher elevation of hills in the south. The main River is Parvati, which is around 3 km outside the Municipal Limits. The other small rivers are Bandargarh and Chopet. The rivers because of their steep banks have not caused floods. On the banks of these river forests are thick and very deep ravines have been formed because of continued erosion.

The soil of the district can broadly divided into 3 major groups.

a) Clay soil associated with moderately stone of shallow depth occurring in well-drained moderately sloping plateau formed by severe erosion.
b) Very shallow, well-drained loamy soils associated with stone on gently sloping plateau formed by severe erosion.
c) Moderately deep to deep fine soil developed in very gentle sloping and well drained areas.

Physiographically, the major part exhibits a region of low level plateau plain of extrusive origin with terrace / rocky bench and flood plain (including in filled river bed) along the course of the rivers. The other landforms are low structural plateau and structural plains of Proterozoic rocks. The maximum and minimum elevations are 561 and 324 m above MSL at 9 km south of Aron in southern part and 31 km south west of Paron in the north western part of the district respectively. The district lies in the Yamuna drainage system. It drains by the Parbati and Kuno rivers, which are the tributaries of River Chambal. The eastern part of the district is drain by the river Sindh. The general flow direction of all the rivers is towards north with low gradient.

6. Climatology of Shivpuri and Raghogarh regions:-

This chapter is focused on climatologically data of Shivpuri and Raghogarh regions. The climate of Shivpuri district is characterized by a hot summer and general dryness except in the south west monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to about the middle of June. The period from mid June to about the end of September is the south-west monsoon season. October and November may be termed the post-monsoon or retreating monsoon season.

Raghogarh has a sub-tropical climate with hot summers from late March to early July, the humid monsoon season from late June to early October, and a cool dry winter from

early November to late February. Summers start in late March, and along with other cities like Nagpur and Delhi, are among the hottest in India and the world. Temperatures peak in May and June with daily averages being around 33-35˚C (93-95˚F), and end in late June with the onset of the monsoon, Raghogarh receives 970 mm (39 inch) of rain every year, most of which is concentrated in the monsoon months from late June to early October. August is the wettest month with about 310 mm (12 inch) of rain. Winter in Raghogarh starts in late October , and is generally very mild with daily temperatures averaging in the 14-16˚C (58 – 62˚F) range, and mostly dry and sunny conditions . January is the coldest month with average lows in the 5-7˚C range (40- 45˚F) and occasional cold snaps that plummet temperatures to close to freezing.

7. Social and economic status of Sahariya in Shivpuri and Raghogarh regions:-

This chapter is focused on Social and economic status of people of Sahariya. The Sahariyas are Negroties in race; they are medium-stature with dark complexion sharp featured. The dress of Sahariya man is simple they require a small dhoti, salooka (shirt) and a turbon (safa).Chappals are used rarely. The womens wear colourful dress and ornaments. The dress of women mainly consists of a lng skirt (lugda/Ghaghara) upper garments (angi/choli/saluk) and sari. The house(Tapra) of Sahariyas are very two slops type low land roofs of sometimes covered with grass or handmade tiles (Khapra).No windows are provided only one opening door provides, ventilation to the house. Domestic animals like cow, goat, sheep, pigs, hen etc. are kept either at the back side or one corner of the hut.They worship their gods namely Teja Ji, Bhim Deo, Nahar Singh etc.

Economically the Sahariyas are very poor. They work as labour in agriculture fields. They also collect minor forest product and sell these products in nearyby weekly markets.

8. Material and methods:-

This chapter is focused on location and people of study area, data collection and data analysis. Under the head study are the location and area of Shivpuri and Raghigarh regions is described. The population of Sahariya in eight blocks of Shivpuri district and twenty villages of Raghogarh region is presented in tables. More over the physical map of different blocks are presented with the name of surveyed villages.

For data collection 60 key informants were selected from different villages of different blocks of Shivpuri district and 40 key informants were selected from different villages of Raghogarh region. Most of the selected information was medicine men, some midwives

were also selected interview method, Plant interview Artefact interview, Group interview, Open ended interview, Semi-structured interview with key informants were conducted at various places. Questionnaires were used to record the information given by informants. The plant specimens were collected, dried, preserved and mounted on herbarium sheets. The voucher specimens were identified with the help of floras and central regional center Allahabad, a branch of Botanical Survey of India.

The quantitative data analysis was done by using different quantitative tools like ICF, FL % (Fidelity Level), IVs (Importance value of species), Direct matrix methods and Preference ranking.

Qualitative phytochemical analysis of some selected medicinal plants:-

The leaf extracts were tested for the presence of bioactive compounds by using standard methods. Trease and Evans, Horborne (1989).

The tests were conducted to record presence and absence of alkaloids, carbohydrates, glycosides, phytosterols, flavonoids, protein and amino acid, diterpens, phenols and tannins

9. Enumeration of Plants used Ethnobotanically:-

This chapter is devoted to the plants which are used ethnobotanically in both study regions. Plants used under different used categories are summarized as under.

A. Plants used for medicine:-

During the course of study many periodical surveys were conducted among the tribals and other rural people of selected 60 village of Shivpuri and 40 village of Raghogarh regions. The information pertaining to ethnomedicinal uses of plants was collected from 100 key informants and many knowledgeable men & women.

The plant species are enumerated alphabetically with their local name, family name, habit, ethonobotanical herbarium specimen number, ethnomedicinal use, dosage, duration and formulation. A total of 200 plant species in Shivpuri region and 110 plant species in Raghogarh region were enumerated which are used to treat different diseases/ disorders of human beings.

B. Plants used for food:-

Different plants have different edible parts such as roots, shoots, seeds, fruits, leaves etc. These plant parts are eaten fresh or processed before consumption. During the study it was reported that in Shivpuri a total of 105 plant species are used for food. Out of these 105 plant species 55 species are wild and 50 are cultivated. In Raghogarh 34 wild and 50 cultivated plant species are used for food. The plant species used for food are listed

together with local name, family name, habit, region, plant part used and mode of preparation.

C. Plants used for fodder:-

During the study it was reported that in Shivpuri a total of 53 plant species are used for fodder. Out of these 53 plant species 48 species are wild and 5 are cultivated. In Raghogarh 29 wild and 4 cultivated plant species are used for fodder. The plant species used for fodder are listed together with local name, family name, habit, region, plant part used.

D. Plants used for house building and agricultural implements:-

During the study it was reported that in Shivpuri a total of 49 plant species are used for house building and agricultural implements. In Raghogarh 22 plant species are used for house building and agricultural implements. The plant species used for house building and agricultural implements are listed together with local name, family name, habit, region, plant part used, and tools.

E. Plants used for gum and resin:-

During the study it was reported that in Shivpuri a total of 8 plant species are used for gum and resin. In Raghogarh 3 plant species are used for gum and resin. The plant species used for gums and resin are listed together with local name, family name, habit, region, part used and used.

F. Plants used for oil:-

During the study it was reported that in Shivpuri a total of 9 plant species are used for oil plants. In Raghogarh 6 plant species are used for oil plants. The plants species used for oil plants are listed together with local name, family name, habit, region, part used and used.

G. Plants used for dye:-

During the study it was reported that in Shivpuri a total of 14 plant species are used for dye plants. In Raghogarh 8 plant species are used for dye plants. The plants species used for dye plants are listed together with local name, family name, habit, region, part used and used.

H. Plants used for musical instruments:-

During the study it was reported that in Shivpuri a total of 12 plant species are used for musical instruments. In Raghogarh 5 plant species are used for musical instruments. The plant species used for musical instruments are listed together with local name, family name, habit, region, part used and instruments.

I. Plants used for insecticide and insect repellent:-

During the study it was reported that in Shivpuri a total of 11 plant species are used for insecticide and insect repellent plants. In Raghogarh 9 plant species are used for insecticide and insect repellent plants. The plant species used for insecticide and insect repellent plants are listed together with local name, family name, habit, region, and plant part used.

J. Plants used for cordage, mat, basket and brooms:-

During the study it was reported that in Shivpuri a total of 30 plant species are used for cordage, mat basket and brooms plants. In Raghogarh 10 plant species are used for cordage, mat basket and brooms plants. The plant species used for cordage, mat basket and brooms plants are listed together with local name, family name, habit, region, part used and used.

K. Plants used for socio-religious ceremonies:-

During the study it was reported that in Shivpuri a total of 30 plant species. In Raghogarh 25 plant species are used for socio-religious plants. The plant species used for socio-religious plants are listed together with local name, family name, habit, region, part used and socio-religious importance.

10. Qualitative phytochemical analysis of some selected medicinal plants:-

This chapter is focused on qualitative phytochemical analysis of some medicinal plants. Fresh leaves of ten medicinal plants of *Bauhinia variegata* Linn. (Caesalpiniaceae), *Calotropis procera* (Ait.) R.Br. (Asclepiadaceae), *Catharanthus roseus* (Linn.) Don. (Apocynaceae), *Lantana camara* (Linn.)Var. (Verbenaceae), *Mangifera indica* Linn. (Anacardiaceae), *Moringa oleifera* Lamk. (Moringaceae), *Ocimum sanctum* Linn. (Lamiaceae), *Pithecellobium dulce* (Roxb) Benth. (Mimosaceae), *Solanum nigrum* Linn. (Solanaceae), *Tinospora cordifolia* (Willd.)Mier.ex Hook. f. and Th. (Menispermaceae), were collected from Shivpuri and Raghogarh region. They were identified in Taxonomy Division, Botanical Survey of India (BSI), Allahabad and herbarium deposited in Department of Botany Govt. S.M.S. Model Science College, Gwalior.

11. Result and discussion:-

This chapter is dedicated to result of my research work and discussion about the findings during the course of present research work. A total number of 264 plant species were listed for Shivpuri and 155 plant species for Raghogarh region. The 264 plant species reported in Shivpuri district belong to 219 genera and 76 families. The 155 plant species reported in Raghogarh region belong to 128 genera and 51 families. The ethnobotanical

study was conducted to report the traditional knowledge about the uses of plants in both study regions. A total of 11 use categories were considered during the ethnobotanical survey of study regions. In Shivpuri a total of 200 plant species and Raghogarh 110 plant species are used for the treatment of different diseases /disorders of study area. In Shivpuri a total of 105 plant species are used for food. Out of these 105 plant species 55 species are wild and 50 are cultivated. In Raghogarh 34 wild and 50 cultivated plant species are used for food. In Shivpuri a total of 53 plant species are used for fodder. Out of these 53 plant species 48 species are wild and 5 are cultivated. In Raghogarh 29 wild and 4 cultivated plant species are used for fodder. In Shivpuri a total of 49 plant species are used for house building and agricultural implements. In Raghogarh 22 plant species are used for house building and agricultural implements. In Shivpuri a total of 8 plant species are used for gums and resin. In Raghogarh 3 plant species are used for gums and resin. In Shivpuri a total of 9 plant species are used for oil. In Raghogarh 6 plant species are used for oil. In Shivpuri a total of 14 plant species are used for dye. In Raghogarh 8 plant species are used for dye. In Shivpuri a total of 12 plant species are used for musical instruments. In Raghogarh 5 plant species are used for musical instruments. In Shivpuri a total of 11 plant species are used for insecticide and insect repellent. In Raghogarh 9 plant species are used for insecticide and insect. In Shivpuri a total of 30 plant species are used for socio-religious. In Raghogarh 25 plant species are used for socio-religious. All the recorded plant species were tabulated in (table 11.3, 11.7, 11.8, 11.9, 11.10, 11.11, 11.12, 11.13, 11.14, 11.15, 11.16). Shivpuri and Raghogarh regions have a rich diversity of medicinal plants. The reported 264 total number of plant in Shivpuri belong to 219 genera and 76 families. The 155 plant species reported in Raghogarh region belong to 128 genera and 51 families. (Fig. 11.1) the Percentage of growth forms of plant species used for medicine is shown by (fig 11.4 and 11.5), The use frequency of different plant parts used for medicine is shown by fig. (11.8.), the percentage of different plant parts used for medicine is shown by fig. (11.6, 11.7,), the percentage of methods of remedy preparation for treatment of diseases is shown by fig (11.9, 11.10) it has observed that the leaves are used very frequently than other plant parts. Among the methods of remedy preparation decoction is used most frequently. Various types of diseases/ disorders of human beings and cattle's of study area are grouped into different disease categories. The number of plant species that are used to treat their different disease categories is shown by fig. (11.11). As a result of comparative analysis of ethnomedicinal plants it is recorded that 46 plant species are used for the treatment of

similiar disease/ ailments in Shivpuri and Raghogarh regions (table 11.5). It is also recorded that 63 species are used for the treatment of disimiliar disease/ ailments in Shivpuri and Raghogarh regions (table 11.6).

Percentage of growth forms of plant species used for food is shown by (fig 11.12, 11.13,), the use frequency of different plant parts used for food is shown by fig. (11.14.), the percentage of different plant parts used for food is shown by fig. (11.15, 11.16,), the percentage of methods of preparation of food is shown by fig. (11.17, 11.18).

Percentage of growth forms of plant species used for fodder is shown by (fig 11.19, 11.20,), the use frequency of different plant parts used for fodder is shown by fig. (11.21.), the percentage of different plant parts used for fodder is shown by fig. (11.22, 11.23).

Percentage of growth forms of plant species used for house building and agricultural implements is shown by (fig 11.24, 11.25,), the use frequency of different plant parts used for house building and agricultural implements is shown by fig. (11.26.), the percentage of different plant parts used for house building and agricultural implements is shown by fig. (11.27, 11.28).

The use frequency of different plant parts used for gum and resin is shown by fig. (10.29.), the percentage of different plant parts used for gum and resin is shown by fig. (10.30, 10.31).

Percentage of growth forms of plant species used for oil is shown by (fig 11.32, 11.33).

Percentage of growth forms of plant species used for dye is shown by (fig 11.34, 11.35,), the use frequency of different plant parts used for dye is shown by fig. (11.36.), the percentage of different plant parts used for dye is shown by fig. (11.37, 11.38).

Percentage of growth forms of plant species used for musical instruments is shown by (fig 11.39, 11.40,), the use frequency of different plant parts used for musical instruments is shown by fig. (11.41.), the percentage of different plant parts used musical instruments is shown by fig. (11.42, 11.43).

Percentage of growth forms of plant species used for insecticide and insect repellent is shown by (fig 11.44, 11.45,), the use frequency of different plant parts used as insecticide and insect repellent is shown by fig. (11.46.), the percentage of different plant parts used as insecticide and insect repellent is shown by fig. (11.47, 11.48).

Percentage of growth forms of plant species used for cordage, mat, basket and brooms is shown by (fig 11.49, 11.50,), the use frequency of different plant parts used for cordage,

mat, basket and brooms is shown by fig. (11.51.), the percentage of different plant parts used for cordage, mat, basket and brooms is shown by fig. (11.52, 11.53).

Percentage of growth forms of plant species used for socio-religious ceremonies is shown by (fig 11.54, 11.55,), the use frequency of different plant parts used in socio-religious ceremonies is shown by fig. (11.56.), the percentage of different plant parts used socio-religious ceremonies is shown by fig. (11.57, 11.58).

The data is also analyzed by employing five quantitative tools. These are ICF, FL%, IVs, Direct matrix methods and Preference ranking.

As a result of quantitative analysis it was concluded that a number of plant species have great healing potential. In Shivpuri ICF value of different disease categories ranges from 0.2560 - 0.826 (Table 11.17) which indicates greater agreement among the informants regarding the use of medicinal plants for the treatment of different diseases. High ICF values are very useful in the selection of specific plants for further search of bioactive compounds. The Raghogarh ICF value of different disease categories ranges from 0.571 - 0.923 (Table 11.18) which indicates greater agreement among the informants regarding the use of medicinal plants for the treatment of different diseases. High ICF values are very useful in the selection of specific plants for further search of bioactive compounds.

The Shivpuri FL% value of selected medicinal plants ranges from 38.46% to 100%. The highest FL% value (100%) was recorded for ***Acacia ferruginea* DC., *Acacia nilotica* (Linn.) Willd. ex Delite, Brassica *juncea* (Linn.) Czern., *Delonix regia* (Boj) ex. Hook. , *Emblica officinalis* Gaertn., *Gymnema sylvestre* (Retz.) R. Br. ex schult, *Ludwigia octovalvis* (Jacq) Raven., *Melia azedarach* Linn., *Pergularia daemia* (Forsk.) Choiv., *Phoenix sylvestris* Roxb., *Tamarindus indica* Linn., *Ziziphus nummularia* (Burm. f.) Wt. & Arn.** The FL% value of 40 medicinal plants reported from Shivpuri is shown in the table 11.19**.**

The high FL% value can be considered as an indicator for high healing potential of those plants used against the corresponding diseases.

In Raghogarh FL% value of selected medicinal plants ranges from 33.33% to 100%. The highest FL% value (100%) was recorded for ***Acacia ferruginea* DC., *Acacia nilotica* (Linn.) Willd. ex Delite, Brassica *juncea* (Linn.) Czern., *Delonix regia* (Boj) ex. Hook., *Emblica officinalis* Gaertn., *Gymnema sylvestre* (Retz.) R. Br. ex schult, *Ludwigia octovalvis* (Jacq) Raven., *Melia azedarach* Linn., *Pergularia daemia* (Forsk.) Choiv. *Phoenix sylvestris* Roxb., *Tamarindus indica* Linn., *Ziziphus***

***nummularia* (Burm. f.) Wt. & Arn.** The FL% value of 40 medicinal plants reported from Raghogargh is shown in the table (11.20).

The high FL% value can be considered as an indicator for high healing potential of those plants used against the corresponding diseases.

The Shivpuri IVs of selected medicinal plants ranges from 0.38 to 1. The high IVs values were recorded for ***Acacia ferruginea* DC., *Acacia nilotica* (Linn.) Willd. ex Delite, Brassica *juncea* (Linn.) Czern., *Delonix regia* (Boj) ex. Hook., *Emblica officinalis* Gaertn., *Gymnema sylvestre* (Retz.) R. Br. ex schult, *Ludwigia octovalvis* (Jacq) Raven., *Melia azedarach* Linn., *Pergularia daemia* (Forsk.) Choiv., *Phoenix sylvestris* Roxb., *Tamarindus indica* Linn., *Ziziphus nummularia* (Burm. f.) Wt. & Arn.** The IVs of 40 medicinal plants reported from Shivpuri is shown in the table (11.21).

The highest score for important value of these plant species indicates that these plants are therapeutically very important and the tribal and rural people of study area rely mostly upon them for effective treatment.

The Raghogarh IVs of selected medicinal plants ranges from 0.33 to 1. The highest IVs value was recorded for ***Acacia ferruginea* DC., *Acacia nilotica* (Linn.) Willd. ex Delite, Brassica *juncea* (Linn.) Czern., *Delonix regia* (Boj) ex. Hook., *Emblica officinalis* Gaertn., *Gymnema sylvestre* (Retz.) R. Br. ex schult, *Ludwigia octovalvis* (Jacq) Raven., *Melia azedarach* Linn., *Pergularia daemia* (Forsk.) Choiv., *Phoenix sylvestris* Roxb., *Tamarindus indica* Linn., *Ziziphus nummularia* (Burm. f.) Wt. & Arn.** The IVs of 40 medicinal plants reported from Raghogarh is shown in the table (11.22).

The highest score for important value of these plant species indicates that these plants are therapeutically very important and the tribal and rural people of study area rely mostly upon them for effective treatment.

Direct matrix ranking was conducted in order to compare multipurpose plants commonly reported by informants of both study areas. On the basis of relative benefits obtained from each plants, 11 multipurpose plants species were selected out of a number of multipurpose plants. These 11 plant species are used commonly in both the study areas. The direct matrix ranking was conducted for 5 use categories Medicine, food, house building, and socio-religious ceremonies of these 11 multipurpose use plants. Five informants were choosen from each study area to assign use values to each attribute (5 =

best, 4 = very good, 3 = good, 2 = less used, 1 = least used and o = not used). The result of direct matrix ranking is shown in table (11.23) and (11.24).

The result of direct matrix ranking shows that in Shivpuri ***Ficus benghalensis* Linn.,** ***Tamarindus indica* Linn.** was ranked first followed by ***Ziziphus mauritiana* Lamk.,** ***Emblica officinalis* Gaertn.,** ***Cynodon dactylon* (Linn.) Pers.,** ***Aegle marmelos* (Linn.) Correa,** ***Morus alba* Linn.,** ***Acacia arabica* Willd.,** ***Acacia leucophloea* (Roxb.) Willd.,** ***Butea monosperma* Lamk.Taub.,** ***Bauhinia variegata* Linn.,** In Raghogarh ***Tamarindus indica* Linn.** was ranked first followed by ***Ziziphus mauritiana* Lamk.,** ***Emblica officinalis* Gaertn.,** ***Cynodon dactylon* (Linn.)Pers.,** ***Ficus benghalensis* Linn.,** ***Aegle marmelos* (Linn.) Correa,** ***Morus alba* Linn.,** ***Butea monosperma* Lamk.Taub.,** ***Acacia arabica* Willd.,** ***Butea monosperma* Lamk. Taub.** ***Bauhinia variegata* Linn.**

In both study regions diarrhoea was reported to be the most common disease, during the ethnobotanical survey a number of informants of both regions gave information about many plants which can be used for the treatment of diarrhoea. Five medicinal plants which are found commonly in both the regions were selected for preference ranking. A total of six key informants were selected from each study area. The preference ranking of selected 5 medicinal plants used against diarrhoea in both study regions was conducted with the help of selected informants. The informants were asked to compare the given medicinal plants based on their efficacy against diarrhoea and to give the highest number (5) for the medicinal plants which they thought most effective in treating diarrhoea and the lowest number (1) for least effective plant. The result of preference ranking of medicinal plants used against diarrhoea in Shivpuri and Raghogarh regions is shown in table (11.25) and table (11.26).

The result of preference ranking of medicinal plants shows that in Shivpuri ***Feronia elephantum* Correa.** ***Morus alba* Linn.** was ranked first, followed by ***Ageratum conyzoides* Linn.,** ***Gymnosporia spinosa* (Forsk.) Fiori. ,** ***Murraya paniculata* (Linn.).** In Raghogarh ***Murraya paniculata* (Linn.) Jack.** was ranked first, followed by ***Ageratum conyzoides* Linn.,** ***Gymnosporia spinosa* (Forsk.) Fiori.,** ***Morus alba* Linn.,** ***Feronia elephantum* Correa.**

The result of preference ranking shows that the given medicinal plants were ranked differently by informants of two study regions. This indicates that due to geographical isolation, the informants of two study regions have different opinion about the effectiveness of medicinal plants used against diarrhoea.

Qualitative phytochemical analysis of some selected medicinal plants:-

From the qualitative analysis of leaves of selected ten medicinal plants, the presence or absence of carbohydrates, proteins, flavonoids, alkaloids, phenols, glycosides, phytosterol and diterpenes was investigated. The results of this study are shown in table 11.27.

The result of qualitative analysis of leaves of ten medicinal plants shows that carbohydrates, proteins, diterpenes and flavonoids were present in leaves of all ten medicinal plants studied. The alkaloids were found to be present in seven medicinal plants, *Bauhinia variegata* Linn., *Calotropis procera* (Ait) R.Br., *Catharanthus roseus* (Linn.) Don. *Moringa oleifera* Lamk., *Ocimum sanctum* Linn., *Pithecellobium dulce* (Roxb) Benth., *Solanum nigrum* Linn., Phytosterols were found to be present in five medicinal plants, *Bauhinia variegata* Linn. *Mangifera indica* Linn., *Moringa oleifera* Lamk., *Ocimum sanctum* Linn., *Pithecellobium dulce* (Roxb) Benth. Glycosides were found to be present in eight medicinal plants, *Bauhinia variegata* Linn. *Calotropis procera* (Ait) R.Br., *Catharanthus roseus* (Linn.) Don., *Lantana camara* (Linn.)Var., *Mangifera indica* Linn., *Moringa oleifera* Lamk., *Ocimum sanctum* Linn., *Solanum nigrum* Linn., phenols were found to be present in nine medicinal plants, *Bauhinia variegata* Linn., , *Calotropis procera* (Ait) R.Br., *Catharanthus roseus* (Linn.) Don., *Lantana camara* (Linn.)Var., *Mangifera indica* Linn., *Ocimum sanctum* Linn., *Pithecellobium dulce* Roxb.(Benth), *Solanum nigrum* Linn., *Tinospora cordifolia* (Willd.) Mier.ex Hook. f. and Th.

CONCLUSIONS

The present study for the first time documented the indigenous plant knowledge in two geographically isolated regions of Madhya Pradesh. Although both the study regions are not very far from each other but the people of Sahariya tribe residing in these two study regions use different number of plant species under different use categories. A number of plant species are used for the same purpose in both the regions but difference in use of many plant species is also exists in the two regions. As a result of study of inter-regional variation in ethnobotanical use of medicinal plants, it is concluded that social and natural factors are responsible for the difference in use of plant species in two study regions. The Shivpuri region is rich in biodiversity and the people of Sahariya tribe are residing since long time in this area. In Raghogarh region most of people of Sahariya tribe are migrated from nearby districts, therefore their cultural status is little different from Sahariyas of

Shivpuri. The people of old generation of Sahariya tribe living in both the study regions have deep knowledge about the medicinal use of different plant species.

As a result of quantitative analysis it is concluded that many plant species have great healing potential and these species are found in both the study regions. The qualitative phytochemical analysis of ten medicinal plants shows that due to presence of alkaloids, glycosides, phytosterols and diterpenes, these plants have high healing potential. On the basis of experience of present study some recommendations are as follows:

1. Herbal gardens should be developed in tribal areas of Shivpuri and Raghogarh regions.
2. The government of Madhya Pradesh should encourage the Sahariya tribe for cultivation of medicinal and multipurpose plants in their localities instead of collecting them from the forest.