Chapter-5

Summary and Conclusions
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The present thesis entitled "Ethnomedicinal, Phytochemical and Antimicrobial Studies of some Medicinal Plants of Sagar District" contains an investigation on medicinal plants of Sagar district used by tribes and indigenous people to cure number of diseases, phytochemical investigations of some selected plants and studies on antimicrobial efficacy of some medicinal plants. The observations have been grouped into five chapters followed by references.

Chapter-I: General Introduction:

The first chapter deals with the introductory theme of the thesis, the rationale for taking up the study, its scope and significance of present work.

Chapter-II: Ethnomedicinal Studies: -

Sagar district of Madhya Pradesh is situated at 23° 50'11" N Latitude and 78° 40'11" E Longitude on an average height of 517 M MSL in India occupying almost central position in the country. The main geological formations of district is basalt and vindhyan sandstone. The climate of the region is broadly characterized by
the typical central Indian type with three distinct seasons. The temperature varies between 8°C to 44°C and the average rainfall is 850-900 mm. The relative humidity varies from 50 to 90. Out of total 10,246 sq. km area, 3014 sq km area is covered with tropical dry deciduous forest of Sagar district. The area is rich in medicinal plants. Out of total 16.5 lakh population of Sagar district, 1.4 lakh belong to various tribes including mainly Gond, Kol, Sahariya, Bharia, Damar, Kanwar etc. and some migrated tribes of adjoining states.

These primitive people often use many common and uncommon local plants for treatment of their day to day ailments and diseases.

Review of literature included in this chapter highlights the ethnobotanical and ethnomedicinal work done in India.

Extensive field survey was carried out from 1991-1993 to collect valuable information on the uses of medicinal plants by the local inhabitants. Material and Methods provide details of the field collection, proforma of field and preservation of plant species in laboratory techniques to make herbarium.
In all 230 plant species of 187 genera and 78 families of ethnomedicinally important plants in Sagar district were collected. It was observed that 5 families were ethnomedicinally dominant, 13 were codominant and, 42 families were represented only by single genus and single species with medicinal importance. All plants were enumerated in Table:- 2.1. Further on the basis of curative properties of these plants, 22 diseases were separately described in Tabular form. (Table- 2.2. to 2.24).

The application of medicinal plants varied from root to leaves, stem, bark (root and stem), flowers, fruits, seeds, and gums etc. It was observed that the same plant is used for a number of diseases in different ways, whereas on other hand the same ailment is cured by different plant species. The most common method of preparing medicines is to make an infusion or decoction by boiling the fresh or dried plants or plant parts and as poultice or paste.

It was observed during survey that many medicinal plants are being collected and exploited by petty contractors through their labours or by native tribals and other forest dwellers from study area. These
collected plant species are supplied to many herbal drug companies and ayurvedic centres. Plant species like Adhatoda vasica, Asparagus racemosus, Ocimum sanctum, Chlorophytum tuberosum, Curculigo orchioides, Plumbago zeylanica, Natura sp. Centella asiatica, Curcuma aromatic, Allium cepa etc. however appeared to be most suitable species for bulk cultivation in this region. They are fast growing and complete their life cycle in a short period and have good market value, Thus the growers can get the product in short time with good return.

Chapter-III: Phytochemical Studies:

The primitive men used the plant parts and their crude extracts to help them in sorrow, need and sickness without the knowledge of their composition. The role of phytochemistry in medicine is a fascinating application of scientific knowledge in the wellbeing of man kind. The high cost of modern drugs and the toxic effects associated with them have brought a revial of interest in phytochemical studies of medicinal plants.

The curative value of the plants is due to the presence of active principles in them as alkaloids, phenolic compounds, steroids, flavonoids, terpenoids,
cerotenoids, lipids, gums, glycosides, glucosides, enzymes, proteins, vitamins, essential oils, coumarins, etc.

On the basis of availability, wide usage for the treatment of different ailments and less work done on them, following ten plants were selected for phytochemical investigations, Aegle marmelos, Agave americana, Boswellia serrata, Centella asiatica, Datura metel, Lawsonia inermis, Momordica charantia, Nigella sativa, Ocimum americanum, Plumbago zeylanica.

The aerial parts and root of the all the plants were extracted with petroleum ether, ethanol and water solvents and these extracts were subjected to qualitative chemical tests to check the presence of different active chemical groups and compounds viz. steroids, alkaloids, carbohydrates and glycosides, tannins, proteins and amino acids, fixed oil and fat, resins, gums and mucilage, saponins, flavones & flavonoids and essential oils. Presence of steroids, carbohydrates and glycosides, tannins, protein and amino acids, fixed oils and fat, resins, and essential oils were noted in all the ten plants while presence of alkaloids was also noted in all plants excepting
Momordica charantia. The presence of saponins was noted in 7 plants being absent in Centella asiatica, Datura metal and Lawsonia inermis, and the presence of flavones and flavonoids was noted in 8 plants being absent in Centella asiatica and Ocimum americanum.

Thin layer chromatographic analysis of all ten plants on silica gel G plates suggested the presence of various components in both, petroleum ether and alcoholic extracts. It was observed that Chloroform : Acetone (9:1) solvent system resolves maximum components in petroleum ether extract while Butanol : Acetic acid : Water (4:1:1) solvent system was found to be best phase mixture for resolution of alcoholic extracts.

Chapter-IV: Antimicrobial Studies:-

Due to increasing importance of higher plants in the search of natural and new antimicrobial agents, the medicinal plants, particularly those which are commonly used by the tribes and local inhabitants of the area under study for the treatment of various infectious microbial and other common diseases, were selected and screened for their antimicrobial activity.

The antimicrobial efficacy of 90 medicinal plant samples was tested against Candida albicans and E. coli.
Standard techniques were followed for the isolation, identification of microbes and maintenance of culture. For antimicrobial studies, 'Oxford Cup Method' with certain modifications was used. It was observed that out of 90 plants extracts only 52 were found to have positive antimicrobial activity against one or the other test organism.

All the same ten plants which were considered in phytochemical studies were again selected for detailed anti-fungal and anti-bacterial studies. Ethnolic extracts of different parts of all ten plants were used for detailed antimicrobial activity.

For broad spectrum screening of plants, ten species of fungi viz Aspergillus fumigatus, Candida albicans, Chrysosporium Sp., Microsporum canis, Myceliphthora fergusii, Neosortori fischeri, Trichophyton ferrugineum, T. gyipseum, T. mentagrophytes were used.

The broad spectrum antimicrobial testing too was made by 'Oxford Cup method' with certain modifications.

On the basis of experimental results, it was found that Lawsonia inermis and Plumbago zeylanica showed
pronounced antifungal activity against majority of dermatophytic fungi.

For broad spectrum antibacterial screening of test plants ten bacteria including, *Bacillus subtilis*, *Clostridium* sp., *Klebsella* sp., *Micrococcus luteus*, *Salmonella typhi*, *Serratia marcescens*, *Shigella flexneri*, *Staphylococcus aureus*, *Streptococcus faecalis*, and *Vibro cholerae* were used.

Pronounced antibacterial activity was observed in *Aegle marmelos*, *Ocimum americanum*, *Datura metal* and *Nigella sativa* more particularly against human pathogenic bacteria.

Chapter-V: Summary and Conclusions:—

In this chapter whole work has been summarised and concluded.

From over all results, it may be concluded that some of the medicinal plants of Sagar district, such as *Aegle marmelos*, *Agave americana*, *Datura metal*, *Lowsonia inermis*, *Ocimum americanum*, and *Plumbago zeylanica* etc. appeared to have a great applied importance and could be exploited on large scale.