CHAPTER VII

DISCUSSION AND CONCLUSION
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Maharashtra is endowed with variations in topography and climate. These factors obviously affect the vegetation and life pattern of the people residing in the area. Till recent decades, the people in remote hilly areas live happily with nature as the neighbouring forests could meet most of their essential requirements. Factors like the advent of modern civilization, the interaction of rural and urban populations and the spread of communication facilities have changed the entire pattern of the life in tribal areas.

To fulfil the fuel need of increasing population and modern industries dense forest cover has been cut down. Secondly, after independence huge dams have been constructed in the water catchment areas with high rainfall for better agricultural output. It has resulted in submersion of fertile land, patches of evergreen forests and many tribal villages.

Most of these tribals could not get harmonized in newly rehabilitated areas of different environs, hence they shifted towards highlands of ghats and started shifting cultivation. This has also resulted into more and more cutting of forests. All these processes force the
'King of Jungles' to urban areas to work as labourers or daily wagers on road constructions. Poor tribal folks are engaged in getting acquainted with new surroundings and are running after earning bread to fulfil daily needs. The situation may result in extinction of traditional knowledge which passed through generations. Before extinction of this traditional knowledge about medicinal plant wealth, studies in these areas are most desirable. Hence present study is undertaken.

In the present study, medico-botanical surveys from tribal areas of Pune and neighbouring districts were undertaken. This type of medico-botanical study along with emphasis on floristic and taxonomic investigations is first of its kind in the area under consideration. It gives useful information about Habitat, Habitat, Abundance, Local names, Flowering and fruiting time, Literature uses and Folk medicinal uses of the species concerned. The floristic information compiled has been summarised in Table 1.

Table 1: Floristic analysis of Medicinal Plants from Pune and neighbouring districts.

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The thesis includes information on 128 families, 434 genera and 592 species. It contains 106 families of dicot, 18 families of monocot and 4 families of ferns.

For all these 592 species described, different plant parts are used as drug source. Detailed plant portion analysis of these is given in Table 2. Principal plant parts used are - root, stem, leaves, flowers, fruits and seeds. Occasionally the whole plant is used for preparing medicine. The bark wherever used is given under stem or root. Under Miscellaneous; latex, resin, cotton, pollen or gum used as a drug source, is given.

By detailed morphogenic analysis of 592 species of 434 genera from 128 families, it is found that various plant parts used as medicine are as follows - Root of 219 species, Stem of 149 species, Leaves of 231 species; Flowers of 77 species; Fruits of 128 species; Seeds of 141 species; Whole plant of 134 species and other plant produces of 48 species.

From the above synopsis it is clear that at family level the Asteraceae ranked first with 24 genera having medicinal utility. With 44 species of medicinal utility the family Fabaceae topped at the species level. In the monocots, Poaceae ranked first as it has medicinally potential of 11 genera and 11 species.
Table 2: Detailed analysis of Medicinal plants with reference to number of families, genera, species and plant parts used as a drug

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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>128.</td>
<td>Osmundaceae</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>
The study provides interesting details regarding medicinal utility of the plants studied. For example 69 plant species mentioned in the thesis form new records as folk medicines. Some of the species possess a property not mentioned in the early literature. Some other species reported here are reputed drugs for other ailments but have novel medicinal utilizations. Some of these are narrated in the Table 3.

Table 3: Folk medicines of new records

<table>
<thead>
<tr>
<th>Botanical name</th>
<th>Tribal community using it</th>
<th>Part used</th>
<th>Used as/on</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aeginetia indica</em></td>
<td>Thakar</td>
<td>Fruits</td>
<td>Female complaints</td>
</tr>
<tr>
<td></td>
<td>Mahadeo Koli</td>
<td>Roots</td>
<td>Diuratic</td>
</tr>
<tr>
<td><em>Blumea malcolmii</em></td>
<td>Thakar/Mahadeo Koli</td>
<td>Leaves</td>
<td>Cuts and Wounds</td>
</tr>
<tr>
<td><em>Aeruva lanata</em></td>
<td>Mahadeo Koli</td>
<td>Inflorescence</td>
<td>Kidney stones</td>
</tr>
<tr>
<td><em>Abutilon indicum</em></td>
<td>Thakar</td>
<td>Leaves</td>
<td>Diabetes</td>
</tr>
<tr>
<td><em>Murraya paniculata</em></td>
<td>Thakar</td>
<td>Leaves</td>
<td>Rheumatic pains</td>
</tr>
<tr>
<td><em>Emilia sonchifolia</em></td>
<td>Katkari</td>
<td>Leaves</td>
<td>Breast abscesses</td>
</tr>
<tr>
<td><em>Allophyllus serratus</em></td>
<td>Mahadeo Koli</td>
<td>Leaves</td>
<td>Wounds</td>
</tr>
<tr>
<td><em>Solanum indicum</em></td>
<td>Thakar</td>
<td>Fruits</td>
<td>Hyperacidity</td>
</tr>
<tr>
<td><em>Barlelia prionites</em></td>
<td>Thakar</td>
<td>Flowers</td>
<td>Painful menstruation</td>
</tr>
<tr>
<td>Botanical name</td>
<td>Tribal community</td>
<td>Part used</td>
<td>Used as/on</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------</td>
<td>-----------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Cuscuta reflexa</td>
<td>Katkari</td>
<td>Whole plants</td>
<td>Skin diseases</td>
</tr>
<tr>
<td>Neuracanthus spaerostachys</td>
<td>Kokna</td>
<td>Whole plant</td>
<td>Galactogogue</td>
</tr>
<tr>
<td>Urena lobata</td>
<td>Mahadeo Koli</td>
<td>Stem/root</td>
<td>Rheumatic pains and paralysis</td>
</tr>
<tr>
<td>Mimusops elengi</td>
<td>Kokna</td>
<td>Fruit</td>
<td>Piles</td>
</tr>
<tr>
<td>Colocasia esculenta</td>
<td>Thakar</td>
<td>Petiole</td>
<td>Abscesses</td>
</tr>
<tr>
<td>Ficus bengalensis</td>
<td>Thakar</td>
<td>Prop-roots</td>
<td>To increase height</td>
</tr>
<tr>
<td>Actinodaphne hookeri</td>
<td>Mahadeo Koli</td>
<td>Leaves</td>
<td>Stomach pain</td>
</tr>
</tbody>
</table>

These utilizations if proved true on pharmacological testing, it would be beneficial and could provide cheaper medicines to poorer classes. On the other hand the utilization of species like *Nothopodites foetida* and *Cartharanthus roseus* on Cancer are proved in laboratory and they occur plenty in the area under study. It is reported that, in Japan trials of *Nothopodites foetida* on Blood Cancer are proved beneficial. But such plants are not mentioned as medicinal by any tribal community from the area under study.

For the known medicinal plant species; the part used as drug, method of preparation and doses which is mostly
not available in the published literature is presented in the thesis. It is very difficult to claim that all the information given by the tribal people is reliable. The scientific studies with advanced techniques may help to prove efficacy of the facts. One cannot deny usefulness of traditional system working successfully for centuries by experienced hands.

Documentation and recording of this data will prove beneficial for the studies in other science faculties too (Chart 7.1). For such type of studies multidisciplinary approach is required. This would be achieved by organizing a task force of scientists from various disciplines under the leadership of an eminent principal investigator. The information will be useful for the later workers from other biological faculties who want to do further investigations in this field. Such type of studies will help for betterment of society.

The data collected will certainly be useful for preserving and reviving of ancient traditional health system. The rare plants with medicinal potentials can be preserved with special attention for their protection. Compilation and documentation of exotic, endemic, wild and cultivated medicinal plant flora from the area under study is also a significant contribution of the study.

The other contribution is the mention of controversial
### Medicinal Plants Chart 7.1

<table>
<thead>
<tr>
<th>Plant Exploration</th>
<th>Taxonomy</th>
<th>Pharmacognosy</th>
<th>Pharmacology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Exploration</td>
<td>Pure Material</td>
<td>Macrophscopic</td>
<td>Animal Exp.</td>
</tr>
<tr>
<td>Collection</td>
<td>Identification</td>
<td>Microscopic</td>
<td>Dose Response</td>
</tr>
<tr>
<td>Field Observations</td>
<td>Herbarium</td>
<td>Powder Analysis</td>
<td>Toxicology</td>
</tr>
<tr>
<td>Ethnobotany</td>
<td>Garden</td>
<td>Adulterent Detection</td>
<td>Antidote</td>
</tr>
<tr>
<td>Autecology</td>
<td>Library</td>
<td>Drug Formulation</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Museum</td>
<td>Pharmacy</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Clinical</th>
<th>Agronomical</th>
<th>Industrialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Clinical</td>
<td>Agronomical</td>
<td>Industrialisation</td>
</tr>
<tr>
<td>Extract Estimation</td>
<td>Homoeopathic</td>
<td>Multiplication</td>
<td>Engineering Complex</td>
</tr>
<tr>
<td>Isolation</td>
<td>Homoeopathic</td>
<td>Environ-Requirement</td>
<td>Bulk Production</td>
</tr>
<tr>
<td>Active Principles</td>
<td>Protective Measures</td>
<td>Pharmacognosy</td>
<td>Quality Control</td>
</tr>
<tr>
<td>Processing</td>
<td>Pharmacognosy</td>
<td>Pharmacology</td>
<td>Marketing</td>
</tr>
</tbody>
</table>
plant species occurring in the area under consideration. The study gives botanical details of the distinct plant species mentioned by tribals as Indrajav bee, Kadachirayet, Shankhapushpi, Bala, Pittapapada, Vidari, Kakadshingi, Nagkeshar and Patha are discussed in details. Medico-botanical utilizations and comments found by scanning of available literature is mentioned with market sample study. An artificial key is formulated for each drug studied will be useful in identification of genuine drug material.

The other facet studied pertains to the 'Kashtaushadhi' i.e. crude drugs available from (Pune) drug market. It is also useful in the identification of botanical source of the drug. This would be also helpful to the medico-practitioners of different pathies. It would be an additional aid to detect adulterations and substitutes from market samples.

During the botanical description of each species the frequency of the availability of the species from the area under study is mentioned. The commonly available materials which are sold in crude drug market can be collected from the tribal areas wherever and whenever available. This will give a financial support to the poor tribals. A well planned systematic procurement programme and establishment of collection centers in the proper areas will solve employment problem to some extent.
Proper collection of drug would be helpful in getting genuine drug material without destroying originality of plant communities. If the persons are trained properly, the threatened species could be protected and spared. Utilization of plant wealth without disturbing the natural ecological balance is a prime need of the day.

In the furtherance of such projects pharmaceutical industries can be established in the areas where the crude drug materials are easily available. During the second phase of this kind of projects, plantation programmes can be arranged.

For the plantation programme of medicinally important species, selection of the species is of great consequence. The data in this thesis will also be helpful in modest way to fulfil this requirement. Preliminary studies on cultivation aspect of the medicinal plants will prove beneficial in this context.

In brief, the achievements of this study are,

(1) Floristic compilation of total 592 medicinal plant species from 434 genera and 128 families.

(2) Documentation of unique and interesting utilizations of 375 plant species used by tribals for medicinal utility.
(3) Enumeration of 218 species available from area under study which are not found useful by tribal communities as medicinal but mentioned in the literature as medicinal.

(4) First hand report of 69 plant species where either drug source is new or utility of known medicinal plant species is unknown.

(5) Compilation and documentation of exotic, endemic, rare, wild and cultivated medicinal plant flora with medico-botanical utilizations from the area under study.

(6) Enrichment of the herbarium at M.A.C.S. (AHMA) with 1285 specimens of medicinal plant species.

(7) Controversial drug studies on renown Ayurvedic plants with botanical approach is helpful in identification of genuine plant source.

(8) Studies on 'Kashtaushadhi' from crude drug market is helpful in confirmation of botanical source of drug material.

(9) Preliminary cultivation aspect is helpful in furtherance of medicinal plant studies.

(10) Thesis provides basic botanical data for studies in many science faculties.
In the end it is author's humble claim that the data claimed in this work are useful as having economic importance because it is directly related to the tribal communities residing in the rural hilly areas. It is helpful to mankind for betterment of society and rural development programmes. The information presented here on medico-botany from tribal areas of Puru and neighbouring districts is a distinct contribution to our knowledge of economic botany in general and Ethnobotany in particular.