CHAPTER II

ETHNOメディCINAL STUDIES WITH SPECIAL REFERENCE
TO GASTROINTESTINAL INFECTIONS
1. LOCATION :

Geographically Madhya Pradesh is located centrally in India. The tropic of cancer crossing this state lies at 18\(^\circ\)-28\(^\circ\) North latitude and 74\(^\circ\)-84\(^\circ\) East longitude (Map-1). The districts, Sagar and Shahdol have been included for this study. Most of collections of medicinal plants were made from the forests of Sagar and Shahdol.

Sagar district is situated a few kilometers north of the tropic of cancer at 23\(^\circ\)50'N latitude and 78\(^\circ\)40'E longitude and occupies a central position in India. It is connected with Lalitpur and Chattarpur districts of the Bundelkhand region. Sagar stands over a hilly tract at an average altitude of ca. 400 to 500 meters above mean sea level. Sagar plateau comprises large number of planted and natural forest ranges having rivers and rivulets due to which humidity is maintained throughout the year which enables flourishing of natural vegetation. Variations in climatic, edaphic, topographic and biotic parameters are further responsible for maintaining a good deal of biodiversity.

The total geographic area of Sagar district is ca. 10231 sq. kilometers of which about one third (2991 sq.km.) is covered by forests. There are dry deciduous type of forests. Which are divided into two forest divisions. The total reserved forest area of North-Sagar division is
1,04,440,558 Hect. and South-Sagar division is 87,167,746 Hect. The forests are now confined to hilly terrain all along the district. The forested hill rocks are generally having an average elevation of 90 to 120 meters from the ground level.

The concentration of forests on Narmada valley in Shahdol district is found in Amarkantak. One of the villages of Shahdol district and a sacred place being the origin of the river Narmada, is situated in 22°41'N. and 81°48'E., on the easternmost extremity of the Maikal range, 25 miles by country road from Shahdol station; 3,000 feet above Narmada river. Shahdol is located on the Katni-Bilaspur section of the south-Eastern Railway.

At Amarkantak, the Vindhyas touch the Satpura range; the Maikal Hill is thus the place of Union of the mountain ranges and hence probably the name 'Maikal'. According to another Mythology the name 'Maikal' is derived from the name of a Sage-'Maikal Rishi' who did penance in its forest clad ravines. In the local mythology it is believed that when God 'Shiva' came for penance on the hill its name was 'Risabh'. In the 'Ramayana' it is named as 'Risabh'. During the period of Mahabharat, it was called 'Vanshguil' Kalidas in 'Meghdut' named it 'Amrakut'. Apparently, Amarkantak appears to be the earlier correct name before it was misspelled as Amarkantak.

Amarkantak lies on a plateau at an altitude of approximately 1000 meters, from the four directions of which
four rivers arise—namely, son from east, Narvada from west, Jwalavanti (Johilla) from north and Mahanandi from south. The river Johilla joins the son shortly after rising and flows towards north into Ganges. Another little stream the Arpa bubbles forth and shortly tumbles over the sheer cliff to the south and mingles with the great Mahanandi, which drains the plains of chattisgarh into the way of Bengal. Besides, few perennial streams (nallah) namely Barati nallah, Amanallah etc. flow in the area, Narvada flows in opposite direction, i.e. from east to west and pours its water into Gulf of cambay. Shortly after its place of origin, it flows into famous falls of Kapildhara, whenceforth it follows a tortuous and usually a rock-bound course.

Maikal range runs in south-westernly direction; towards the north, the slopes are gradual, but on the south the mountain fall abruptly, leaving a magnificent view over the foot hills. The whole area is hilly; the highest point being Damgarh (1102.27m). Local topography and other physical features combine to produce a bewildering variety of edaphic conditions. Mountain slopes are intersected and much cut up by water courses and ravines. At place the ridges are steep and there are narrow valleys with cliff, gorges and all sorts of exposures. The aspect vary considerably. The area, thus provides a variety of habitats.
2. GEOGRAPHICAL STRUCTURE:

Madhya Pradesh state is structurally a part of the peninsular India. Which constitutes major block of the oldest rocks of the earth's crust. The morphology of the regions has played a vital role in flourishing flora and fauna of this region structural distribution of these formation have peculiar characteristics which are (i) The eastern, southern and northern part composed of ancient rocks (ii) The western half covers the Deccan Traps. The ancient rocks are found in Bundelkhand uplands, Bundelkhand plateaus and also northern Bundelkhand, Satpura's regions. The Baghelkhand plateau, northern chattisgarh basin and central satpura areas are formed by coal bearing Gondwana rocks.

Sagar district has an undulating topography with low rising hills scattered all around. The maximum height is shown by southern hills (683 meters) while the minimum (350 meters) towards the north side. The rocks mostly are vindhyan sand-stonesor Basalts, the main geological formation of Sagar district. Basalt is the igneous formation of late cretaceous while vindhyan sand-stone is sedimentary formation of combrian period (Wadia, 1948). Basalt rocks are deposits of lava flow which is igneous in nature and highly susceptible to physico-chemical weathering resulting in the production of round boulders, particularly on steep slopes, very common due to removal of top soil both
on account of destruction of forest vegetation, over-grayzing
and subsequent erosion of soil in the area covered with thick
vegetation.

Amarkantak has hills capped with bauxite and
laterite products with underlying basalt (deccan trap).
Soils are typically shallow where the topography is steep
but of fair depth on the flatter tops. laterite is usual.
The Satpura mountain consists of a series of parallel ridges
between the Narmada and Tapti. In the eastern part they
comprise in succession. The highest Amarkantak peak is 1000m.

3. CLIMATIC CONDITIONS :

Climatic conditions are important factor for the
growth of plants. Climatic conditions of M.P. have been
described by a number of workers (Shrivas, 1990) on the
basis of the rainfall, relative humidity and variations in
the temperature.

Climate of Amarkantak area based on records from
observatory of Forest Research Centre, Amarkantak.

(i) Temperature :

The mean annual temperature ranges from $21^\circ$-31$^\circ$C.
The January mean being about $21^\circ$C and the May temperature
rising to about 31-33$^\circ$C. May and June are the hottest months
and December and January coldest months when the lowest
temperature reaches to 1$^\circ$C.
(ii) Rainfall :

Rainfall is largely from S.-W. Monsoon. Maximum rainfall is from July to September. Winter rains occur in December and January. Total annual rainfall is over 1900 mm.

(iii) Frost :

Frost occurs mainly in February causing great injury to the crop, so much so that even tree of sal are badly injured.

(iv) Soil :

The soil is ferruginous and clayey with more or less acidic and neutral reactions (Misra, 1956).

The climatic conditions of Sagar have been described by a number of workers (Mishra, 1961). Climatic conditions of the entire district are more or less alike due to similar topographic features. Besides, informations from Sagar Gazetteer, other sources have been used for interpreting the extremes of climatic conditions.

The climate of Sagar areas can be divided into three distinct seasons, namely rainy, winter and summer, each of about four months duration.

(i) Rainy season :

Rainy season in Sagar, begins from the middle of June and continues up to September. It is strictly confined to about four months. It is characterised by intermittent
heavy rains and higher relative humidity with least diurnal fluctuations in them. The meteorological records of annual rain fall during 1988 to 1991, are 766.93mm. (1988), 868.50mm. (1989), 2094.84mm. (1990), 545.24mm. (1991) respectively. Maximum rainfall occured during June to September.

(ii) Winter season :

Winter season starts from mid November and ends in mid February. Relative humidity in this season stands lesser in comparison to that in rainy season.

(iii) Summer season :

Summer season commence from April and stretches upto June. During this season temperature goes up while relative humidity goes down.

(iv) Humidity :

Humidity is an important factor which is related to the growth of herbaceous layer. In general minimum average values of relative humidity are obtained in April and maximum in the month of August. October to January are comparatively less humid months.

(v) Temperature :

Temperature also exhibits seasonal trend with varying ranges. It shows higher magnitude in summer season. The lowest temp. can be recorded in December and January, afterwards there is gradual rise in temp. upto February.
Generally the month of may has maximum temperature (about 40°C). with the advent of monsoon, temp. declines.

(vi) Soil:

The thickness, colour and texture of soil is an important factors which is related with the growth of herbaceous layer. the soil topographically is very undulating resulting in great variation in the physical and chemical properties of soil. Soil are found various type in considered areas as black, Alluvial or clay, red & Leteritic or sandy etc. Due to removal of silica and alkali metals, alkalies soils become red. The availability of water, temperature, carbon dioxide concentration and various organic acids factor of the soil characterised the vegetation of any area.

4. VEGETATION:

M.P. covered 35.091° area for forest which are divided into three types such as reserved forests, protected forests and unclassified forests. These forests are mainly two types. Tropical moist deccideous forests and tropical dry deccideous forests according to champion et al. (1968) and Kumar (1990).

The whole region of Sagar district, from the forest point of view, is divided into following forest divisions and Ranges.

(A) SOUTH SAGAR FOREST DIVISION:

(1) Khurai Range   (2) Bandari Range   (3) Banda Range
(4) Shahgarh Range (5) Sagar Range.
(B) NORTH SAGAR FOREST DIVISION:
(1) Rahatgarh Range  (2) Rahli Range  (3) Dhana Range
(4) Gourjhamer Range  (5) Kesli Range  (6) Deori Ranges.

The whole region of Shahdol District is divided into following forest division, sub-division and Ranges from the forest point of view.

(A) NORTH SHAHDOL DIVISION:
1. Shahdol sub-division -
   (a) Ghunghuti Range  (b) Pali Range
2. Jaisingh nagar sub-division -
   (a) Jaisingh nagar Range  (b) Amjhar Range
   (c) Khandudhi Range.
3. Beohari sub-division -
   (a) East Beohari  (b) West Beohari Range.

(B) SOUTH SHAHDOL DIVISION:
1. Sohagpur sub-division -
   (a) Shahdol range  (b) Jaitpur range  (c) Budhar range
2. Kotma sub-division -
   (a) Keshwari Range  (b) Kotma Range.
3. Anuppur sub-division -
   (a) Anuppur  (b) Rajendra gram  (c) Amarkantak Range.

(C) UMARIA FOREST DIVISION:
1. Umaria sub-division -
   (a) Umaria  (b) Karkeli  (c) Chandia
   (d) Damokhar Range.
2. Manpur sub-division -
   (a) Manpur Range    (b) Panpatha Range.

(D) BANDHAVGARH NATIONAL PARK :
   (a) Kallwah    (b) Khitauli    (c) Magadhi    (d) Tala Range.

   The climatic, adaphic, altitudinal and biotic variations with their complex inter-relationships and species composition have resulted in different kind of vegetational cover in the area out of total 10,246 sq. kilometer area of Sagar district 3014 sq. kilometer area is covered with forests. The total reserved forest area of north Sagar division is 1,04,440,558 Hect. and south Sagar division 87,167,858 Hect. Forest vegetation of Sagar is of "Tropical dry deciduous" type, According to champion & seth (1964). A number of workers have studied the structure and composition of this district such as Mishra and Joshi (1952), Bhatia (1955), Mishra (1961), Bhatnagar (1968), Kandya (1974), Prasad (1976), Athaya (1980) and Tripathi (1984).

   The forests of Sagar district are classified into :
   (I) Teak forests (with more than 50% teak trees)
   (II) Mixed forests (with or without teak)

   These forests are heterogeneous in composition, quality and physiognamy due to underlying topography, variations in soil depth and characteristics and biotic disturbances.
Teak forests are further classified into the following subtypes:

(a) *Tectona* forests.

(b) Miscellaneous forests.

(c) *Anogeissus pendula* forests.

(d) *Acacia catechu* forests and

(e) *Butea monosperma* forests.

They are generally cover the entire basalt hill rocks whereas non teak forests are found on vindhyan sandstones. Moist sites are covered with species like *Tectona grandia*, *Terminalia tomentosa*, *Diospyros melanoxylon*, *Mitragyna parviflora*, *Ougeinia delbergioides*, *Delbergia latifolia*, *Boswellia serrata*, *Anogeissus latifolia*, *Pterocarpus marsupium*, *Terminalia bellirica*, *Lagerstroemia parviflora* and *Kydia calycina* etc. Whereas Xeric sites and sun facing hill slopes are covered with *Aegle marmelos*, *Sterculia urens*, *Lagerstroemia parviflora*, *Lenea coromandelica* etc. *Anogeissus latifolia* generally occupies steep slopes and *Terminalia tomentosa* on deep black soil of foot hills. Thorny and bushy species are very common on the marginal area of forests because of biotic influences.

The species which are characteristic of mixed forests are *Lagerstroemia parviflora*, *Boswellia serrata*, *Anogeissus latifolia*, *Chloroxylon swietenia*, *Buchanania lanzan*, *Aegle marmelos*, *Careya arborea*, *Annona squamosa*, *Emlica officinalis* and some annual and perennial species are
Phyllanthes, Desmodium, Tephrosia, Achyranthes, Abutilon, Euphorbia sp. etc. Butea monosperma, Buchanania lanzan, Gardenia latifolia, Zizyphus sp., Acacia sp. etc. are some common species of both forest types.

In Amarkantak the plateau carries subtropical vegetation. The forest type that occurs in plateau is classified under 'Central Indian sub tropical hill forests' (Champion, 1938). the vegetation has the following natural aspects :

Sal (Shorea robusta) forests: Sal constitutes almost pure forests over considerable areas. The common associates are Mallotus philippensis, Buchanania lanzan, Ouigenia oogoinenis, Terminalia chebula, Bauhinia sp., Grewia sp., Gardenia latifolia, Anogeissus latifolia etc. which support climbers like Bauhinia vahlii, Discorea sp., Celastrus paniculatus, Smilax sp. etc. The ground flora consists of Desmodium sp., Moghania sp., Urena lobata, Plectranthus mollis, Sida sp., Crotalaria sp., Leucas sp., Pogostemon bengalensis, Leea sp., Strobilanthes sp., Oplismenus sp., Setaria sp., etc.

Mixed forests of Valleys: In valleys sal loses its dominance after certain altitude and is replaced by miscellaneous species e.g. Bauhinia retusa, Grewia sp., Ficus sp., Rhamnus wightii, Bursera serrata, Schlechera oleosa, Schefflera Venulosa etc.
Mixed forests of open area: In open areas, mixed forests of semi-deciduous nature occur. Important constituents species of this type are: Butea monosperma, Lagerstroemia parviflora, Boswellia serrata, Gardenia latifolia, Anogeissus latifolia, Ficus sp., Lannea coromandelica, Garuga pinnata etc.

Scrub: On exposed steep hill slopes and ridges, where drier conditions prevail, scrub vegetation is found. Euphorbia nerifolia, Zizyphus sp., Gardenia latifolia, Spermadictyon suaveolens are the important constituent species of this type.

Aquatic vegetation: Aquatic flora is poor in the area and is found only in ditches or where the flow of stream is very slow. i.e. on abrupt curves of streams and rivers. Notable species are: Vallisneria, Potamogeton, Myriophyllum, Ammania, Eriocaulon, Limnophila, Nymphoides sp. etc.

Grassland: Open pastures extending in great tracts adjacent to the sal areas and along the banks of Narvada, are composed of Coix, Coelachne, Chionachne, Echinochloa, Fragrostiella, Ergrostis sp. etc.

Flora: The flora of the area interesting as it presents few types that are characteristic to the North-West and Central Himalaya, e.g. Thalictrum sp., Geranium sp., Androsace sp., Mazus sp., Lindernia sp. etc.
5. POPULATION:

The Sagar district has the total population of 16,46,198 out of which 8,75,064 are male and 7,71,134 are female. There are 881 females to every 1000 males.

As a whole its 42.35% of total are literate in the district.

The Sagar district has 1,42,903 tribe population, out of which 73,654 are male and 69,249 are female. The 9.67% scheduled tribe population is literate (Census, 1991). The literacy percentage of tribal female is less than one percent.

6. TRIBAL COMMUNITIES:

The tribal of India lives in the hills, forests and isolated regions. They are known as 'Vanyajati' (caste of forest), Vanvasi (inhabitants of forests), Pahari (hill dwellers), Adimjati (original communities), Adivasi (First settlers), Janjati (folk people), Anusuchit Janjati (Scheduled tribes) and so on. Till today they have retained their customs and regulations. Barring a very small fraction, there is little difference between their economic life and that of their neighbouring rural folk, yet, as the tribes have, more or less, retained their separate social identity and on the whole can be regarded as comparatively isolated and economically backward, they have been placed under the category of scheduled tribes.
India's tribal population, estimated at 54 million, is almost equal to the total population of United Kingdom. They form about 7.76% of the country's total population. India has the second largest tribal population in the world, only next to Africa. There are more than 830 tribes subdivided into groups spread throughout the length and breadth of the country. The tribes differ considerably from one another in race. Language and culture: In their myths and customs and their longing and aspirations (Ghosh, 1990).

M.P. being the heartland of the country has maximum concentration of tribals. Every fifth tribal in the country lives in M.P. (Chakravarti & Prasad, 1989). 22.97% tribals are living in M.P. region among all population of India.

In Sagar district about 27 tribal communities were recorded (Rastogi, 1993) Table-1. Gond, Sahariya, Kol, Bharia, Kanwar, Saur are some principal tribes of Sagar district. (Census, 1991).
TRABALS GROUP OF SAGAR DISTRICT

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<th>No.</th>
<th>Tribes</th>
<th>Sub-Tribes</th>
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<tbody>
<tr>
<td>1.</td>
<td>Agaria</td>
<td>Ahirwar, Bighwar, Narotia, Bharotia, Nahar</td>
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<td>2.</td>
<td>Baiga</td>
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<td>Banjara</td>
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<td>Bharia</td>
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<td>9.</td>
<td>Bhunjia</td>
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<td>14.</td>
<td>Dhanwar</td>
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<td>15.</td>
<td>Gadaba or Rajgond</td>
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<td>16.</td>
<td>Gond</td>
<td>Pardhan, Ojha, Anakh</td>
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<td>17.</td>
<td>Halba or Halbi</td>
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<td>18.</td>
<td>Kamar</td>
<td>Kankar, Tanwar, Kamalvasi, Paikara</td>
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<td>Khairwar</td>
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Table-1
Map No.1: Showing Location of M.P. in India
MAP No. 2 : Showing selected study sites of Sagar District
MAP No. 3: Showing selected study sites of Shahdol District
Present work was carried out from March 92 to December 95 in different villages and forest area of Sagar and Shahdol Districts selected study sites were visited for the collections of plants. (Map No. 2 and 3).

Study sites of Sagar district:
- Bahrol: Nursery and forest
- Banda: Forest
- Bandri: Forest
- Garhpara: Forest
- Patharia: Forest
- Rahatgarh: Forest
- Ramna: Forest
- Tili: Village, Garden, Forest.

University: Botany garden, Hilly area of campus.

Study sites of Shahdol district:
- Amarkantak: Forest of "Shanbhu Dhara"
  - Forest of "Kapil Dhara"
  - Forest of "Son Muda"
  - Forest of "Mai ka Bageecha"
  - Nursery of Forest Research Institute.

In the present work, following aspects were taken into consideration i.e. (a) Collection of ethnomedicinal plants used for gastrointestinal infections. (b) Antimicrobial screening and (c) Phytochemical study of selected plant.
I. Collection of Ethnomedicinal plants:

INFORMATION SOURCES:

The standard methods of ethnomedicinal studies have been followed in present work as suggested by several workers (Jones, 1942; Woodward, 1956; Jain, 1964, 1967a; Faulk, 1958; Schultes, 1960, 1963; De, 1968; Alkorn, 1985 and Rao, 1989).

One can perform ethno-medicinal studies in two ways, viz: Direct and Indirect approach.

Direct approach follows the extensive and intensive field work in tribal area. Field work in most significant in this approach which is carried out by direct contacts with tribals and first hand information was collected from all the study sites.

In indirect approach it is not necessary to do field work in tribal packets. Source of information can be obtained in different ways, i.e. through ancient literature, herbarium and Museum specimens, personal diaries of foresters, indigenous doctors, plants collectors, Herbalists, Village medicinemen, Gardeners, Elders of the villages, Cowherds and various persons, analysis of different folklores, archeological remains etc. Information of plants related with medicine, worship, magical belief, food and drinks and cultural aspect is often available in religious books, archaeological depositories and old monuments.
METHODS FOR COLLECTION:

The field work and periodic collection of plants was conducted following the guide lines suggested by Schultes (1962), Santapur (1955) and Jain (1988). Collection and preparation work for their processing and preservation of plants was done under following steps.

1. For obtaining the complete specimen, flowering and fruiting stages, frequent and seasonal trips to the forests were made.

2. During field studies and collection of plants, the following necessary equipments were used; field diary, field proforma, vasculam or polythene bags, knife, digger blotting sheets, field press, rope, camera, pencil, thread etc.

3. Proper field notes for each species were recorded giving botanical names, family, local name, habit, locality, date of collection etc.

4. The collected specimens were allotted due field number and pressed properly for drying in the manner so, that as far as possible, all the features of plant are visible.

Freshly collected chopped raw material of plant has high moisture content therefore, it had to be subjected to drying. Drying prevents moulding, the enzymatic action, microorganism infestation and chemical changes. It fixed the constituents and facilitates grinding and milling as well as
converting the raw drug into a more convenient from for handling.

Each specimens was identified in three stages. First in field, afterwards in laboratory in unmounted condition and later on after herberium preparation and duly recorded at proper place.


LITERATURE :

Ancient or unnoticed published or unpublished literature have also been consulted and it has found that these literature have proved to be a good source of ethnobotanical data particularly on medicinal plants. In India with its heritage of ancient cultures and scriptures published or unpublished work can be used as a valuable ethnobotanical resources (Sharmah, 1972, 1973; Jain and Tarafder, 1970; Omprakash, 1961).

HERBARIUM AND MUSEUM :

The herbarium and museum of Botany department, Dr.H.S. Gour Vishwavidyalaya, Sagar (M.P.) was consulted to
get some useful informations. It has been found that the study and examination of field notes on herbarium sheets and museum specimens provide good sources of information on uses of medicines.

ETHNOBOTANICAL OBSERVATIONS:

The ethnobotanical informations about the uses of medicinal plants for the treatment of gastrointestinal infections were recorded Gond medicinemen, head of Villages, herbalists, foresters and other experienced tribal persons who have a knowledge of herbal drugs and other economic uses. For the collection of informations the methods adopted by various earlier workers like Raghavaih, 1956; Jain, 1963a; Raizada , 1966; Jain and Roo, 1977; Goel, et al., 1987 and Jain, 1988 were followed in the present work.

The present ethnobotanical work is based on the plants which are used by tribals for some most common diseases like diarrhoea, dysentery and gastrointestinal diseases. It appears that most of infections are transferred through water, which is normally polluted. Sometimes due to scarcity of water, tribals are compelled to use non-potable water also for their routine purpose. It was found that these diseases most commonly occur during the rainy season.
II. ANTIMICROBIAL SCREENING:

Some of the plants were collected from the forests of Sagar and Shahdol district for their antimicrobial screening. Plants were harvested by rooting, excess soil was brushed and washed from roots, duplicate and representative samples were pressed for identification purposes and representing each sample, were tagged with an identifying number. The samples were then air dried in a well ventilated room which was not exposed to the direct sublight. When dry, each sample was milled to coarse powder and stored in tightly closed polythene bag until it was scheduled for extraction.

PREPARATION OF EXTRACTS:

Extraction of plant material was done following the method of Mishra and Dixit (1977a) 100gm. of coarse plant material washed with 70% ethanol, then with fresh water repeatedly and finally with sterilized water.

The fresh or dried plant samples were pulverised well and strained through two layers of sterilized cheesecloth and finally filtered through sterilized whatman No.1 filter paper. The filtrate thus obtained were used as an extract sample. Excess sample was stored in tightly closed amber bottles under refrigeration. Preparation of selective solvent extracts was done by different solvents. By using, crude extracts of various plant parts were studied for
antimicrobial testing against some pathogenic fungal and bacterial strains.

III. PHYTOCHEMICAL ANALYSIS:

'In vitro' antimicrobial activity of the different plant parts extracts of selected plants have revealed the presence of antibiotic principles. It was, therefore, considered desirable to carry out investigations on preliminary phytochemical analysis and antimicrobial activity of different fractionates and chemical constituents of at least a selected plant.
ENUMERATION OF MEDICINAL PLANTS
WHICH ARE USED IN GASTROINTESTINAL INFECTIONS

Ranunculaceae

*Nigella sativa* Linn. "Kallongi", seeds

Habit : Herb
Locality : Market sample
Ethno. Use : Seeds used in dysentery.

Annonaceae


Habit : Moderate sized tree or shrub
Locality : Patharia Forest
Ethno. Use : The bark given in diarrhoea and the root given in acute dysentery.

Menispermaceae


Habit : Climbing shrub.
Locality : Patharia
Ethno. Use : Decoction of root is given 3 times in a day for 7 days in chronic diarrhoea and Root decoction together with the seeds of *Holarrhena antidysenterica* wall. is used is dysentery.
Nymphaeaceae

*Nymphaea nouchali* Burm.F. "Kamal Kakri" Rhizome.

Habit: Aquatic herb

Locality: Sagar lake

Ethno. Use: Rhizome is demulcent, used in desentery.

Cruciferae


Habit: Herb.

Locality: Tili farm

Ethno. Use: It is used in Diarrhoea.

Flacourtiaaceae


Habit: Small tree

Locality: Market sample

Ethno. Use: Paste of about 7gm bark with 2gm mustard seeds is heated in an earthen pot and given with curd twice daily in dysentery.

Dipterocarpaceae


Habit: Tree

Locality: Amarkantak

Ethno. Use: Gum is useful in dysentery with Dahi & Sugar.
Malvaceae

*Abelmoschus esculentus* Linn. "Bhindi", Fruit. (= *Hibiscus esculentus*)

**Habit** : Shrub  
**Locality** : Tili farm  
**Ethno. Use** : Mucilagenous fruit useful in gonorrhoea and urinary discharge in strangury, in diarrhoea.

*Abutilon indicum* (Linn.) Sweet., "Tapari", leaves  
**Habit** : Minutely hoary-tomentose herb  
**Locality** : Lake side  
**Ethno. Use** : Leaf decoction is given in diarrhoea.

**Habit** : Shrub  
**Locality** : Tili farm  
**Ethno. Use** : Juice of the leaves, made into a paste with the seeds of *Vernonia anthelmintica*, is applied to eruptions of the skin following fever and leaves ground and mixed with milk, are given for strangury.

*Hibiscus rosa-sinensis* Linn. "Jasum", leaves (*†*), Root  
**Habit** : Shrub  
**Locality** : Botanical Garden  
**Ethno. Use** : The root is valuable in coughs. The leaves are considered emollient and aperient.

**Habit**: Small tree

**Locality**: Garhpahra

**Ethno. Use**: Mucilagenous bark is used for reducing blood sugar. Leaves are chewed when there is a deficiency of saliva.


**Habit**: Herb

**Locality**: Widespread at different places.

**Ethno. Use**: Root useful in fever, burning of the body and urinary discharge. The expressed juice of the leaves is used in the form of an electuary, in the treatment of intestinal worms.


**Habit**: A softly, hairy, undershrub.

**Locality**: Common weed found all over the area.

**Ethno. Use**: The expressed juice of the roots is used for external injuries, cuts etc. Root powder is given with sugar candy and raw cow milk twice a day in night-wetting. Pulverised leaves and stem with sugar candy are pressed in between the palms and strained, the decoction thus prepared is given daily on an empty stomach for seven days in gonorrhoea.


**Habit**: Erect herb or undershrub.
**Locality**: Widespread at different places.

**Ethno. Use**: The root and leaves are useful in fever, heart diseases, burning sensation, and pites.

**Thespesia lampas** Dalz et Gibs syn. *T. macrophylla* Blume

"Banbhindi", Root.

**Habit**: A large shrub

**Locality**: Bahrol forest of Sagar Distt, Amarkantak Forest of Sardoli Distt.

**Ethno. Use**: Root of the plant is useful for syphilis and gonorrhea and also in dysentery.

**Sterculiaceae**

**Melochia corchorifolia** Linn. "Bilpat", Leaves.

**Habit**: Erect and branched herb.

**Locality**: Patharia

**Ethno. Use**: Leaf decoction is used in dysentery.

**Sterculia urens** Roxb. "Kulu", Stem gum.

**Habit**: A large tree

**Locality**: Rahatgarh

**Ethno. Use**: The gum exudate from the stem of the tree is used as a laxative and when mixed with sugar and milk is given in the treatment of dysentery, stem bark given in bloody discharge.

**Tiliaceae**

**Corchorus antichorus** Rauesch "Choti chench" Plant.

**Habit**: Herb
Locality : Amarkantak forest.
Ethno. Use : Powdered plant is used for the treatment of dysentery.

**Corchorus trilocularis** Linn. "Nari-sak", Leaves.
Habit : Herb
Locality : Weed of cultivated fields
Ethno. Use : Powdered leaves are used during diarrhoea in children.

**Grewia tiliaefolia** Vahl. "Dhamin", Stem bark.
Habit : Small tree
Locality : Patharia
Ethno. Use : The bark after removal of the tuber is mixed with the water and thick mucilage strained from it, given in 50 gms. doses with 20 gms. of the flour of **Punicum millaceum** as a remedy for dysentery.

**Tricutmeftea rotundifolia** Lamk. "Mendurli" or "Khireta", Root.
Habit : A suffruticose herb.
Locality : Ramna forest
Ethno. Use : Root useful in dysentery.

**Rutaceae**

**Feronia limonia** (Linn.) Swingle "Kaith", fruit.
Habit : Tree
Locality : Patharia forest
Ethno. Use : The unripe fruit is given in diarrhoea and dysentery.

Habit : Small tree
Locality : University campus
Ethno. Use : Leaves decoction given in disorder of intestine such as diarrhoea and dysentery.


Habit : Small tree
Locality : Botanical Garden
Ethno. Use : Fresh leaves are grinded with water and filtered. The filtrate is provided orally during dysentery and diarrhoea.

Ruta graveolens Linn. "Somlata", Leaves

Habit : A Strongly smelling herb.
Locality : Botanical Garden
Ethno. Use : Used in dysentery.

Meliaceae

Soymda Febrifuga A. Juss. "Rohani", stem bark

Habit : A tall tree
Locality : Market sample
Ethno. Use : Bark decoction used in the advanced stages of dysentery, in diarrhoea.

Vitaceae

Vitis vinifera Linn. "Angoor", Fruits (*), Leaves

Habit : Climbing shrub.
Locality : Tili Farm

Ethno. Use : Juice of fruits given in diarrhoea from indigestion. The leaves, on account of their astringency, are sometimes used in diarrhoea.

Papilionaceae

Atylosia Scarabaeoides Benth. "Balaspatti" Stem

Habit : A slender herbaceous twinner with densely grey downy stems.

Locality : Makronia

Ethno. Use : Stem used in diarrhoea caused by foul or disordered stomach.

Butea monosperma (Lamk.) Kuntz. "Palas", "Tesu" Leaves

Habit : Medium sized tree

Locality : Patharia, University campus.

Ethno. Use : **The decoction of the leaves is used for the treatment of diarrhoea and dysentery. The bark & stem gum is used in dysentery.


Habit : Shrub

Locality : Amarkantak forest

Ethno. Use : Roots is used in stomachache, Plant is used in scabies and impetigo.

Desmodium gangeticum Dc. "Sarivan", Root

Habit : Shrub

Locality : Garhpahra
Ethno. Use: The powdered root is prescribed for oral administration during dysentery.

Ougeinia oojeinensis (Roxb.) Hochr. "Tinsa", Stem bark

Habit: Medium sized tree.

Locality: Patharia forest

Ethno. Use: Inside bark produces a kino-like exudation which is used for diarrhoea and dysentery.

Caesalpiniaceae


Habit: Medium sized tree

Locality: Patharia

Ethno. Use: Juice of leaves along with onions is given during fever and diarrhoea. Bark is used in dysentery.


Habit: Small tree

Locality: University campus

Ethno. Use: The powdered floral buds are prescribed in dysentery.

*Saraca asoca (Roxb.) De Wilde "Ashok", Flowers.

Habit: Tree

Locality: Botanical garden

Ethno. Use: Flowers are used as a uterine tonic and also used in biliousness dysentery and diabetes.
Mimosaceae

*Acacia arabica* Wild. "Babul", stem bark.

**Habit**: Small tree  
**Locality**: Patharia forest  
**Ethno. Use**: Bark astringent useful in cure of dysentery and diarrhoea.

"Renja", stem bark.

**Habit**: Tree  
**Locality**: University campus and Patharia  
**Ethno. Use**: The powdered stem bark is used to curing dysentery.

*Acacia nilotica* Linn. "Kikar", stem bark.

**Habit**: Tree  
**Locality**: Garhpahra  
**Ethno. Use**: The stem bark is used in Chronic dysentery, diarrhoea and gastrointestinal catarrh.

*Acacia senegal* Wild. "Ritha", Pod

**Habit**: Small tree  
**Locality**: Botanical Garden  
**Ethno. Use**: Pod is antidiarrhoeal.

*Neptunia triquetra* Benth. "Lajalu", Root

**Habit**: Herb  
**Locality**: Amarkantak forest  
**Ethno. Use**: **Root** are rubbed with water on the surface of
the stone and the dilute paste in provided orally to the children during dysentery.

**Combretaceae**

*Anogeissus pendula* Edgew. "Kardhai", seeds

**Habit**: Medium sized tree.

**Locality**: Rahatgarh forest

**Ethno. Use**: The decoction of the powdered seeds is used in dysentery.

*Terminalia bellerica* Roxb. "Bahera". Fruit.

**Habit**: Large tree

**Locality**: Botanical Garden

**Ethno. Use**: Fruit are to be useful during diarrhoea and dysentery.

*Terminalia tomentosa* Wight and Arn. "Saj". Stembark

**Habit**: Large tree

**Locality**: Bandari forest

**Ethno. Use**: Bark juice is useful in dysentery

**Myrtaceae**

*Myrtus communis* Linn. "Vilayati Mehndi", Fruit

**Habit**: Shrub

**Locality**: Botanical Garden

**Ethno. Use**: Fruit is useful in diarrhoea, dysentery and internal ulceration.

*Psidium guajava* Linn. "Amrud", Fruit

**Habit**: Shrub or small tree
Locality : Botanical Garden

Ethno. Use : The Fruit and its conserve are astringent and suitable to those suffering from diarrhoea and dysentery.

Punicaceae

Punica granatum Linn. "Anar", Fruit

Habit : Small tree or shrub.
Locality : University campus.

Ethno. Use : The decoction of the fruit wall is used in dysentery.

Onagraceae


Habit : Aquatic herb
Locality : Sagar lake

Ethno. Use : The Nuts are useful in bilious affections and diarrhoea.

Caricaceae

*Carica papaya Linn. "Papita" Fruit (*), leaves

Habit : Small tree
Locality : Botanical garden

Ethno. Use : Ripe fruit is stomachic, used in haemoptysis, bleeding piles. Leaves are used as anthelmintics.
Cucurbitaceae

*Diplocyclos palmatus* (L.) C. Jeffery "Shiv-Lingi", Fruit

**Habit**: Climbing herb

**Locality**: Garphahra

**Ethno. Use**: Fruits are boiled and use as vegetable during diarrhoea and other intestinal disorders.

Umbelliferae

*Cuminum cyminum* Linn. "Zira", seeds

**Habit**: Herb.

**Locality**: Market sample

**Ethno. Use**: Seeds are antidiysenteric and antidiarrhoeaic.

*Trachyspermum ammi* Linn. " Ajwain", Seeds

**Habit**: Herb

**Locality**: Market sample

**Ethno. Use**: It is prescribed for oral administration during colic. Fruits are used in diarrhoea.

Compositae

*Ageratum conyzoides* Linn. "Ajgandha' or "Sahadei", seeds

**Habit**: An hispid-hairy-errect herb.

**Locality**: Widespread at different places.

**Ethno. Use**: Seeds decoction was found to given during diarrhoea by kanwar people.


**Habit**: Herb
Locality : Banda

Ethno. Use : The decoction of the root is said to be useful during dysentery in children.

Erigeron canadensis Linn. Plant.

Habit : Herb

Locality : Amarkantak

Ethno. Use : Extract of plant is taken in diarrhoea and dysentery.

Spathanthes acmella Murr. "Kadha'. Root (*), Plant.

Habit : Herb

Locality : Garhphra

Ethno. Use : Root extract is used in diarrhoea and dysentery. Plant is boiled in water and the whole liquid and solid given in dysentery.

Tridax procumbens Linn. "Gorakmundi", Leaves.

Habit : Herb

Locality : Widespread at different places.

Ethno. Use : Leaf juice as a haemostal agent and drink this juice with mild hot water in diarrhoea and dysentery.

Vernonia cinerea (Linn.) Less "Sahadevi", Plant Extract.

Habit : Herb

Locality : Widespread at different places.

Ethno. Use : Plant extract used in dysentery.
**Plumbaginaceae**


**Habit**: Herb

**Locality**: Patharia

**Ethno. Use**: Root extract use in dysentery, diarrhoea.

**Apocynaceae**

*Holarrhena antidysenterica* Wall. "Kurchi" or "Dudhi", Stem bark (*†*), seeds

**Habit**: Small tree

**Locality**: Garhpahra

**Ethno. use**: 60-120 gms of powdered bark is useful in the treatment of diarrhoea. Powder of seeds and bark are used in dysentery.

**Loganiaceae**

*Strychnos nux-vomica* Linn. "Kajra"or"Kuchla, Wood

**Habit**: Tree

**Locality**: Amarkantak

**Ethno. Use**: Juice of fresh wood is given in doses of few drops in popular remedy, acute dysentery.

**Boraginaceae**


**Habit**: Herb

**Locality**: Widespread at different places.
Ethno. Use: Pounded roots when made into a paste is applied to reduce swelling and pounded with water is given as a drink to children in dysentery.

**Trichodesma zeylanicum** Br. "Ondhakulai", leaves.

**Habit**: Herb

**Locality**: Banda

Ethno. Use: Expressed juice of the leaves with common salt is provided orally for the treatment of dysentery in children.

**Convolvulaceae**

**Convolvulus microphyllus** Sieb. ex. Spreng, plant.

**Habit**: Herb

**Locality**: Wide spread at different places.

Ethno. Use: Extract of whole plant taken with sugar in diarrhoea and dysentery.

**Evolvulus alsinoides** Linn. "Shankhpushpi", plant

**Habit**: Herb

**Locality**: Wide spread at different places in Amarkantak Forest.

Ethno. Use: Extract of plant with sugar is given in diarrhoea and dysentery.

**Solanaceae**

**Solanum nigrum** Linn. "Makoi", Leaves (*), Berry.

**Habit**: Herb.
Locality: Widespread at different waste places.

Ethno. Use: The leaves are eaten as a vegetable for dysentery. The berries are given in Fever, diarrhoea.

Scrophulariaceae

Verbascum chinense (Linn.) Santapau "Dangra ka tamaku", Leaves.

Habit: Herb.

Locality: Common in different moist, waste places.

Ethno. Use: Leaf juice is used to decrease pain and restlessness and in diarrhoea and dysentery.

Acanthaceae


Habit: Herb.

Locality: Tili and Bandri.

Ethno. Use: The aqueous extract of the leaves is used during dysentery in children.

Verbenaceae


Habit: Herb.

Locality: Near the lake side.

Ethno. Use: An aqueous extract of the leaves is provided for the treatment of diarrhoea, dysentery in children.
Labiatae


**Habit**: Herb.

**Locality**: Botanical Garden.

**Ethno. Use**: Expressed leaves juices is useful for the treatment of diarrhoea in children.


**Habit**: Herb.

**Locality**: Banda.

**Ethno. Use**: An infusion of the seeds is provided orally in diarrhoea.

Amaranthaceae

*Alternanthera sessilis* (Linn.) R.Br.Prodr., Plant

**Habit**: Herb.

**Locality**: Weed of cultivated fields.

**Ethno. Use**: Extract of Plant is taken in dysentery.

Myristicaceae


**Habit**: Tree.

**Locality**: Market sample

**Ethno. Use**: Nut useful in choleraic diarrhoea.
Euphorbiaceae

**Euphorbia hirta** Linn. 'Badi Dudhi', Stem latex.

**Habit**: Herb.

**Locality**: Widespread at different waste places.

**Ethno. Use**: The juice of the plant is given in dysentery.

**Phyllanthus niruri** Linn. "Jaramla", Plant.

**Habit**: Herb.

**Locality**: Patharia.

**Ethno. Use**: The plant is stomachic, Good for chronic dysentery. An infusion of the young shoots is given in dysentery and diarrhoea.

**Ricinus communis** Linn. "Arandi", Leaves.

**Habit**: Small tree or shrub.

**Locality**: Village or Botanical Garden.

**Ethno. Use**: The leaves are useful in Vata and Kapha.

Urticaceae

**Artocarpus lakoocha** Roxb. "Dhau" Fruits and Seeds (*).

**Habit**: A large tree.

**Locality**: Field.

**Ethno. Use**: Fruits and Seeds used for diarrhoea.

Moraceae

**Ficus bengalensis** Linn. "Bargad", Stem bark (*), Root.

**Habit**: A large tree.

**Locality**: Road side.
Ethno. Use: The bark is used as astringent, given in dysentery. An infusion of the tips of aerial roots is provided orally to the children in dysentery.

Ficus racemosa Wall. "Gular", Fruit.

Habit: Tree.
Locality: Road side.
Ethno. Use: Juice of fruit is given in diarrhoea and dysentery.

Amaryllidaceae


Habit: Herb.
Locality: Garhpahra.
Ethno. Use: In combination of Root with aromatics and bitters. It is used in diarrhoea.

Dioscoreaceae

Dioscorea bulbifera Linn. "Baichandi" or "Ratalu", Root tuber.

Habit: Climbing herb.
Locality: Patharia.
Ethno. Use: Dried and powdered tubers are applied in piles and dysentery.
Palmae


**Habit** : Aquatic shrub.

**Locality** : Amarkantak.

**Ethno. Use** : Powder of rhizome used in stomachache.

Cyperaceae

*Cyperus rotundus* Linn. "Motha", Rhizome.

**Habit** : Herb.

**Locality** : Widespread at different places.

**Ethno. Use** : Rhizome is used in dysentery.

*Cyperus scariosus* R.Br. "Nagarmotha" Root tuber.

**Habit** : A small sedge.

**Locality** : Amarkantak forest.

**Ethno. Use** : Tubers are useful in fever, diarrhoea, dysentery.


**Habit** : Herb.

**Locality** : Banda.

**Ethno. Use** : The rhizome is cut into pieces, washed with water, dried and powdered. It is used for the treatment of stomachache and diarrhoea.
Polypodiaceae

**Actinopteris dichotoma** (Kuhn.) Hook. "Morshikha", Plant.

**Habit** : Herb.

**Locality** : Garhpahra.

**Ethno. Use**: The powdered plant is recommended for oral administration in dysentery.

* Plants which are not used in gastrointestinal infections but have been taken for screening against bacteria.

** The information which appeared to be new or at least not well known in the available literature on Indian medicinal plants.

(*) Plant part which is used in study.
M.P. is one of those region in India where the tribals and rural population and forest dwellers form a considerable part of the population. A large number of people particularly tribals and ruralss living in the far remote areas of the state in thick forests depend on nature for their food and shelter. These people especially belong to primitive or aboriginal culture have been found to possess a good deal of information about traditional medicines. The total belief on traditional medicines among primitive societies is based on their long felt experience and it will be of considerable significance if the value of such experience be held in proper scheme and due importance.

Periodical and extensive ethnomedicinal surveys carried out in the area understudy, to have revealed valuable information regarding medicinal uses of plants of M.P. from 1992-95. About 86 plants collected on the information mainly based on their uses for the treatment of gastrointestinal infections and other diseases belonging to 44 families have been included, in the present study some plants were tested against gram positive and gram negative bacteria and some selected plants against pathogenic fungus.

Ethnomedicinal collected plants are belonging to different group of plants viz. Dicot. Monocot, Gymnosperm and pteridophytes and belong to different habitat viz. herb, shrub, tree, climber.
Diarrhoea and dysentery are most common diseases in tribal people and villagers due to lack of knowledge of sanitation. It appears that most of diseases are transferred through contaminated water. Tribal peoples and villagers don't use modern medicines for their treatment and make use of their own system of herbal medicines.

Following common methods were usually employed for the preparation of various herbal prescriptions:
1. Plant parts directly used for external application.
2. Plant parts boiled in water to make decoction.
3. Plant parts of soaked in water or local wine to make an 'infusion'.
4. Plant parts dried and powdered.
5. Plant parts rubbed or inhaled.
6. Plant parts powdered and made into paste.
7. Plant part chewed.

Almost similar methods were also followed by the 'Adivasis' of Bastar (Jain 1963).

During the survey, it came into light, that people possess a good deal of knowledge about the medicinal uses of plants and they are still using them frequently. These people preserved the knowledge as one of the primitive and aboriginal cultures but they didn't like to share their knowledge with great persuasion and private consultation they agreed to provide informations. Some local medicinemen seemed proud of telling the secrete known to them. Similar
experiences were also recorded by Boding (1927) from Santhals and Jain (1965 b) from the tribals of Bastar (Madhya Pradesh).

A personal interview with these people revealed valuable information about medicinal uses of certain wild plant species against water borne diseases like diarrhoea, dysentery and gastrointestinal infections and because of this, a good number of medicinal plants were found in the selected places of Sagar district and Amarkantak-proved may be useful for the medicineman of Ayurved and to the science as a whole. The localities selected for this study are popularly inhabited by Gonds tribes. Besides, a number of people mainly villagers, medicineman, oldman of villages, vaidya, herbalists, farmers, gardners as well as "Kacchi", "Kumhar", "cowhards", "Goathards" etc., were also consulted for the collection of data.

After going through the survey reports, interview etc. It is evident that most of the rural population use only herbal drugs viz. Stem barks, Roots, leaves, rhizome etc., for most of the ailments and a number of water borne diseases could be cured by their traditional therapy.

The frequency of use of different plant/parts in all the prescriptions were counted and are given in tabular form.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Plant parts</th>
<th>No of prescription/used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Leaves</td>
<td>18</td>
</tr>
<tr>
<td>2.</td>
<td>Roots</td>
<td>14</td>
</tr>
<tr>
<td>3.</td>
<td>Stem bark</td>
<td>13</td>
</tr>
<tr>
<td>4.</td>
<td>Fruits</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>Whole plant</td>
<td>8</td>
</tr>
<tr>
<td>6.</td>
<td>Seeds</td>
<td>7</td>
</tr>
<tr>
<td>7.</td>
<td>Rhizome</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Root tuber</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>Stem gum</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>Flower</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Stem latex</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Stem</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Pod</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Wood</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Flower bud</td>
<td>1</td>
</tr>
</tbody>
</table>

The data given in table revealed that the leaves are most commonly used plant parts followed respectively by the other plant parts. Jain (1985 b) also recorded that the leaves and roots were used most commonly by the tribal people in Bastar.

The uses of collected materials were consulted with village medicine men, herbalists and vaidyas. After the identification of plant samples, their uses were also
searched in ayurvedic literature and in the published rep of various workers. Certain plant materials which were not available in fresh form, were also obtained from market and similarly their uses were confirmed from literature.