

Ethanobotanical Survey of Plants in Bordi Region Used In Gastrointestinal and Urinary Track Infections



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Abstract:

Bordi is small village in Dahanu Taluka, District Thane. The area under investigation is Aswali, Jambugaon, Khunawade, Gholwad and nearby padas which is a tribal area covered by thick dense forest, situated between 22052' N latitude and 74020' E longitude. The main ethnic tribes viz., Varli, Dhodi and Dubla are the largest tribal community residing in this area. All the three advasi's ethnic groups have strong belief on natural recourses for human welfare i. e. Panchamahabhuta.

Aim of the research was to collect information of medicinal plant against different diseases. In present research efforts are made to collect the information of plants used in gastrointestinal and urinary track infection. The data collected during the numerous discussions with tribal people was recorded for further biological assay which supports the research work. Antimicrobial activity of all 15 plants was carried out on bacterial strains such as *E. Coli*, *Salmonella paratyphi A*, *B. Subtilis* and *P. vulgaris*.

Keywords: Ethanobotany, plant survey, biological activity, gastrointestinal and urinary track infection, Bordi region.

Introduction:

Ethnobotany is an ever-growing field and forms the mainstream in establishing the therapeutic potential and medicinal use of herbs growing in the interior areas of India, where tribal people use plants of that region as medicines. The undesirable effect of the modern medicine has already reverted the attention of the people towards herbal medicines. To increase the acceptability and awareness among the people, there is an urgent need to develop trust and faith towards the safer indigenous system by establishing its validity in treatment for various diseases. This will also improve the health and quality of life of the entire nation (Pande et al, 2008). It is necessary to have full knowledge regarding the occurrence, frequency, distribution and phenology of various plant species for their proper utilization.

In view of the same findings, the research intend towards the study of Ethanobotany in Bordi region. Bordi is small village in Dahanu Taluka, District Thane. The area under investigation is Aswali, Jambugaon, Khunawade, Gholwad and nearby padas which is a tribal area covered by thick dense forest, situated between 22052' N latitude and 74020' E longitude.

The research mainly focused on the plants which are utilized in gastrointestinal infection and urinary tract infection. Gastrointestinal infection and urinary tract infection is caused mainly by viruses, parasites and bacteria. It caused diarrhea or vomiting that tends to involve non-

inflammatory infection in the upper small bowel or inflammatory in the colon (Andree *et. Al.* 2006). Most bacterial infections are food and water borne. *Escherichia coli* are gram-negative bacilli that constitute the gastrointestinal normal flora but are opportunistic in certain conditions and several strains of *E. coli* are associated with food poisoning and may cause severe illnesses. *Salmonella paratyphi A* is a gram negative bacillus which is a strict human pathogen and a causative agent of paratyphoid A. Annually 17 million cases of typhoid fever incidences are reported worldwide and the recommended combat includes proper health measures and antibiotics. *Bacillus subtilis* is not considered a human pathogen but it can contaminate food and in rare cases is known to cause food poisoning. *Proteus vulgaris* constitute normal flora of human intestine, but are opportunistically pathogenic and are causative agents of urinary tract and wound infections. Biological activities were carried out to provide scientific support to the traditional medicines.

Material and Method

The present study was done during 2013-14. The information was collected from various Padas and villages (mentioned above). The information gathered through questionnaire and discussion with various ethnic groups. The survey work was carried out in two parts viz., Floristic study in selected area and discussions with experience old folk and local vaidyas to know the significance of the plants for curing intestinal and urinary tract infection. Further the biological activities were carried out to find out the

inhibitory effect of plant extracts on related pathogens such as *E. Coli*, *Salmonella paratyphi A*, *B. Subtilis* and *P. vulgaris* which are involved in the infection.

Besides on the basis of frequent interviews with experienced old folk of various ethnic groups, the required information was collected viz., local names, plant part(s) used, method of drug preparation and dosage of the plants used for curing different ailments. The collected plant species are enumerated in alphabetical order followed by local names, families and ethnomedicinal uses.

15 plant species were listed which are used against gastrointestinal infection and urinary tract infection by tribals of Bordi region. Plant collection carried out by standard method (Jai *et. Al.* 1967). Identification of plants was done with the help of flora and other taxonomic literature (Jai *et. Al.*, 1963 a-e, Jai *et. Al.*, 1964 a-c, Jai *et. Al.*, 1965a-b). Selected plant material was collected from the forest for further extraction.

Extraction of plant material

Extraction of plant material was carried out by the standard procedures described by Wagner, 1996. The fresh plant material collected from forest was extracted in Methanol, Water and Chloroform by cold extraction method. Further extracts were evaporated at room temperature for complete dryness and redissolved in same solvents to get 10mg/ml concentration.

Antimicrobial Assay

The fresh Cultures of *Escherichia coli*, *Salmonella paratyphi A*, *Bacillus subtilis* and *proteus vulgaris* were collected from Microbiology Laboratory of King Edward Memorial Hospital, (KEM) Mumbai, MH, India. The Cultures were maintained by Sub Culturing on the Nutrient Agar Medium at 37⁰ C. Antibacterial assay was carried out by Standard Disc Diffusion Method described by Bauer (Bauer and Kriby 1996). The cultures were incubated at 37°C for 24hrs. Inhibitory activity of extracts was measured in terms of Inhibition Zone (mm).

Ampicillin and Chloramphenicol discs were used as positive controls. Alcohol controls were used as blanks to determine the effective inhibitory activity of plant extracts. Effective inhibitory activity = activity of plant extracts - activity of 100 % ethanol Plates were incubated at 37⁰ C for 48 hrs. Observations were made after 48 hours and the diameter of the zone of inhibition was recorded using a millimeter ruler.

Result and Discussion

Enumeration of plants

In present field survey we have identified total 15 species of medicinal plants belonging to different families which are

used against gastrointestinal and urinary tract infections nearby Bordi region.

Bordi is small village in Dahanu Taluka, District Thane. The Bordi region includes following villages viz., Aswali, Khunwade, Gholwad, Jambugaon. The area under investigation is Aswali, Jambugaon, Khunawade, Gholwad and nearby padas which is a tribal area covered by thick dense forest, situated between 22052' N latitude and 74020' E longitude. The main ethnic tribes viz., Varli, Dhodi and Dubla are the largest tribal community residing in this area. Varlis are an indigenous tribe living in mountainous as well as coastal areas of Maharashtra and Gujarat border. Dhodi and dubala are the hindu caste found in Maharashtra and Gujarat state. Dublas are also called Talvi Rathode. All the three adivasi's ethnic groups have strong belief on natural recourses for human welfare.

During the discussion with elder people it was found that for any treatment of any infections, plants are used in various forms; either fresh or dry with different preparation methods. It may be applied as it is or with some modifications such as paste or powder. The detailed information for each plant is listed in Table no. 1.

Antimicrobial assay

In present investigation we have obtained remarkable antibacterial activity for all plant extracts against fresh Cultures of *Escherichia coli*, *Salmonella paratyphi A*, *Bacillus subtilis* and *proteus vulgaris* (Table No. 2).

The results were compared with positive control i.e Ampicillin (10mcg/ disc) and negative control i.e. solvents.

The report of the study gives an over view of the medicinal plants in the Bordi region with its floristic details. The information collected during this survey work can be applied as baseline data to decide the status of biodiversity, conservation, community development and even for the phytochemical studies of such plants, need to be taken up to find out the bioactive ingredients that help in curing various human ailments.

Conclusion

The information collected during this survey work can be applied as baseline data to decide the status of biodiversity, conservation, community development and even for the phytochemical studies of such plants, need to be taken up to find out the bioactive ingredients that help in curing various human ailments. Combined information of all these studies can be used to develop and formulate medicines for gastrointestinal and urinary disorders with an active ingredient.

Table No. 1: enumeration of plants used as gastrointestinal and urinary track infection.

Sr. no	Scientific name	Common name	Family	Medicinal importance
1	<i>Aegle marmelos</i>	Bel	<u>Rutaceae</u>	Pulp of the ripped fruit is useful in chronic diarrhea, piles, severe stomach pain and bacterial dysentery . During summer season the pulp of the fruit is taken in the form of <i>sarbat</i> to get relief from sun stroke.
2	<i>Achyranthus aspera</i>	Aghada	<u>Amaranthaceae</u>	Infusion of roots applies on boils, skin eruptions and piles. Mild doses are used in labour pain but high doses produce abortion. It is also used in reptile bites. Also used in dysenteric problems.
3	<i>Cassia tora</i>	Takala/Tarota	<u>Caesalpinaceae</u>	Decoction of seeds is used to get relief from severe stomach pain also useful in skin diseases.
4	<i>Dioscoria bulbifera</i>	Kadukarinda	<u>Dioscoriaceae</u>	Bulbils are used in piles, skin diseases and also in mild dysentery.
5	<i>Eclipta alba</i>	Maka	<u>Asteraceae</u>	Extract of the whole plant is used in hair oil as tonic to boost the growth of the hairs, and also used as liver tonic.
6	<i>Grewia hirsute</i>	Khad Dhaman	<u>Tiliaceae</u>	Fruits are edible. Bark of the tree effective in skin diseases like eczema, leprosy etc. and also used in stomach ache.
7	<i>Hemidesmus indicus</i>	Anant mul	<u>Asclepiadaceae</u>	The roots crushed and mixed with goat milk and given orally to nursing mother for a week to increase the lactation. The roots are chewed to cure toothache. Root is used for giving aroma to tea and also purifies blood, skin diseases and stops vomiting and also useful in urinary problems.
8	<i>Holarrhena antidysenterica</i>	Kutaja/ Indrajav	<u>Apocynaceae</u>	Bark is used in gripping bowel, effective in dysentery and diarrhea . Latex of stem is applied externally to cure scabies and skin diseases. Powder of dried bark is mixed with boiled water and given orally twice a day for 5 days to cure amoebic dysentery.
9	<i>Mimusops elengi</i>	Bakul	<u>Sapotaceae</u>	Bark is used to enhance the fertility in women, it also used in snake bite and to relieve headache. Fruits and flowers used in wound, ulcer and urinary problems . Unripe fruits useful in fixing loose teeth.
10	<i>Morinda tomentosa</i>	Bartondi	<u>Rubiaceae</u>	The fruit is pulp used in diarrhea and chronic amoebic dysentery . The leaves are used in skin eruptions and prickly heat.
11	<i>Murraya koeingii</i>	kadipatta	<u>Rutaceae</u>	The leaves are used as spice it is used for seasoning the curries, anti- helminthes and also useful in vomiting and poisonous bites. Useful in urinary problems
12	<i>Ocimum sanctum</i>	Tulsi	<u>Lamiaceae</u>	Leaves are used in common cold and cough in children and as blood purifier and also useful in skin disease, ringworm, insect bites and urinary problems.
13	<i>Plumbago zeylanica</i>	Chitrak	<u>Plumbaginaceae</u>	The leaves and flowers are useful in skin diseases, diarrhea, ulcers and scabies and also highly effective on baldness and as abortifacient.
14	<i>Sida acuta</i>	Ati bala	<u>Malvaceae</u>	Roots are used in general debility, weakness and also to increase the vigor and vitality. Paste of the leaves is used in chronic dysentery, burns and boils.
15	<i>Sida cordifolia</i>	Bala	<u>Malvaceae</u>	Whole plant is useful in urinary disorders , in bile mal-function and in Migraine (head ache with hyper acidity).

Table No. 2: sensitivity of plant extracts on bacterial cell line of *Escherichia coli*, *Salmonella paratyphi A*, *Bacillus subtilis* and *proteus vulgaris*

No.	Plant Name	Extract	Inhibition zone											
			E. Coli			S. Paratyphi A			B. subtilis			P. vulgaris		
			1	2	3	1	2	3	1	2	3	1	2	3
1	<i>Aegle marmelos</i>	H ₂ O	-	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
2	<i>Achyranthus aspera</i>	H ₂ O	-	+	+	-	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
3	<i>Cassia tora</i>	H ₂ O	+	+	+	-	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
4	<i>Dioscoria bulbifera</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
5	<i>Eclipta alba</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	-	+	+
6	<i>Grewia hirsute</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
7	<i>Hemidesmus indicus</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
8	<i>Holarrhena antidysenterica</i>	H ₂ O	+	+	+	+	+	+	-	-	+	-	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
9	<i>Mimusops elengi</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
10	<i>Morinda tomentosa</i>	H ₂ O	-	-	+	-	-	-	-	-	+	-	-	-
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
11	<i>Murraya koeingii</i>	H ₂ O	-	-	-	-	-	-	-	-	-	-	-	-
		C ₂ H ₅ OH	+	+	+	-	+	+	-	-	-	+	+	+
		CHCl ₃	+	+	+	-	-	+	-	-	+	-	-	+
12	<i>Ocimum sanctum</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+

13	<i>Plumbago zeylanica</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
14	<i>Sida acuta</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+
15	<i>Sida cordifolia</i>	H ₂ O	+	+	+	+	+	+	+	+	+	+	+	+
		C ₂ H ₅ OH	+	+	+	+	+	+	+	+	+	+	+	+
		CHCl ₃	+	+	+	+	+	+	+	+	+	+	+	+

H₂O- water extract, C₂H₅OH- ethanol extract, CHCl₃ – chloroform extract; 1: 10ul. 2: 20ul and 3: 300ul. ‘-’: zone of inhibition 0mm – 10mm, ‘+’: zone of inhibition 11mm- 25mm).

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