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## Ethnobotanical survey of medicinal plants used for the treatment of diarrhoea and dysentery by the Tribals of Mahoba district (Uttar Pradesh), India

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### Abstract

The present study is the first hand information regarding the ethanobotanical use of plants on diarrhoea and dysentery by the tribals of Mahoba district (U.P.) India. It is inhabited by different tribals who possess vast knowledge about uses of a good number of plant species for curing various ailments, where modern medicine and hospital are still unvariable within their reach. Diarrhoea and dysentery are the main water borne disease considered to be endemic in many regions of the world that bring the major health threats to the world population, both in tropical and subtropical poor countries. Questionnaire surveys, participatory observations and field visits are made to elicit information on the uses of various plants. This survey includes 23 ethanomedicinal plants of 21 genera belonging to 15 families, featured in popular antidiarrhoeal and antidysentery activities. Botanical name, family, local name, parts used and ethanobotanical uses of the plants are reported briefly. Some useful species are under serious threat due to unsustainable activities. Hence, a proper documentation of useful plants with their present status and local traditional knowledge as well as practices is urgently needed. Effort should also be initiated to implement appropriate conservation measures for preservation and sustainable use of these useful species.

**Keywords:** Diarrhoea, dysentery, ethnobotanical plants, indigenous knowledge, mahoba, traditional uses, tribal people, etc.

### Introduction

India is one of the world's leading biodiversity centers, comprising about 45,000 different plant species (Asthana, 2016) [2]. Over 6000 plants in India are used in traditional, folklore and herbal medicine. The Indian system of medicine has identified 1500 medicinal plants in which 500 are commonly used (Agarwal and Tyagi, 2015) [1]. According to WHO herbal medicine serve the health needs of about 80% of the world's population especially for millions of people in the vast rural areas of developing countries (WHO, 2001) [13].

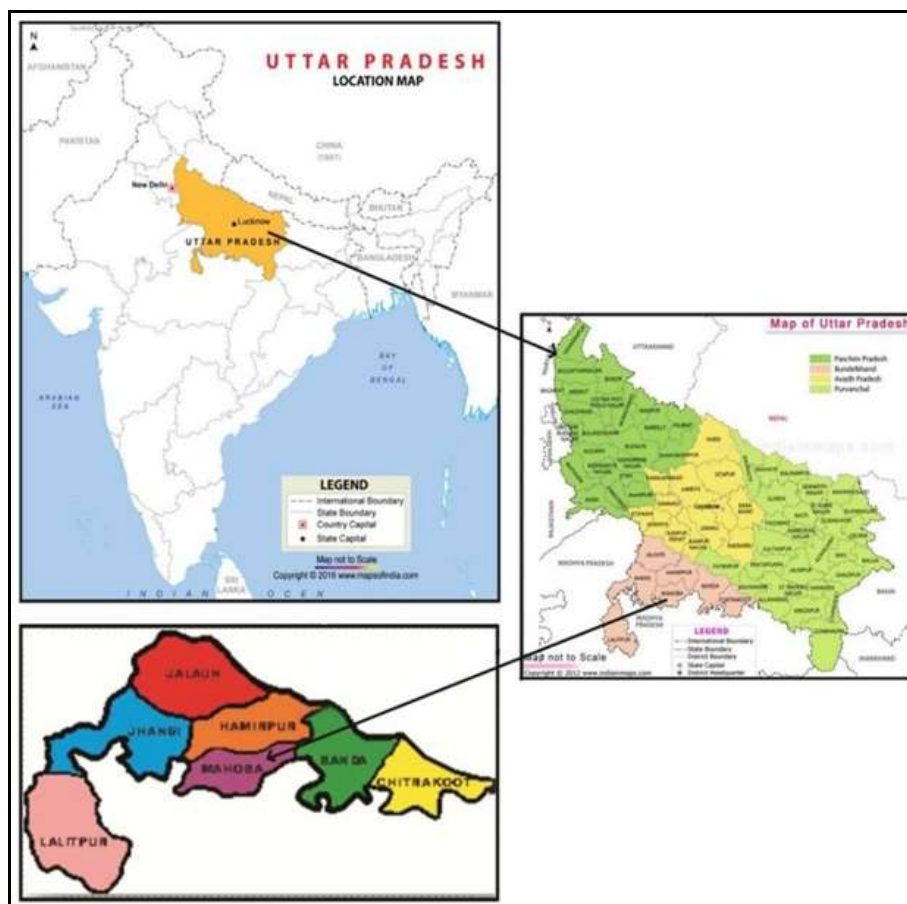
Rural people, especially the ethnic communities of India, traditionally used the plant resources for their food, shelter and healthcare. In this regard, a biological relationship formed out and traditional uses of plants as medicines are in practice. Such knowledge, mostly oral, is passed on to generations and thus appears to be eroding owing to the gradual changes in the life style of these communities. Even after identification of many plants used in Indian system of medicine, a large number of plants or uses of plant are yet to be documented, particularly which are confined among the people of rural areas (Pattanayak, 2012) [6].

Diarrhoea is said to be an endemic disease in many of developing Asian countries, considered one of the major public health concern that lead epidemic cause of high degree of morbidity and mortality in rural communities (Synder and Merron, 1982) [9]. It is one of the most common disease for all age groups with a symptom of having three or more loose or liquid bowel movement per day or more frequently than normal for the individual (WHO, 2015) [10]. Diarrhoea is a condition of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms and spreads through contaminated food or drinking water, or from person to person as a result of poor hygiene (WHO, 2015) [10]. But Dysentery is an episode of diarrhoea in which an intestinal inflammation causing frequent passage of faecal with mucus and blood. Vomiting and fever may accompany it. There may be abdominal cramps and pain on defecation. Diarrhoea or bloody diarrhoea forms an important cause of

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mortality all over the world especially in the developing countries (Jebunnessa *et al.*, 2009) [4]. Globally, an estimated 1.8 billion diarrhoeal death among children occur every year (WHO, 1995) [12]. According to the WHO approximately 3.5 million deaths each year are also attributable to diarrhoea and

80% of those deaths occur in children under the age of 5 years. The determination of diarrhoea disease in India, the preventive, control and better developments are to be reviewed for planning and health services among the communities (Lakshminarayanan and Jayalaksmy, 2016) [5].



**Map 1:** Location map of Mahoba district in Uttar Pradesh, India

The World Health Organization (WHO) studies the problem of diarrhoea and importance of traditional medicine practices and prevention method for controlling the disease. This may be valuable advantage of traditional medicine in reducing the rate of mortality in developing countries due to diarrhoea (Woldeab *et al.*, 2008) [11]. Because of lack of sanitation and safe drinking water, the incidences of diarrhoea and dysentery are being dominant among the community. However, the modern medicines are still unreachable for their living and herbal medicines are the only available option to them for the treatment, as it provides cheap alternative without any known side effects. They have profound knowledge of herbal preparations used to treat diarrhoea and dysentery.

Uttar Pradesh is known to have rich flora of medicinal plants. Ethnomedicinal survey was conducted in different geographical locations of the state and valuable data on the uses of plants as folk medicine has been recorded. A good number of plants species are being used by tribal and rural people for the treatment of diarrhoea and dysentery. Mahoba is a well-known district of Uttar Pradesh, India. It is also known to have rich flora of medicinal plants. It occupies the Bundelkhand part of Uttar Pradesh. The tribal people of this district primarily depend on ethanobotanical plants of their surroundings for health. The most common reason for using traditional medicine, is that more affordable, more closely corresponds to the patient's ideology, allays concerns about the adverse effect of chemical (synthetic) medicines, satisfies a desire for more personalized health care and allows greater

public access to health information.

This study is therefore a pioneering work among the ethnic groups in Mahoba. In the drop of the above facts the present study aims to document the different plants used in diarrhoea and dysentery. Documentation of traditional ethnomedicinal knowledge, indigenous herbal preparation for diarrhoea and dysentery could help in preserving knowledge and creating awareness regarding the need for conservation of biological resources.

## Materials and Methods

### Study area

The study was conducted for collection of ethanobotanical information against diarrhoea and dysentery from the Mahoba district of Uttar Pradesh. Mahoba is a very backward and under developed area of Bundelkhand region of Uttar Pradesh, but good repository of medicinal plants. It is situated between latitude 25° 18' N and longitude 79° 53' N surrounded on the east by district Banda, on the west by the district Jhansi, on the south by state of Madhya Pradesh and on the north by district Hamirpur of South-Western Uttar Pradesh. The total area of district is about 3071 square kilometer. It has a population of 8, 75,958 (as of 2011). People spread over 521 villages and the district is divided into three tehsils named Kulpahad, Charkhari and Mahoba. The district is inhabited by a large section of rural population and different tribes (*viz.* Sahariya, Kol and Gond) and Nomads (*viz.* Kanjad, Kanfar, Padkola and Jasaundhi). These people

widely utilize plant resources to meet their herbal medicine requirements.

### Survey

Ethnobotanical survey was carried out to get maximum information. The ethnobotanical data was collected through questionnaire, series of interviews and discussions among the local people, experienced aged rural folk, traditional medicine practitioners and local herbal drug sellers. The traditional healers were specifically asked about the plants used for treatment of diarrhoea and dysentery along with local name, parts used, mode of application, and dosage of the prescribed medicine.

### Collection and identification of medicinal plants

The plants used by the inhabitants are all locally grown. The plant samples used by the traditional health practitioners were collected safely. Specimens and voucher deposited in the 'Duthie Herbarium' Department of Botany, University of Allahabad, Prayagraj, U.P. These collected plants specimens were identified with the help of available taxonomic literature (Duthie 1994, e-Flora 2008, The plant list 2013, JSTOR 2020, GIBF 2020 and Herbarium catalogue 2021). The data collected in the field were formatted and preserved carefully.

### Results and Discussion

A total of 23 ethnobotanical plants species belong to 21 genera and 15 families has been reported to treat diarrhoea and dysentery by the tribal communities of Mahoba district of U. P., India. The collected medicinal plants were arranged alphabetically in table (1) with their local name, family, collection number, habit, parts used and mode of application. The reported species were distributed among 23 botanical families in which 13 families are angiospermic and 2 are pteridophytic. Family Rutaceae (4 species), Fabaceae (3 species) and Rhamnaceae (3 species) were best represented in terms of the number of species (figure 1), followed by Asteraceae (2 species). The other important families of medicinal plants are Selaginellaceae, Sapotaceae, Mimosaceae, Apocyanaceae, Myrtaceae, Ebenaceae, Cyperaceae, Tilliaceae, Solanaceae, Cannabinaceae and Adiantaceae etc.

All the medicinal plants were reported in their local names since the local communities know them only by their local names. Based on the life forms (plant habit), there are 49.8% herbs, 26.1% shrubs and 21.6% trees (figure 2). The traditional health practitioners and local people of this area collected the medicinal plants from their natural habitats at different seasons and prepared the plant products. The

preparation range from decoction, juice, powder, pulp, extract, crushed, flour and plant part directly etc. They were administered as respective medicine in appropriate doses to the patients. Almost all medicinal remedies were based on the preparation of a single plant, few of them in combination with other plant parts. The study based on the plant parts used (figure 3) reveals that the leaves (30.4%) were most commonly used in the treatment followed by fruits (21.7%), shoots (17.3%), roots (8.6%), seeds (8.6%), root bark (8.6%) and stem bark (4.3%). In terms of herbal preparation or mode of treatment (figure 4) people mostly used decoction (26.0%) followed by juice (17.3%), crushed (17.3%), powder (13.0%), pulp (13.0%), extract (4.3%) and flour (4.3%). They were administered as respective medicine in appropriate dosage in the patients. Almost all medicinal remedies were based on the preparation of a single plant, few of them in combination with other plant parts. Among 23 ethnomedicinal plant species, 6 were used for diarrhoea, 12 for dysentery and 6 for both diarrhoea and dysentery (figure 5).

The medicinal use of plant leaves in the management and treatment of the diseases have been an age long practice (Sofowara, 1982) [8] thereby, it will directly affect the photosynthesis, interchange of gases, floral induction, transpiration and storage of water because leaves are the most important for life. Plant derived medicines are widely used because they were relatively safe than the synthetic alternatives, they are easily available and cheaper (Iwu *et al.* 1999) [3]. Plant preparations were prepared mostly as decoction (figure 6). Decoctions were used to prepare herbal teas from the hard parts of the plant. The tribal communities were very knowledgeable about the medicinal plants and still depending on the herbal products for treatment of their common ailments and disease like diarrhoea and dysentery. The incidence of diarrhoea and dysentery may be related to changing of seasons, warm climate, poor environmental sanitation and non-availability of portable water during floods and rainy seasons. The basic ingredients in the traditional medicine are the medicinal plants which are depleting at a faster rate due to increase in consumption and indiscriminate drawl of resources from the wild. With the changing scenario there is a need to enhance and promote the conservation and cultivation of their natural resources especially medicinal plants. In addition to the requirement for conservation of medicinal plants, it has also become essential to protect and patent the traditional knowledge (Raghupathy and Lakshmi, 2001) [7]. Not only this, but evaluate pharmacological investigations of medicinal plant is required to discover new drugs and better use of resources as well.

**Table 1:** Ethnobotanical plants being used to treat and manage diarrhoea and dysentery along with their mode of medicinal use

S. No.	Botanical name	Local name	Family	Collection number	Habit	Parts used	Mode of medicinal use/ Formulations
1	<i>Adiantum incisum</i> Forsk.	Hansraj	Adiantaceae (Pteridophyte)	274	Herb	Whole Plant	Extract of whole plant along with sugar candy given orally for the Treatment of dysentery.
2	<i>Aegle marmelos</i> (Linn.) Corr. ex. schultz	Bel or Belpatra	Rutaceae	163	Tree	Unripe fruit	Unripe fruit, roasted in the fire and the pulp taken in the morning in empty stomach in case of Dysentery and diarrhoea.
3	<i>Blumea lacera</i> (Burm. f.) DC.	Kukuraund ha	Asteraceae (Compositae)	106	Herb	Leaves	Leaf juice, about 10 ml given orally thrice a day in Diarrhoea to children.
4	<i>Cannabis sativa</i> Linn.	Bhang	Cannabinaceae	169	Herb	Leaves and flowering tip	Decoction of the leaves and flowering tips (15-20 drops) given orally daily in Blood dysentery.
5	<i>Capsicum annuum</i> L.	Mircha	Solanaceae	140	Herb	Fruit	Fruit crushed, add black salt and given orally in Dysentery.
6	<i>Cicer arietinum</i> L.	Chana	Fabaceae (Papilionaceae)	223	Herb	Seeds	The flour of seeds is made into paste with water and fried in mustard oil as globules. It is taken to treat Amoebic dysentery.

7	<i>Citrus aurantifolia</i> (Chr.) Sw.	Nimbu	Rutaceae	32	Shrub	Leaves	Crushed leaves, given Orally twice a day in diarrhoea.
8	<i>Corchorus capsularis</i> L.	Sanai	Tiliaceae	233	Herb	Bark and leaves	Bark and leaf crushed, (10 Ml) extract given orally twice a day in Dysentery.
9	<i>Cyperus rotundus</i> Linn.	Motha ghas	Cyperaceae	258	Herb	Roots	Roots, (50 gms) boiled in the water and mixed with milk and little honey given orally in the morning for 4 to 5 days in chronic Dysentery.
10	<i>Desmodium triflorum</i> DC.	Kudai	Fabaceae (Papilionaceae)	156	Herb	Whole plant	The whole plant, mixture with leaves of Gumithra ( <i>Leucas cephalotes</i> ) and taken to cure diarrhoea and Dysentery.
11	<i>Diospyros melanoxylon</i> Roxb.	Tendu	Ebenaceae	213	Tree	Fruit	Dried fruit powder, given Orally twice a day in diarrhoea and dysentery.
12	<i>Eucalyptus citriodora</i> H.K.	Safeda	Myrtaceae	21	Tree	Leaves	Leaf juice given orally thrice a day in diarrhoea.
13	<i>Helianthus annuus</i> L.	Surjumukhi	Asteraceae (Compositae)	363	Herb	Leaves	About 20 ml Leaf juice, given orally thrice a day in Diarrhoea.
14	<i>Holoarrhena antidysentrica</i> (Linn.) Wall	Kuda	Apocynaceae	9	Small tree	Bark	Powdered bark, (two tea spoonful) add in one cup of boiling water to make fresh infusion and it is given orally, (2 tea spoonful) three times, daily, in all varieties of dysentery either chronic or Acute.
15	<i>Indigofera linnaei</i> Ali.	Durkunu	Fabaceae (Papilionaceae)	172	Herb	Whole plant	Whole plant decoction (50 ml.) given orally twice a day in stomach ache, Diarrhoea and dysentery.
16	<i>Limonia acidissima</i>	Kaitha	Rutaceae	91	Tree	Fruit	Fruit pulp given orally to cure diarrhoea and Flatulence.
17	<i>Manilkara hexandra</i> (Roxb) Dub.	Khirni	Sapotaceae	135	Tree	Seeds	About 50 gm seed powder given orally thrice a day in dysentery and gastric Troubles.
18	<i>Murraya paniculata</i> (Linn.) Jack	Meethi neem	Rutaceae	182	Shrub	Leaves	Leaves juice (20 ml) given orally once a day in Dysentery.
19	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Jungal jalebi	Mimosaceae	99	Shrub	Root bark	Decoction of root bark mixed with the paste of ginger (3:2) given orally Twice a day to cure dysentery.
20	<i>Selaginella bryopteris</i> (L) Bak.	Kamraj	Selaginellaceae (Pteridophyte)	271	Herb	Whole plant	Whole plant decoction (20 ml) given orally with some water, twice a day in Dysentery of child.
21	<i>Zizyphus xylopyrus</i> (Retz. Willd)	Chhota ber	Rhamnaceae	221	Shrub	Fruit	The fruit pulp mixed with sugar and a small quantity of common salt taken Orally to cure diarrhoea and dysentery.
22	<i>Zizyphus mauritiana</i> Lamk.	Ber	Rhamnaceae	37	Shrub	Stem bark	The paste of stem bark with the decoction of long pepper (3:2) given for cure of blood dysentery.
23	<i>Zizyphus nummularia</i> (Burm f.) Wt & Arn.	Jhar-beri	Rhamnaceae	160	Shrub	Root	50 ml decoction of root powder given orally twice a day for 5 days in diarrhoea.

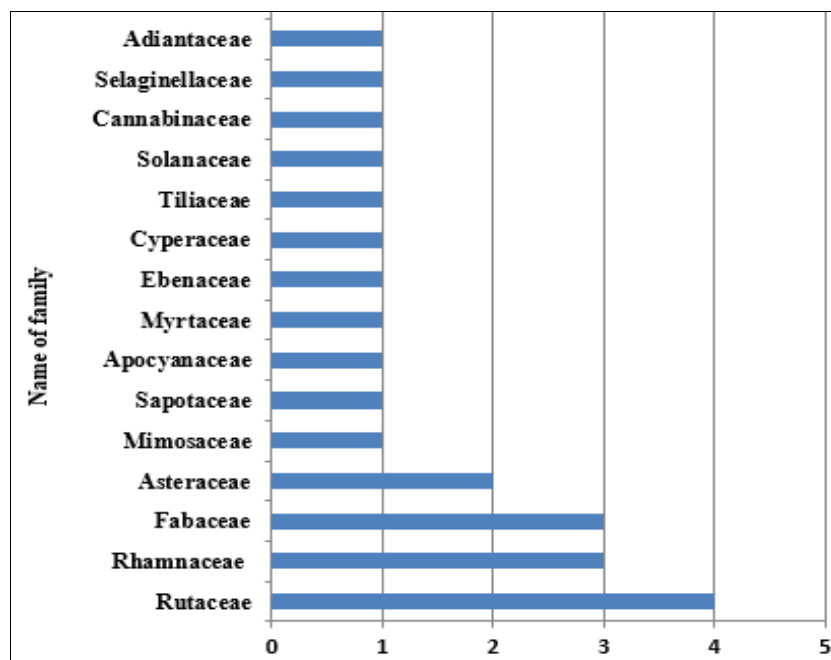


Fig 1: Families of the ethno medicinal plants used for diarrhoea and dysentery with their frequencies

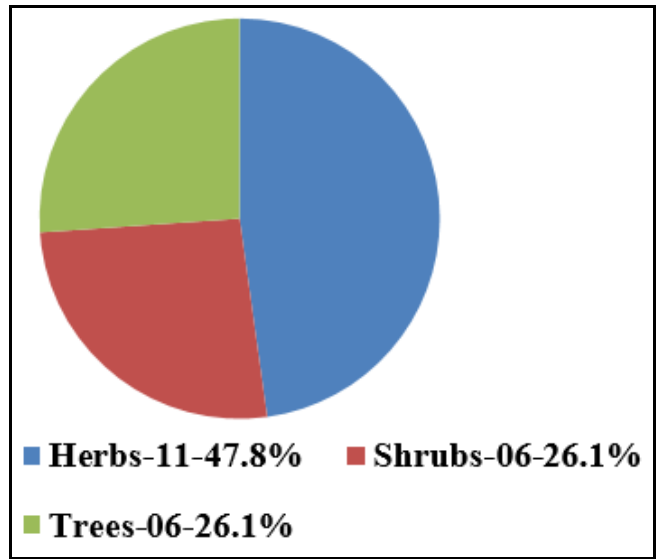


Fig 2: Percentage of life form (Plant habit)

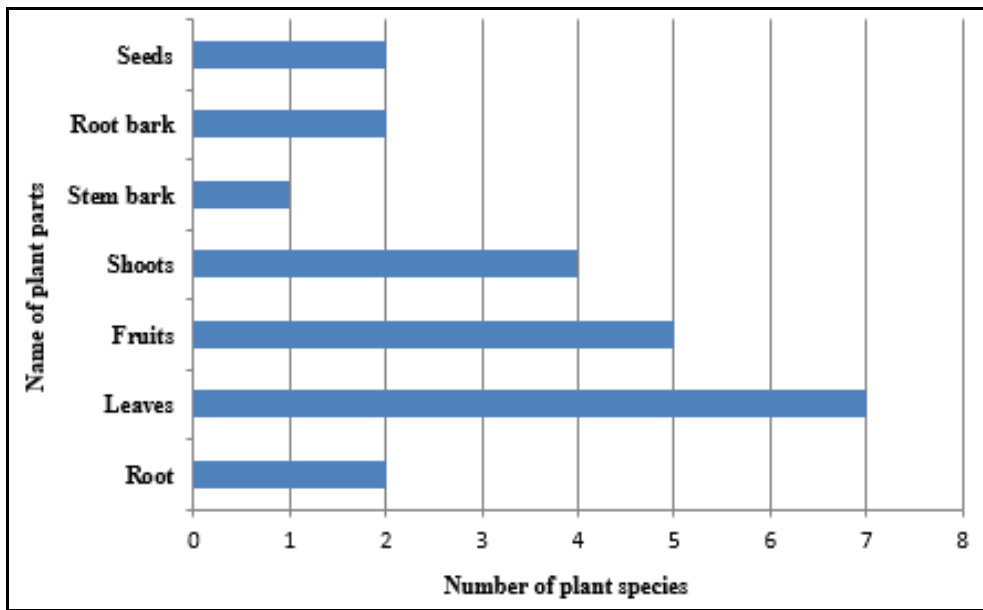


Fig 3: Plants parts used to cure diarrhoea and dysentery

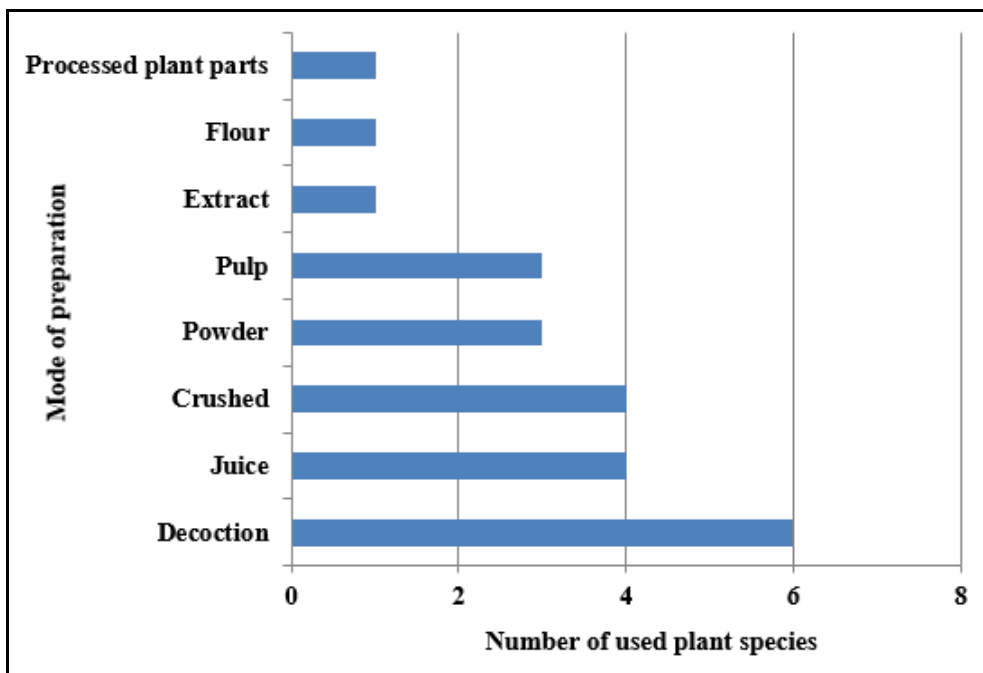
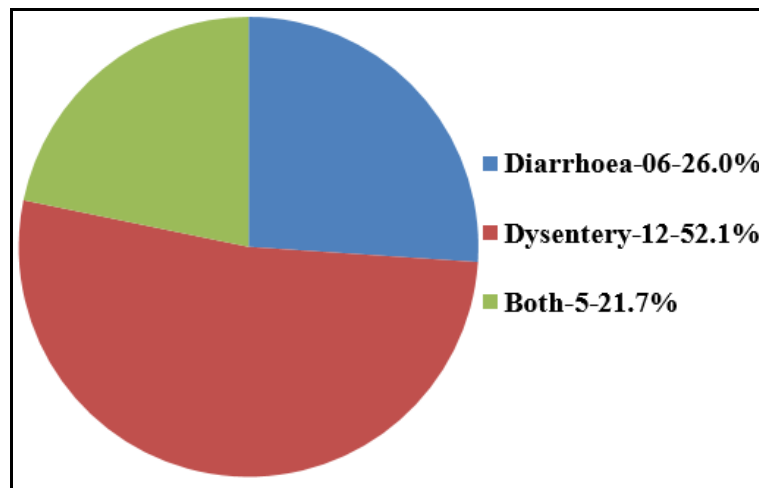


Fig 4: Mode of preparation and used plant species



**Fig 5:** Percentage of plant species used to treat diarrhoea and dysentery

### Conclusion

The present study indicates that the district Mahoba has high biodiversity of medicinal plants. After gradual socio-cultural transformation, the ethnic groups and rural people still rely upon the efficacy of medicinal plants for treatment of some common health problems, owing to their poor socio-economic conditions, high cost and difficulty to access the allopathic medicines. In this survey, a total of 23 medicinal plant species used to treat diarrhoea and dysentery were recorded and documented very well. From this study report, it is also clear that the conservation of traditional knowledge and practice is very important, there is most urgent need to transfer traditional health knowledge and technology to further generation because things are changing now due to deforestation, modernization of region and lack of proper written records passed down from generation to generation. Thus, it is felt that there is an urgent need and attention required to document and conserve such vital resources as to optimize their use in the primary health care system. The scientific study is also required to tap and harvest the medicinal constituents of the rich medicinal plant enable catering the needs of vibrant healthcare products in future. The biodiversity and wealth of Mahoba district for medicinal plants are a great legacy that deserves to be protected from undue influences and effects.

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