

Full Length Research Paper

# Hepatoprotective medicinal plants used by the Gond and Bhill tribals of District Raisen Madhya Pradesh, India

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The ethnobotanical survey of the medicinal plants used in the management of jaundice (hepatic disorder) was carried out in the District Raisen of Madhya Pradesh. The herbalists, herb sellers and traditionalists were interviewed by the administration of questionnaires. Floristically, the area is placed in Malwa plateau region of Madhya Pradesh. Aims of the study were to document the medicinal plant resources and their use patterns by the tribal people. A total of 19 plant species belonging to 16 families were reported as locally used for the hepatic disorder purposes. Majority of the recipes are prepared in the form of decoction from freshly collected plant parts. Mostly a single species is used and taken orally. Field observations showed that vegetation of the area was generally threatened with the ignorance of local communities. The trends like urbanization, deforestation, over grazing, habitat fragmentation, unscientific extraction of natural vegetation, introduction of the exotic taxa and habitat loss were the visible threats. Measures for the conservation of plant resources especially medicinal plants of Raisen district of Madhya Pradesh are urgently needed. Some of the important species for the alleviation of hepatic disorders are *Aegle marmelos*, *Azadirachta indica*, *Cajanus cajan*, *Cuscuta reflexa*, *Gloriosa superba* and *Ricinus communis*.

**Key words:** Jaundice, tribe, medicinal plant, conservation, hepatic disorders.

## INTRODUCTION

Jaundice is the most common of all liver disorders. It is not a disease but rather a sign that can occur in many different diseases. Jaundice is the yellowish staining of the skin and sclerae (the whites of the eyes) that is caused by high levels in blood of the chemical bilirubin. The color of the skin and sclerae vary depending on the

level of bilirubin. It is a condition in which yellow discoloration of the skin and mucous membranes occur due to an increase in the bile pigments, namely, bilirubin in the blood. When the bilirubin level is mildly elevated, they are yellowish. When the bilirubin level is high, they tend to be brown. Jaundice is caused by bilirubin which

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comes from red blood cells. When red blood cells get old, they are destroyed (Balakrishnan et al., 2011). Hemoglobin, the iron-containing chemical in red blood cells that carries oxygen, is released from the destroyed red blood cells after the iron it contains is removed. Jaundice may be caused by an obstruction of the bile ducts which normally discharge bile salts and pigment into the intestine. The bile gets mixed with blood and this gives a yellow pigmentation to the skin. The obstruction of the bile ducts could be due to gallstones or inflammation of the liver, which is known as hepatitis, and is caused by a virus. Jaundice may result from various diseases or conditions that affect the liver, like hepatitis A, hepatitis B, hepatitis C, hepatitis D, hepatitis E, auto immune hepatitis, liver cirrhosis, liver cancer, hemolytic anaemia and malaria. There is no unique treatment for jaundice (hepatitis) by prescribing modern allopathic and homeopathic medicine (Agarwal, 2001; Goel and Bhattacharya, 1981).

Jaundice indicates excessive levels of conjugated or unconjugated bilirubin in the blood and is clinically apparent when the bilirubin level exceeds 2 mg/dl (34.2  $\mu\text{mol/L}$ ). It is most apparent in natural sunlight. In fact, it may be undetectable in artificial or poor light. In fair-skinned patients, jaundice is most noticeable on the face, trunk and sclerae; in dark-skinned patients, it is noticeable on the hard palate, sclerae, and conjunctivae. Pseudo jaundice may be found in black patients with pigmented sclera, from carotinemia, uremia (a sallow yellowish pallor), and quinacrine (a yellow-green color). Causes of jaundice can be classified into pre-hepatic, hepatic or post hepatic (Saleem et al., 2008; Stickel and Schuppan, 2007; Chang et al., 2008).

In this paper, our focus is on post hepatic causes of jaundice (obstructive or surgical cholestasis) as this is more relevant to surgeons. Obstructive jaundice is not a definitive diagnosis and early evaluation to establish the etiology of the cholestasis is crucial to avoid secondary pathological changes (e.g. secondary biliary cirrhosis) if obstruction is not relieved.

In this context, the present study is the first milestone with particular emphasis on antiviral application of medicinal plants for jaundice. Chemical that remains in the blood after the iron is removed becomes bilirubin. The symptoms of jaundice are extreme weakness, headache, fever, loss of appetite, severe constipation, nausea and yellow discoloration of the eyes, tongue, skin and urine. The patient may also feel a dull pain in the liver region. Obstructive jaundice may be associated with intense itching. Pulse, tongue, nail and eye examinations are important diagnostic methods used to reveal a person's body humour and its imbalance. This will help the doctor in treating the disease. Quite a handful of tribes reside in every nook corners of Raisen district of the state Madhya Pradesh. The tribal (Figure 1) community via Gond, Bhils, Pardhan, Agariya, Ojha, Nagarchi and Solhas are one of the nomadic tribes who have settled down in villages. The historical evidences reveal that they associated

themselves with the forest which provides them all their day-to-day requirements. The main objective of this paper is to analyze how these tribal pastoralists and peasants agriculturists have interacted with the forest resources in utilizing them for jaundice. The tribals of the district are still using the natural resources available in their surroundings to treat many diseases and accidental derangements. They believe in mantras and tantras also, in the view of snake bites, they are using the old tradition of treatment, that is, by mantras along with the administration of particular plant drugs.

### Study area

Raisen District of the Bhopal commissioners division lies in the central part of Madhya Pradesh. The District is situated between the latitude 22° 47' and 23° 33' North and the longitude 77° 21' and 78° 49' East. It lies mostly on the Malwa Plateau and partly in the Narmada Valley. The District has an irregular shape. The Tropic of Cancer passes through the Northern part of the District. It is bounded in the West by Sehore District, in the North by Vidisha District, in the East and North-East by Sagar District, in the South-East by Narsimhapur District, and in the South by Hoshangabad and Sehore Districts. The Narmada river flows along the South-Eastern boundary of the Districts and separates it from Narsimhapur and Hoshangabad District (Figure 2). The total area of the District is 8,395 sq. km which contains 1.93% of the states total area. The District Raisen has a dry climate except in the Southwest monsoon season. The year may be divided into four seasons. The period from March to about the second week of June is the hot season. The South-West monsoon season which follows thereafter continues up to end of September. October and November constitute the post-monsoon season. The cold season is from December to the end of the February. The temperature obtained in the area is mild for the latitude due to the effect of altitude. Thus, the climatic conditions in the District are normal. During the summer season, the mercury raises up to 42°C and during the winter, the climate is cold and the temperature is around 5°C. The average annual rainfall in the District is 1312.6 mm. (50.693 inches). The region around Bareilly and Sultanpur gets the lowest rainfall in the District and that around Chiklod gets the highest rainfall. About 22% of the annual rainfall in the District is received during the South-West monsoon months from June to September, July being the rainiest month.

### MATERIALS AND METHODS

In the present investigation we focused on medicinal plants used to treat jaundice and hepatitis. The study was carried out by interviewing respondents in seventeen remote sites. Intensive field work has been undertaken for a period of three years (2008 to 2011), covering different seasons so as to gather information on



Figure 1. Tribal community.

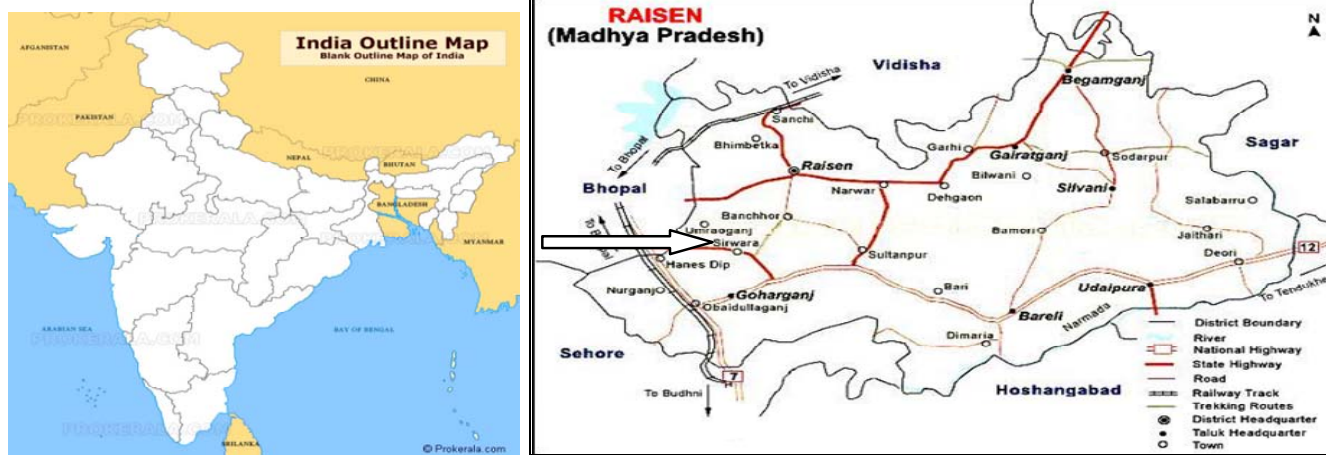


Figure 2. Map showing Raisen District.

each of the plant species found to be used in traditional healing practices of Raisen tribes of Madhya Pradesh of India. A total of 95 informants, including 45 female, 40 male and 10 traditional healers were interviewed. Information was gathered by taking interview of local herbalists using structured questionnaires in some cases and documentation of verbal information and personal observations. Herbalists were selected on the report of local informants. Before the interview, the respondent was explained with the aim of the study, followed by verbal consent. Each of the healers was selected based on their previous experience of using medicinal plants in treatment and the data obtained from one healer was cross verified with the other. The vernacular name, mode of preparation and also disease treated were recorded. In certain cases, where the healers did not know the name of the disease, the names of the diseases were given on the basis of symptoms described by them. The collected specimens were tagged and herbarium sheets were prepared for each of the species. The specimens were identified consulting Flora of British India (Hooker, 1897), Flora of Bhopal (Oommachan, 1976) and Flora of Marathwada (Naik, 1998). Some of the noteworthy contributions in the field of ethnobotany of the centrally located state of the country encompass the work of Jain (1963, 1964, 1987), Khan and Chaghtai (1979, 1981), Khan et al. (1981, 1984, 1992), Ahmad et al. (2010), Khan and Zaheer (1981) and Ahirwar (2010). As is evident from these references, there is

very little ethnomedicinal information available for the district Raisen. The information recorded in the field was further compared with the works of Jain and Singh (1994), Judah and Oommachan (1994) and Masih (1997).

Recently, Srivastava (2011) has explored the medicinal plants used by tribals of Bandhavgarh National park of Madhya Pradesh, and Ahirwar and Singh (2011) have reported some anti diabetic plants from Dindori district of Madhya Pradesh. As said earlier, the studies is pertaining to floristics and ethnobotany, so for as the state of the Madhya Pradesh is concerned and perusal of literature reviews that the district Raisen is almost unexplored from this point of view. A perusal of literature reveals that only the preliminary study of Goharganj of this district is carried out by Khan and Haque (1981). Plants were collected in flowering and fruiting conditions and confirmed by using different herbaria. Specimens were dried, pressed, poisoned and mounted on herbarium sheets. All collected specimens were identified with the help of available literature. Finally, specimen identification was authenticated consulting Saifia Science College, Herbarium, Barkatullah University, Bhopal, India. Set of herbarium sheets were deposited in the herbarium for future reference. The alphabetic arrangement of all the plant species were made along with information on vernacular names, place of collection, parts used, mode of uses and disease classification.

**Table 1.** Medicinal plants used by the tribals of Raisen for the management of Jaundice.

S/No	Botanical name/family/local name/ voucher specimen number	Part used	Chemical constituents	Mode of administration
1	<i>Achyranthes aspera</i> Linn, Amaranthaceae, Latzeera ( Patajada), ZAL139	Root	Alkaloids, glycosides, saponins, and dihydroxyketone	The fresh roots (5 g) are ground to fine powder given to patient twice a day for about one week to cure the patient
2	<i>Aegle marmelos</i> Correa ex Koen., Rutaceae, Beel/Bel, ZAL213	Leaf	Pyridine, scopoletin, maresin	The fresh leaves (10 ml) are extracted and its juice mixed with five pieces of black pepper. Two spoons of this juice given twice a day for 10 to 15 day cures the patient
3	<i>Azadirachta indica</i> A. Juss., Meliaceae , Neem, ZAL225	Leaf, stem bark, fruit and flower	Azadirachtin, melianine A, B, Azadirone, melianone, nimbin, nimbidin nimbidinin, vilasinin and melicitrin	Mixture of same quantity of leaf powder ,fruit powder, stem bark powder and flower powder, taken one spoonful with one spoonful ghee and honey (½ spoon) twice a day for ten days
4	<i>Cajanus cajan</i> (L.) Mill Sp., Fabaceae, Arhar, Tuar, ZAL202	Leave	Coumarin cajanuslactone, stilbenes, cajanin	The juice of leaves is mixed with black pepper and butter milk. Two spoonful of this mixture is given to patient thrice a day for two weeks cures the patient
5	<i>Capparis zeylanica</i> Linn, Capparidaceae, Endriand (Ardadanda), ZAL136	Fruit	Thioglucosides and glucocapparin	The fruits are washed and seeds are taken out from the fruit then seeds are dried for 2 to 3 h. Then (100 to 200) seeds are fried in cows ghee for one minute. After it 2 or 3 seeds are taken daily for 7 to 8 days in empty stomach with water
6	<i>Cosmos sulphureus</i> Cav, Asteraceae , Jungli gaindha (Peela gaindha), ZAL253	Fruit	Quercetine	The fresh fruits are crushed mixed with water and are prepared in the form of tablets given to the patient twice a day for about one month to treat jaundice
7	<i>Cuscuta reflexa</i> Roxb., Convolvulaceae, Amarbel( Akasbel), ZAL182	Stem	Alcohol, systolic and tachyphylaxis	The fresh small pieces of the stem (10 to 12) are given to the patient twice a day for about twenty days to recover from the jaundice
8	<i>Eclipta alba</i> (Linn.) Hassk., Asteraceae, Bhrigraj (Babri), ZAL252	Leave	Polyacetylenic thiophenes	One glassful of leaves decoction is taken twice a day for two weeks to relieve jaundice
9	<i>Gloriosa superba</i> L., Liliaceae, Ladael (Languli), ZAL237	Tuber	Colchicine, lumicolchicines, demethylcolchicine, luteolin	Garland of fresh tuber pieces put around the neck of patient for 10 to 15 days to treat the patient
10	<i>Holoptelea integrifolia</i> Planch, Ulmaceae, Churale (Chilbil), ZAL119	Leaf	Hexacosanol and octacosanol	The decoction of the leaf is used for bath after applying the ash of the <i>Achyranthus aspera</i> on the body cures the jaundice patients
11	<i>Lawsonia inermis</i> L., Lythraceae, Mehnidi, ZAL184	Leave	Xanthones and Laxanthones	The leaves one gram are crushed mixed with 4 black peppers and made into a paste and taken with two glass of milk once a day for 15 days to cure jaundice

Table 1. Cont'd

12	<i>Madhuca indica</i> J.F. Gmel., Sapotaceae, Mahwa, ZAL221	Stem bark	Saponin and bassianin	Decoction of stem bark is used for bath after applying the ash of <i>Achyranthes aspera</i> on body once a day for 3 days
13	<i>Morus nigra</i> Linn., Moraceae, Shatoot, ZAL201	Fruit	Phenols and alkaloids	The decoction of the young fruits is taken. One cup with one teaspoonful of sugar is given twice a day before meals for about one week
14	<i>Phyllanthus niruri</i> Linn., Euphorbiaceae, Jaaliriya (Jungli amla), ZAL128	Whole plant	Flavonoids, tannins, alkaloids and sterol	The dried plants (2 to 3) are crushed into a fine powder and put into water or milk and half glass of it is given to the patient for (3 to 5) days once a day in the empty stomach for the ailment of jaundice
15	<i>Phyllanthus urinaria</i> L., Euphorbiaceae, Boine awla (Lal- bhuin anvalah), ZAL116	Leave	Alkaloids, tannins, corilagin, rutin etc	The fresh leaves are ground to the fine powder, and put it into milk with the addition of water. The (6 g) of it is given to the patient once a day for about three days
16	<i>Psidium guajava</i> Linn., Myrtaceae, Amrood, ZAL240	Leave	Beta-sitosterol, Uvaol, oleanolic acid and ursolic acid etc	Three cooked leaves in oil are taken twice a day for 3 week
17	<i>Ricinus communis</i> Linn., Euphorbiaceae, Andi (Arandi), ZAL173	Leave	Lipids and phosphatids	The decoction of the leaves is taken one glassful twice a day for about 2 to 3 weeks
18	<i>Solanum nigrum</i> L., Solanaceae, Makoo, ZAL147	Stem Bark	Pinosresinol, syringaresinol, medioresinol, scopoletin etc	The fresh decoction of the stem bark and leaves is given to the patient twice a day for about one week to relief the patient against the jaundice.
19	<i>Tribulus terrestris</i> Linn., Zygophyllaceae, Choti Gokhru, ZAL231	Whole Plant	Steriodal saponins etc	The plant is made into paste along with equal quantity of whole plant of <i>Amaranthus tricolor</i> . 2 spoonfuls of paste is mixed with cow milk and given on empty stomach for about one week to cure the jaundice

## RESULTS AND DISCUSSION

Data of jaundice plants investigation is compiled in (Table 1) and the plants species are arranged in alphabetic order. A total of 19 plant species belonging to 16 families have been reported for the treatment of jaundice. For each plant species, botanical name, family, local name, parts used, chemical constituents, voucher specimen number, preparation and application are provided.

The most dominating families were

Euphorbiaceae with three species, Asteraceae with two species, followed by Amaranthaceae, Convolvulaceae, Fabaceae, Meliaceae, Liliaceae, Lythraceae, Rutaceae, Sapotaceae, Ulmaceae, Moraceae, Myrtaceae, Solanaceae, Zygophyllaceae and Cappridaceae with one species each. Some of the highly utilized plant species include, *Achyranthes aspera*, *Aegle marmelos*, *Azadirachta indica*, *Cajanus cajan*, *Capparis zeylanica*, *Cosmos sulphureus*, *Cuscuta reflexa*, *Eclipta alba*, *Gloriosa superba*, *Holoptelea*

*integrifolia*, *Lawsonia inermis*, *Madhuca indica*, *Morus nigra*, *Phyllanthus niruri*, *Phyllanthus urinaria*, *Psidium guajava*, *Ricinus communis*, *Solanum nigrum* and *Tribulus terrestris* (Table 1).

Different plant parts were used to cure jaundice. Among these fruits, whole plants were highly utilized followed by root, leaves, seeds, bark and rhizome in decreasing order (Table 1). Data presented in Table 1 shows that thirty five medications were used for jaundice that can be divided into two categories: those that are

prepared from (i) single plant and (ii) from more than one plant species. In majority of the cases, these medications were prepared by using water as a medium and administered along with buttermilk, water and sugar. In all the cases, mode of application was oral. In regard to the patients' condition, the preparations were use more than two times daily from a week to month till the problem is cured.

Jaundice results from various diseases or conditions that affect the liver. Mostly, it is due to viral hepatitis A, B, C, D and E, liver cirrhosis and liver cancer. Some of the plant species mentioned in the present study used to cure jaundice have been investigated for their antimicrobial activities (Pal et al., 2006). For example, the hexane and alcoholic extracts of *Phyllanthus emblica* (fruit), *Tamarindus indica* (fruit) and *Punica granatum* (fruit - pericarp) were found to be antimicrobial while *Morus alba* (fruit) did not show antimicrobial activity (Ahmad et al., 1998). Aqueous extract of *Tamarindus indica* (fruit) shows positive response against antimicrobial activity. By comparing these plant species recorded to cure jaundice with available pharmacological literature reported from other regions of the subcontinent and world, it appears that there are many medicinal plant species in the area that were not reported in other locations. To our knowledge, the use *P. emblica*, *P. granatum* to cure jaundice, have never been reported before. Hepato-protective effect of *Aegle marmelos* on rats was reported by Vinodhini (2007). Decoction of fresh plant material of *Boerhaavia procumbens* is used for the said purpose in the study areas, while other authors (Shah and Khan, 2006; Katewa et al., 2004; Sing et al., 2002; Khan et al., 2000) reported that leaves and roots of this plant are used for jaundice, swelling, watering of eyes, anaemia, asthma, dropsy, gonorrhoea, stomach disorders, sore throat, to relief pain, typhoid, as cooling, antispasmodic and astringent. Dried fruit powder of *P. emblica* is used for said purpose in the study areas, while Ahmed et al. (2007) and Shinwari and Khan (1998) reported that fruit, leaves and bark of this plant are used as eye tonic, astringent, cooling, diuretic, laxative, refrigerant, aperients, for asthma, diarrhea, dysentery, cold and cholera.

## Conclusion

Medicinal plants play a vital role in the life by serving good health and well being of mankind. Present study reveals unique utilization of medicinal plants by the tribes belonging to Raisen district of Madhya Pradesh. In the present investigation, 19 medicinal plant species used to treat jaundice were reported and documented. The use of these plants to treat various illnesses is still needed by the communities, because of poor socio-economic conditions the high cost and a difficult access to allopathic medicines. The majority of the reported species

are wild and rare. These demand an urgent attention to conserve such vital resources so as to optimize their use in the primary health care system. Nowadays, conservation of traditional knowledge is greatly menaced by a lot of factors related to modernization of the region and lack of interest in traditional healers, in transferring it to next generation. It is therefore, a need of the hour to save the cultural heritage of the natives, by confirming the therapeutically used plants with scientific criteria. In this context, screening for active substances and testing their activities against jaundice and hepatitis causing organisms form an interesting subject for the future studies.

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## Conflict of interest

We declare that none of us has any conflict of interest.

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