

## PLANTS FOR LIVER AND JAUNDICE TREATMENT: A CASE STUDY FROM FOREST FRINGE COMMUNITIES IN NORTH BENGAL, INDIA

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### Abstract

The traditional utilization of ethno-medicinal plants used for the treatment of jaundice and other liver disorder is commonly known among ethnic groups. The present study was carried out among the forest fringe villages of Chilapatta Reserve Forest in foothills of the eastern Sub-Himalayan mountain belts of West Bengal. The aim of the study was to document the traditionally used ethno-medicinal plant resources against jaundice and other liver disorders. A total of 19 plant species belonging to 15 families and 17 genera were documented. These 19 species were dominated by trees (07), herbs (05), shrubs (03) and four species of climbers. The plant families dominating the list were Apiaceae, Dioscoreaceae, Euphorbiaceae and Moraceae with 2 species each. Fruits (08) were the most dominant plant parts used for the treatment followed by leaves of 07 species. The plant parts are employed by the inhabitants in the form of infusion, decoction, paste, juice, etc., either as a sole drug species or in combination with other species. The documented plants and their procedure for utilization can be a useful tool for scientific community for further evaluation and recommendations to the practicing communities.

**Key words:** ethno-medicine, formulations, liver disorder, orally.

### Introduction

Medicinal plant use evolved into an art and a science, practiced according to the experience, traditions and disease theory of the healer (Van der Merwe et al. 2001). The traditional system of health care has been significantly used for over two thousand years to treat illnesses (Tripathi et al. 2013). Traditional medicinal use of plants is strongly related to physiological and pharmacological activity of active plant ingredients (Fourie et al. 1992). Jaundice is one of the commonest liver disorders affecting the citizens of both rural and ur-

ban Indians and is treated by both cultivated and wild plants. Yellowing of eyes and vomiting yellowish fluid are the initial external symptoms of hepatitis (Bernard and Knipe 1996, White and Fenner 1994). Jaundice is indicated by the yellowish staining of skin and sclera that is caused by high levels of bilirubin in blood. It may result from various diseases or conditions that affect the liver including Hepatitis A, Hepatitis B, Hepatitis C, Hepatitis D, Autoimmune hepatitis, liver cirrhosis, liver cancer, haemolytic anaemia and malaria (Wahab et al. 2004). The disorder is commonly observed in new borns because

there is some haemolysis during delivery and the new born's liver is immature and may not be fully matured to handle the task of bilirubin for a few days (Wahab et al. 2004). Jaundice becomes visible when the bilirubin level is about 2 to 3 mg/dl (Hall et al. 2005).

Due to varied climatic and geographical features, India alone holds large number of medicinal plants used in indigenous systems of medicine (Shah et al. 2013, 2014; Pala et al. 2012; Debbarma et al. 2017). A large number of plants and formulations have been claimed to have hepatoprotective activity. Nearly 160 phyto-constituents from 101 plants have been claimed to possess liver protecting activity (Handa et al. 1986). There have been several studies and reports from the northern part of West Bengal regarding the use of ethno-medicinal plants to treat various diseases (Biswakarma et al. 2015, Sarkar et al. 2015, Shukla and Chakravarty 2012). However, a study completely pertaining to the treatment of jaundice through the use of orally transmitted traditional knowledge has not been reported yet from this study area. Therefore, the present study was carried out among forest fringe communities of Chilapatta forest from northern part of West Bengal with the aim to document the plant resources used for the treatment of liver and jaundice disorder and the traditional knowledge they possess about these plant resources.

## Material and Methodology

The study area is located around Chilapatta Reserve Forest spreading over 41 km<sup>2</sup> that lies within the forests of Cooch Behar Wildlife Division of Alipurduar district (recently separated out from Jalpaiguri district) of West Bengal with latitude

26°32.85'N and longitude 89°22.99'E. The villages included in the present study are Uttar Simlabari, Uttar Chaukakhetai, Andu Basti, Bania Basti, Dakshin Mendabari, Uttar Mendabari, Kodal Basti and Kumarpara. The forest is inhabited by the divergent communities with Indo-Mongoloid tribes consisting of Raj Bangshis, Mech, Ravas, Totos, Limbus, Lepchas, Nageshis, Uraons and Mundas dependent directly or indirectly on its forest resources and are mainly agrarian subsistently growing paddy, jute and maize. The study was conducted from December 2014 to May 2016 with purposive sampling method used for selection of area. To obtain the information, both old aged and middle aged groups were approached for interview. A total number of 100 respondents including traditional medicinal practitioners were selected randomly for personal interview schedule through open ended questionnaire. Majority of the respondents were literate (71 %), i.e. have attended school up to primary level or more, while rest of them were illiterate or not attended school at all. The livelihood of the respondents centred on non-timber forest products and subsistence rain-fed farming on forest adjacent lands.

The schedule was administered to the respondent in local language and the responses were recorded in English on the schedule. The questionnaire covered aspects like plant species used as ethno-medicines against stomach and liver disorder, plant parts used, procedure for dosage and therapy (Pala et al. 2012, Shah et al. 2014, Shukla and Chakravarty 2012). The ethno-medicinal plant species were identified mostly in the field with their local names and also by consulting available secondary literature. However few unidentified specimens were mounted on herbarium sheets and identified with

the available herbarium of Department of Forestry Uttar Banga Krishi Viswavidyala, Pundibari.

## Result and Discussion

The present study is an effort to scrutinize the resources with respect to medicinal plants used by the ethnic people for treating the liver disorder and jaundice. The study reported 19 species belonging to 15 families and 17 genera for curing of various liver and jaundice disorder. Our study revealed that the families like Apiaceae, Dioscoreaceae, Euphorbiaceae and Moraceae were represented by maximum of two species each, while rest of the families were having single species (Table 1). These reported plant species are represented by 7 species of trees (*Averrhoa carambola* L., *Emblia officinalis* Gaertn., *Ficus hispida* L., *Mangifera indica* L., *Morus alba* L., *Oroxylum indicum* (L.) Benth. ex Kurz, *Terminalia chebula* Retz.), 5 species of herbs (*Centella asiatica* (L.) Urban, *Andrographis paniculata* (Burm. f.) Wall. ex Nees, *Centella* spp., *Musa* L. spp., *Rauvolfia serpentina* (L.) Benth. ex Kurz), 3 species of shrubs (*Ricinus communis* L., *Cajanus cajan* (L.) Mill., *Abroma augusta* (L.) L. f. etc.) and 4 species of climbers (*Cuscuta europaea* L., *Dioscorea belophylla* L., *Dioscorea* L. spp., *Luffa* *gytiaca* Mill.). The most dominant parts of the plants to prepare phyto-medicine were fruits found to be used in 8 formulations followed by leaves in 7, root in 5, whole plant in 4, bark in 3, tubers in 2 and stem and flowers from one species each. The reports of plant species used for jaundice and liver treatment has also been reported by Mulay and Sharma (2013) from Ahmednagar district of Maharashtra, and Kumar et al. (2017) from

Hathras district of Uttar Pradesh, India. In majority of cases, the herbal drugs were prepared in the form of juice, decoction, paste and powder and method of drug administration was oral. Some of the plant species documented in the present study have been reported earlier from other areas and for different treatments. *Abroma augusta* were used to treat jaundice in Tamil Nadu and Bangladesh by using its leaves (Maruthupandian et al. 2011, Chowdhury and Rahmatullah 2012), but in our study we found its root and bark is effectively used for the same treatment by using its different mode of application. Rahim et al. (2012), Gupta et al. (2010) and Debi et al. (2016) also reported *Cajanus cajan*, *Ricinus communis* and *Centella asiatica* in the treatment of jaundice. We also observed that *Dioscorea belophylla* tuber and fruit are used to treat jaundice but according to Srivastava and Nyishi (2010) they are used for the treatment of fever, malaria, headache and dysentery. Kumar et al. (2017) also reported the use of *Andrographis paniculata* for the treatment of jaundice. Fruit decoction of *Terminalia chebula* is also reported by Amiri et al. (2014) used to treat jaundice in Iran.

## Conclusion

The indigenous communities have rich traditional knowledge system about the ethnobotanical plants. The documentation of the plant species and their traditional procedure indicates the community consciousness on the conservation values of these ethnobotanical species used against liver and jaundice. There could be possibility of presence of more species of this value in the area and needs to be identified through further research and can be of commercial and livelihood importance

Table 1. Reported species, parts used and their applications.

Scientific name	Common name	Family	Habit*	Uses	Parts used	Therapy/procedure of use
<i>Abroma augusta</i> (L.) L. f.	Ulatkambal	Malvaceae	S	Jaundice	bark, root	Root bark paste along with misri (local sweet) is used to prepare juice.
<i>Andrographis paniculata</i> (Burm. f.) Wall. ex Nees	Kalmegh, Chirawta	Acanthaceae	H	Liver problems	whole plant	Leaves and immature stem of <i>Andrographis paniculata</i> , roots of <i>Rauwolfia serpentina</i> and fruits of <i>bistifal</i> is taken in powdery form. Whole plant parts in the form of tablets are taken to cure liver problems.
<i>Averrhoa carambola</i> L.	Kamringa, Charpatay	Oxalidaceae	T	Jaundice and liver problems	fruits	Fruits juice is taken for curing jaundice and liver problem.
<i>Cajanus cajan</i> (L.) Mill.	Rahar, Raheeri	Fabaceae	S	Jaundice and liver problem	leaves, root	10–12 leaves along with taimisri (local sweet) and sadhamisri (local sweet) of 100 g juice is used for curing jaundice. Roots juice with addition of water is also used for curing jaundice.
<i>Centella asiatica</i> (L.) Urban	Bang Sag, Thankuni, Gortapre	Apiaceae	H	Jaundice	leaf, roots	<i>Centella asiatica</i> , bamboo, <i>Ocimum sanctum</i> leaf and earthworm is boiled and juice is taken for curing jaundice. Roots are eaten simply or else by cooked with potato (fried) and taken to cure jaundice. Besides this <i>Centella asiatica</i> , <i>Piper nigrum</i> , cardamom (2–3 nos.) is taken as tea for curing jaundice.
<i>Centella</i> sp. Linn.	Mana-muni	Apiaceae	H	Liver problem	whole plant	Whole plant is chewed or juice is taken to cure liver problems.
<i>Cuscuta europaea</i> L.	Kankor, Pahelohara	Convolvulaceae	C	Jaundice	whole plant	The whole plant is boiled and taken bath with light warm water for curing jaundice. Also the boiled water with salt is taken to cure jaundice.
<i>Dioscorea belophylla</i> (Prain) Voigt ex Haines	Jangliatu, Ban alu, Gichikanda, Ghetuallu	Dioscoreaceae	C	Jaundice	fruits, tubers	Cut fruits is boiled and taken as food to cure jaundice by removing its bitter taste. Excess eating is poisonous and not good for health. It's bitter in taste. Tubers in powdery form are massaged on the whole body for curing jaundice.
<i>Dioscorea</i> sp.	Kowatumbil	Dioscoreaceae	C	Jaundice	tubers	Tubers soaked in water for 5–10 minutes are taken to cure jaundice.

<i>Embllica officinalis</i> Gaertn.	Amlai, Amla, Amlaki	Euphorbiaceae	T	Liver problem	fruits	Fruits of <i>Embllica officinalis</i> along with fruits of <i>Terminalia chebula</i> and <i>Terminalia bellirica</i> is formed into powder and taken to cure liver problem.
<i>Ficus hispida</i> L. f.	Kuchuli	Moraceae	T	Jaundice, liver problems	fruits	Fruits are edible which helps in curing jaundice and liver problem.
<i>Luffaa gyptiaca</i> Mill.	Gongra, Dhudol, Gherawla	Cucurbitaceae	C	Liver disorder	fruits, leaves	Immature fruits and leaves are consumed as vegetables which also resulted in treating liver disorder.
<i>Mangifera indica</i> L.	Amba	Anarcardiaceae	T	Jaundice	bark	Bark juice with water is taken in empty stomach for curing jaundice.
<i>Morus alba</i> L.	Neel, Tuith	Moraceae	T	Jaundice	root, leaves	Small piece of root is enclosed and tied on neck on Tuesday and Saturday with their traditional belief for 12 days and thrown where he or she doesn't pass by for curing jaundice. Also 10–12 boiled leaves are cooled and taken facing eastward direction in one breath (about 200–300 g).
<i>Musa</i> sp.	Kola	Musaceae	H	Liver problem	leaves	Juice of leaves is taken in empty stomach to cure liver problem.
<i>Oroxylum indicum</i> (L.) Benth. Ex Kurz	Kanaidingi, Totola, Surimala	Bignoniaceae	T	Jaundice, liver problem	flowers, bark, leaves	Fallen flowers are cooked and taken to cure jaundice. Bark soaked in water used for taking bath also cures Jaundice. Bark juice and leaves eaten as vegetables in empty stomach cures jaundice and liver problem.
<i>Rauvolfia serpentina</i> (L.) Benth ex Kurz.	Nakbaili, Sarpaganda	Apocynaceae	H	Jaundice	whole plant	Whole plant or any other plant part is powdered (bitter in taste) and used to cure jaundice.
<i>Ricinus communis</i> L.	Aranda, Varendra, Rahari	Euphorbiaceae	S	Jaundice	leaves, fruits	Leaf with sugar is consumed to cure jaundice. Fruits are boiled with fruits of <i>Cajanus cajan</i> and consumed to cure jaundice.
<i>Terminalia chebula</i> Retz.	Haritaki, Harra	Combretaceae	T	Jaundice, liver problem	fruits	Dried fruit solution of <i>Terminalia chebula</i> , <i>Terminalia bellirica</i> , and <i>Embllica officinalis</i> (one each) is taken in empty stomach to cure jaundice and makes liver strong.

\*Legend: T – tree; S – shrub; H – herb; C – climber.

to local communities. The communities should be encouraged with improved cultivation techniques of commercially viable ethnobotanical species through capacity building, timely policy intervention along with strong market linkage. This will ensure income generation and livelihood improvement and ultimately conservation of these species.

## References

- AMIRI Md.S., JOHARCHIB Md.R., YAZDI Md.E.T. 2014. Ethno-Medicinal Plants Used to Cure Jaundice by Traditional Healers of Mashhad, Iran. *Iranian Journal of Pharmaceutical Research* 13(1): 157–162.
- BERNARD F., KNIPE D.M. 1996. *Virology*. 3rd Edition, Lippincott Raven Philadelphia: 2739–2789.
- BISWAKARMA S., SARKAR B.C., SHUKLA G., PALA N.A., CHAKRAVARTY S. 2015. Traditional application of ethnomedicinal plants in Naxalbari area of West Bengal, India. *International Journal of Usufruct Management* 16: 36–42.
- CHOWDHURY A.R., RAHMATULLAH M. 2012. Ethnomedicinal plants for treatment of jaundice by the folk and tribal medicinal practitioners of several districts in Bangladesh and review of their scientifically reported hepatoprotective activity. *American-Eurasian Journal of Sustainable Agriculture* 6(4): 360–370.
- DEBBARMA M., PALA N.A., KUMAR M., BUSSMANN R.W. 2017. Traditional knowledge of medicinal plants in tribes of Tripura in north-east, India. *African Journal of Traditional, Complement Alternative Medicine* 14(4): 156–168.
- DEBI D., DATTA B.K., DEBBARMA J., DEB S. 2016. Ethno-medicinal plants used for herbal medication of jaundice by the indigenous community of Tripura. *India biodiversity* 1: 256–259.
- FOURIE T.G., SWART I., SNYCKERS F.O. 1992. Folk medicine: a viable starting point for pharmaceutical research. *South African Journal of Science* 88: 190–192.
- GUPTA R., VAIRALE M.G., DESHMUKH R.R., CHAUDHARY P.R., WATE S.R. 2010. Ethnomedicinal uses of some plants used by Gondtribe of Bhandara district, Maharashtra. *Indian Journal of Traditional Knowledge* 9(4): 713–717.
- HALL J., GUYTON A., HALL J. 2005. *Textbook of Medical Physiology*. 11th Edition, eBook, Saunders. 1152 p.
- HANDA S.S., SHARMA A., CHAKRABORTY K.K. 1986. Natural products and plants as liver protecting drugs. *Fitoterapia* 57: 307–351.
- KUMAR S., SINGH B.S., SINGH R.B. 2017. Ethnomedicinal plants to cure diabetes and jaundice diseases among the rural and tribal peoples of Hathras district (U.P.). *International Journal of Botany Studies* 2(2): 19–20.
- MARUTHUPANDIAN A., MOHAN V.R., KOTTAIMUTHU R. 2011. Ethnomedicinal plants used for the treatment of diabetes and jaundice by Palliyartribals in Sirumalai hills, Western Ghats, Tamil Nadu, India. *Indian Journal of Natural Products and Resources* 2(4): 493–497.
- MULAY J.R., SHARMA P.P. 2013. Plants Used in Treatment of Jaundice by Folklore of Ahmednagar district, Maharashtra, India. *Science Research Reporter* 3(2): 216–222.
- PALA N.A., NEGI A.K., GOKHALE Y., RAZVI S., TODARIA N.P. 2012. Medicinal plant resources in sacred forests of Garhwal Himalaya. *Journal of Non-Timber Forest Products* 19(4): 291–296.
- RAHIM Z.B., RAHMAN M.M., SAHA D., HOSEN S.M.Z., PAUL S., KADER S. 2012. Ethnomedicinal plants used against jaundice in Bangladesh and its economical prospects. *Bulletin of Pharmaceutical Research* 2(2): 91–105.
- SARKAR B.C., BISWAKARMA S., SHUKLA G., PALA N.A., CHAKRAVARTY S. 2015. Documentation and utilization pattern of ethnomedicinal plants in Darjeeling Himalayas, India. *International Journal of Usufruct Management* 16: 3–11.
- SHAH S., RAM J., PALA N.A., TRIPATHI P. 2013. Ecological status of medicinal plants in Oak

- and mixed Oak forests of Nainital Catchment, Uttarakhand. *Journal of Non-Timber Forest Products* 3: 171–178.
- SHAH S., RAM J., PALA N.A., TRIPATHI P., KUMAR M. 2014. Medicinal plant wealth of Oak dominated forests in Nainital Catchment Area of Uttarakhand. *Academia Journal of Medicinal Plants* 2(1): 006–013.
- SHUKLA G., CHAKRAVARTY S. 2012. Ethnobotanical Plant use of Chilapatta Reserve Forest in West Bengal. *Indian Forester* 138: 1116–1124.
- SRIVASTAVA R.C., NYISHI C. 2010. Traditional knowledge of Nyishi (Daffla) tribe of Arunachal Pradesh. *Indian Journal of Traditional Knowledge* 9: 26–37.
- TRIPATHI S., RAY S., MONDAL A.K., VERMA N.K. 2013. Rare ethnomedicinal plants of south-west Bengal, India with their different medicinal uses; needs conservation. *International Journal of Life Sciences Biotechnology and Pharma Research* 2(2): 114–122.
- VAN DER MERWE D., SWAN G.E., BOTHA C.J. 2001. Use of ethnoveterinary medicinal plants in cattle by Setswana-speaking people in the Madikwe area of the North West Province of South Africa. *Journal of South African Veterinary Association* 72(4): 189–196.
- WAHAB M.A., YOUSAF M., HOSSAIN M.E. 2004. Some indigenous medicinal knowledge for treating jaundice in Chittagong hill tracts Bangladesh. *Hamdard Medicus XLVII(4):* 55–58.
- WHITE D., FENNER F. 1994. *Medical Virology*. 4th Edition, eBook, Academic Press. 603 p.