Ethno-medicinal plants used for herbal medication of jaundice by the indigenous community of Tripura, India

DIPANKAR DEB1, B.K. DATTA2, JABA DEBBARMA1,*, SOURABH DEB2

1Agroforestry and Forest Ecology Laboratory, Department of Forestry and Biodiversity Tripura University (A Central University), Suryamaninagar 799022, Tripura, India. Tel. 0381-237-9093, Fax. 0381-237-4807, *email: jaba.forestry@tripurauniv.in
2Plant Taxonomy and Biodiversity Laboratory, Department of Botany, Tripura University (A Central University), Suryamaninagar 799022, Tripura, India

Abstract. Deb D, Datta BK, Debbarma J, Deb S. 2016. Ethno-medicinal plants used for herbal medication of jaundice by the indigenous community of Tripura, India. Biodiversitas 17: 256-269. The immemorial association of medicinal plants is highlighted in various utilization pattern by different indigenous community. An investigation was done for less known ethno-medicinal plants used for jaundice as well as some other ailments by the indigenous community of Tripura, Northeast India. The traditional utilization of plants for treatment of jaundice by the indigenous communities is not so well studied in the land locked hilly part of the country. Timely ethnobotanical survey was undertaken with the knowledge of the species mainly used for curing jaundice. Necessary specimens were collected and cross-checked with the existing literatures. A total of 50 ethno-medicinal plant species belonging to 37 families were documented used for the treatment of jaundice (45 plant species with an additional ingredient of 5 species) and other diseases. Mainly leaves and roots were preferred to prepare decoction, pills and paste etc. Most of the plant species are sources of different chemical constituents which further contribute in formulating drug for common use. The active biochemical compounds are investigated by thorough literature survey. There is need for further critical phytochemical analysis and investigation of new valid drugs. Immediate documentation of such valuable knowledge is necessary as we are gradually missing many precious traditional herbal formulations with increasing impacts of modernization.

Keywords: Antioxidant, herbal formulation, indigenous community, jaundice, phytochemical

INTRODUCTION

An indigenous community seems to hold the habitual knowledge of herbal remedies for different minor to chronic diseases. Such indigenous identity of the particular community is derived due to the immemorial association with their floral and faunal environment. This association has led to the use of many plants for food, fodder and medicine (Abbasi et al. 2009). The local folks are therefore dependent on various aspects of herbal formulations for curing different ailments (Annalakshmi et al. 2012). This traditional knowledge has been passing on verbally from one generation to another (Majumdar et al. 2006) which is equivalent to the irreversible loss of flora and fauna (Bora et al. 2012). However, there is always a chance to loss of this knowledge rather than leaving behind to next generations. Thus the customary approach to document the knowledge about the medicinal properties of plants for curing different diseases has become indispensable before it is lost perpetually.

Northeast region of India is considered as an abode of more than 50% of total ethnic communities present in the country with a unique folklore (WHO 2001). These ethnic people are living in remote areas with closest harmony to the adjacent forest. Their livelihood subsistence greatly depends on biotic resources available in that area ( Deb et al. 2012). The indigenous community people are not well concerned about any modern medicinal facilities due to their restricted socio-economic condition. Therefore, the ethnic people from various parts of Northeast India are greatly inevitable with contingent on plant-based healing to their health care needs by indefinite cohorts (Majumdar and Datta 2007; Das et al. 2008).

The Northeastern part of India consists of half of the total flora of India (Lokho 2012) and Tripura also harbor varieties of medicinal plants (Singh et al. 1997; Majumdar et al. 2006; Majumdar and Datta 2007; Das et al. 2009; Das et al. 2012). The ethno-medicinal study is regarded as most feasible method for identifying new medicinal plants used for customary health care practices propagated by the ethnic communities (Annalakshmi et al. 2012). This is attracting the attention of several scientists to uphold direction to keen research towards the unearthing of several herbal remedies (Bhattacharya and Goel 1981; Karuppasmy 2007; Manikandan et al. 2009). Among them many workers throughout the globe have reported the usefulness of plants from several chronic to minor diseases like diabetes, dysentery, urinary disorder, jaundice etc. (Raman and Lau 1996; Matsuda et al. 2001; Abbasi et al. 2009; Zulfiqer et al. 2010; Rahim et al. 2012; Annalakshmi et al. 2012; Karmakar et al. 2012; Marrufo et al. 2013; Doss and Anand 2014; Islam et al. 2015).

Jaundice is a disorder which occurs when the bilirubin content in the blood is excessive due to haemolysis (Annalakshmi et al. 2012; Rahim et al. 2012; Jayachandra and Devi 2012). It is a yellowish discoloration of the skin, sclera, eyeballs, nails and mucous membrane. It indicates disorder in liver or gall bladder; occurs mostly in the
newborn babies as they do have the immature liver which cannot regulate the amount of bilirubin like an adult (Guyton 2005; Jayachandra and Devi 2012). It is one of the most common diseases in the less developed countries and in the Asian countries as well (Karmakar et al. 2012).

According to the oldest codified system of medicine from South India, the Siddha system of medicine illustrates jaundice as one of the pitha type of disease (Annalakshmi et al. 2012). However, in modern allopathic and homeopathic medicine there is no unique treatment for jaundice (Abbasi et al. 2009). Whereas, people relatively preferred the non-codified system like folk medicine prescribed by the rural communities. Although, different ethnobotany workers have mainly documented the less known herbal remedies curing jaundice along with other diversified diseases by the ethnic communities from Northeast India (Deb 1968; Singh et al. 1997; Kala 2005; Majumdar and Datta 2007; Sajem et al. 2008; Sikdar and Dutta 2008; Shil and Choudhury 2009; Das et al. 2009; Rai and Lalramnhinglova 2010; Das and Choudhury 2010; Sahu et al. 2011; Choudhury et al. 2012; Das et al. 2012; Das and Choudhury 2012; Jayachandra and Devi 2012; Dutta and Sharma 2013). However, to our acquaintance no sole systematic explorations on application of medicinal plants against jaundice have been made so far in Tripura. In this context, the present study is the first landmark with meticulous emphasis on less known medicinal plants used for jaundice by the indigenous communities of Tripura.

**MATERIALS AND METHODS**

**Study site**

The present study is the outcome of bioresource survey throughout the state of Tripura, India during 2013-2015. It is a hilly state in the northeastern part of India which lies between 22°56’ to 24°32’ N latitude and 90°09’ to 92°20’ E longitude. It is bordered internationally with Bangladesh in the North, West and South. Nationally bordered with two sister states Mizoram in the east and Assam in the northeast. The state has 19 ethnic communities distributed throughout the 8 districts. The survey conducted in the remote areas of community dwelling places like Kanchanpur, Gandacherra, Baramura, Twidu, Amarpur, Karbook, etc. (Figure 1). The major inhabitants of these areas were Tripuri, Jamatia, Halam, Santhal and nontribal community.

**Data collection**

The ethnobotanical data were collected by conducting a questionnaire survey and formal group discussions. In the survey, details of the species were asked which are mainly used for curing jaundice along with some other ailments. Vernacular names, parts used, composition and dosages were recorded to validate the curing process. Some precautions were also noted down for each use of the species composition. The details were carefully recorded. The species were identified by visiting in their natural growing sites. During the survey necessary specimens were collected to ensure the species identification. The botanical names along with author names were cross-checked with the help of IPNI website (http://www.ipni.org) and existing literatures (Deb 1981, 1983). Further, the phytochemical constituents of recorded plant species were also collected after thorough literature survey.

**RESULTS AND DISCUSSION**

**Results**

A total of 50 species were documented which are used in treating jaundice. The species are enumerated in a tabular form along with the scientific names, family

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**Figure 1.** Study site in the state of Tripura, India (●)
names, vernacular names, parts used, composition, dosage, additional materials added and some recommended precautions (Table 1). The recorded genus and species were 46 and 45 respectively belonging to 37 families. The dominant family is Rutaceae contributed by 4 species, Acanthaceae (3 species) followed by Convolvulaceae, Cucurbitaceae and Mimosaceae with 2 species each. Whereas, the rest 32 families with single species each, which include Anacardiaceae, Apiaceae, Costaceae, Euphorbiaceae, Lamiaeae, Menispermaceae, Plumbaginaceae, etc. (Figure 2). The parts utilized for various ailments were whole plants, stems, leaves, fruits, barks and roots. The most widely used parts were leaf/twigs (38%) > roots/rhizome (18%), fruits (16%) > stems (11%) > barks (8%) > whole plant (7%) and 2% tuber. Figure 3 highlights the utilization pattern of plant parts with the percentage of uses.

The leaves are mostly taken in the form of decoction, raw, paste, powder and often juice is extracted for regular consumption. But even some are included in their daily diet by boiling for making curry. The species includes viz. Azadirachta indica A. Juss., Asteracantha longifolia Nees., Cajanus cajan (L.) Millsp., Citrus limon (L.) Osbeck, Eclipta alba L. ex B.D. Jacks, Hibiscus surattensis L., Kalanchoe pinnata Pers., Mangifera indica L., Marsilea minuta L., Scoparia dulcis L., Typhonium trilobatum (L.) Schott etc. Roots of Citrus limon (L.) Osbeck, Glycosmis arborea (Roxb.) DC., is utilized in the form of decoction. Often roots are also taken in the form of paste or powder form from species such as Costus speciosus (J. Koenig) Sm., Entada phaseoloides (L.) Merr., Ichnocarpus frutescens (L.) R. Br., Plumago zeylanica L., Smilax zeylanica L., Solanum nigrum L. and Thunbergia grandiflora Roxb. Most of the fruits are taken raw or when ripen (Averrhoa carambola L., Garcinia pedunculata Roxb. ex Buch.-Ham, Phyllanthus niruri Roxb. ex Wall) and sometimes juice is extracted for consumption (Citrus medica L., Morodernica charantia L.). The species whose barks are utilized are Mangifera indica L., Micromelum integrerrimum (Roxb. ex DC.) Wight Arn. ex M. Roem; Oroxyllum indica (L.) Benth. ex Kurz and Ziziphus oenoplia (L.) Mill. Bark paste of Mangifera indica L. is used to cure jaundice by rubbing against body before bath for 3-4 days, as the water color changes to orange, this practice is believed to cure jaundice as reported by local medical practitioners.

A total of 45 species out of 50 were recorded for treating jaundice including five species which are used as an additional ingredient added to prepare medicine. The additional species used includes Allium sativum L., Allophyllus racemosa L., Cassia fistula L., Piper longum L. and Zingiber officinale L. A number of ailments were recorded from this study other than jaundice. The key pointed ailments mentioned were worm (intestinal/stomach), gum/tooth problem, anemia, dysentery, ophthalmic problem, kidney stone, diabetes, cough, skin disease, urinary disorder, snake bite and wound healing. During the treatment of jaundice, diet of the patient is highly taken care of and suggested to take food which keeps the body temperature cool. Therefore, oil rich foods were not included in diet. Generally high nutritious leafy green vegetables were advised to take.

The plant parts are taken in different forms as represented in Table 1. Decoction was mostly taken for all the parts utilized, followed by raw, paste, juice, powder, boil, crushed and cooked as food. These parts are taken either in a single or conjugated with some other additional materials like scented rice (Oryza sativa L.), Coccinia grandis (L.) Voigt, Catharanthus roseus L., salt, calcium hydroxide etc. either orally or is applied in case of wound healing or washing during gum or tooth ache.

The phytochemical constituents of species preferred for curing jaundice are assembled after critical review of literatures (Table 2). The identified compounds were known to have beneficial importance in medical science and also for industrial purposes.

The common constituents like carbohydrate, vitamin and minerals ensure about the utility of the material in regular diet. These phytochemicals provide pharmacological and therapeutic effects upon its use. Besides, these are also providing nutrition in our daily diet. Fruits of Averrhoa carambola L. is consumed during the occurrence of jaundice. It is indicated to contain a huge amount of antioxidant properties. These antioxidants significantly delays or prevents oxidation of oxidisable substrate that protects the body against damage caused by reactive oxygen. Alocasia indica (Roxb.) Schott. is well preferred.
vegetable of community’s regular diet. Tubers of this plant have diagnostic effects due to the presence of compounds like phenolic acids and flavonoids. *Enhydra fluctuans* Lour. is another species, whose leaves are taken after boiling, contains sesquiterpene lactones. The other species which possess the same compounds are *Citrus medica* L., *Centella asiatica* (L.) Urb., *Coccinia grandis* (L.) Voigt, *Mangifera indica* L., *Neptunia prostrata* Bail., *Terminalia bellirica* (Gaertn.) Roxb. among others, listed for its beneficial chemical compounds. *Centella asiatica* (L.) Urb. is possessing an array of chemical constituents like asiaticoside, betulinic acid, thankunic acid and isothankunic acid and many other beneficial active chemical component, which have cognitive enhancing effect, neuroprotective effect and influences oxidative stress parameters (Orhan 2012).

**Discussion**

The present study shows the preferences of many herbal medicines to cure varieties of ailments mainly jaundice, dysentery, intestinal worms, wound healing, ophthalmic problem, etc. An appraisal of other reports simplified that various species have some similarities across the communities in the same geographical region. Species like *Azadirachta indica* A. Juss., *Cajanus cajan* (L.) Millsp., *Carica papaya* L., *Centella asiatica* (L.) Urb., and *Oroxylyum indicum* (L.) Benth. ex Kurz were found to be used against jaundice in *Manipuri* communities (Das and Choudhury 2012) and in *Darlong* communities (Deb et al. 2012). In the present study the use of species like *Cuscuta reflexa* Roxb. and *Glycosmis arborea* (Roxb.) DC. against jaundice are found similar with other studies (Majumdar et al. 2006; Das et al. 2009). This may be due to the inter-cultural homogeneity in the knowledge of the significant uses.

Many above and below ground parts were utilized in the form of decoction, food, paste, as fruit, powder, juice, crushed form, by soaking, by forming pills and others like brushing etc. The maximum parts utilized were above ground like leaves, stems and fruits which was found to be similar with the reports (Sen et al. 2011). Mishra et al. (2012) reported 15 species for curing jaundice out of 68 species from Tarai region of Uttar Pradesh.

*Costus speciosus* (J. Koenig) Sm. was recorded from the present study against jaundice. However, the same species was reported against kidney stone (Shankar et al. 2012) and diabetes (Choudhury et al. 2012). It shows the importance of the species irrespective of the location. In the present study, fruits of *Phyllanthus niruri* Roxb. ex Wall was recorded for treating jaundice which was similar with the others’ findings (Skhakar and Dutta 2008; Sen et al. 2011; Das et al. 2012). The significant effects of the use of *Phyllanthus niruri* Roxb. ex Wall in treating jaundice has also been shown by chemical analysis (Jayachandra and Devi 2012). *Plumbago zeylanica* L. in the present study is found to be used in treating snake bite. But instead of this plant some other plant parts was reported for the same treatment (Lokho 2012). These differences may be due to the lack of knowledge and known effects of the same. It also signifies the same phytochemical properties of different species.

The listed plants have different kind of chemical constituents (Table 2). The components are different types of essential to secondary metabolites viz. vitamins, glycosides, tannins, flavonoids etc. It is assumed that these compounds are responsible for the various physiological activities. Among the Vitamins, exact physiological role of Vitamin A is essential in vision. The main precursor of the rhodopsin is Vitamin A, as well as it boosts up immunity power (Igwenyi et al. 2011). Vitamin B (riboflavin) is essential for energy production and in its coenzyme forms (FMN and FAD) serves as hydrogen transport systems (Mayes 2000). Vitamin C, an antioxidant, facilitates wound healing, production of collagen, formation of red blood cells and boosts immune system (Monsen 2000). Some other vitamins act as an antioxidant and also plays a role in cellular respiration (Burtis and Ashwood 2003), coenzymes for various oxidoreductases. Besides, alkaloids are well known for their ability to inhibit pain.

The sugar molecules of many plant glycosides are often bound to poisons in order to move them from the body. The tannins prevent urinary tract infection by preventing bacteria from adhering to the walls (Igwenyi et al. 2011). Cholesterol is breakdown in the blood stream by the combine action of tannin and anthocyanins. Tannins also help build and strengthen collagen along with vitamin C (Okuda et al. 1991). During infections and microbial invasions in body saponins serve as natural antibiotics. It can also enhance the effectiveness of certain vaccines, lower cholesterol level and destroy lung & blood cancer tumor cells. Flavonoids have antioxidant activity, anti-allergic; prevent from inflammation, free radicals, platelet aggregation, microbes, ulcers, hepatoxins and tumors in biological systems (Okwu and Ndu 2006). Thus the presence of good amount of phytochemicals can provide and protect body’s physiological process against different damaging effects (Igwenyi et al. 2011).

These chemical constituents are tested for several physiological disorders and as a whole these are screened out by pharmacological tests for specific and particular ailments (Raman and Lau 1996; Xie et al. 1998; Ito et al. 2004; Atangwko et al. 2009; Zulfiker et al. 2010; Orhan 2012; Islam et al. 2015). Besides, the present study reports the usefulness of these plants to prepare herbal formulation for jaundice. So there is a need for some specific phytochemical screening, whether these listed chemicals exactly perform to cure jaundice or not?

In conclusion, indigenous communities are habituated to live around the natural resources and utilizing the resources. This practice of plant product utilization is build up based on the trial and error method. Plants are the repository of potential medicinal values thus can be widely used for alleviating several health problems. New formulations of drugs are based on the local trials by the indigenous people. But due to the absence of the modern medicine and existence of the belief in the effect of the herbal drugs, people in the rural area still prefer traditional ways of curing. Species like *Ensete glacum* (Roxb.) Cheesm and *Thunbergia grandiflora* Roxb. are newly reported for their use in jaundice and hence require a necessary attention in finding the new chemical
Table 1: Enumeration of the recorded plant species with their scientific, vernacular and family names along with their parts used and dosages.

<table>
<thead>
<tr>
<th>Species</th>
<th>Family name</th>
<th>Vernacular name</th>
<th>Part(s)</th>
<th>Composition</th>
<th>Dosage</th>
<th>Additional materials</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alocasia indica</em> (Roxb.) Schott.</td>
<td>Araceae</td>
<td>Kochu (B), Muitu (K)</td>
<td>Tuber</td>
<td>Tuber is boiled and taken as food</td>
<td>4-5 days during jaundice</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Andrographis paniculata</em> (Burm. f.) Wall. ex Nees</td>
<td>Acanthaceae</td>
<td>Chirata (K)</td>
<td>Whole Plant</td>
<td>Whole plant decoction</td>
<td>Administered 2-3 table spoon in a day for at least 5 days</td>
<td>Zinger (<em>Zingiber officinale</em> L.)</td>
<td>-</td>
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<tr>
<td><em>Asteracantha longifolia</em> Nees.</td>
<td>Acanthaceae</td>
<td>Kulekhara (B)</td>
<td>Leaf</td>
<td>Leaf decoction or either eaten raw</td>
<td>Until cure</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Averrhoa carambola</em> L.</td>
<td>Oxalidaceae</td>
<td>Neem (B/K)</td>
<td>Leaf</td>
<td>Leaf decoction or eaten raw</td>
<td>3-4 weeks</td>
<td>Warm rice (<em>Oryza sativa</em> L.)</td>
<td>-</td>
</tr>
<tr>
<td><em>Azadirachta indica</em> A. Juss.</td>
<td>Meliaceae</td>
<td>Arahar, Aroll (B), Khakleyng (J), Muimasing (K)</td>
<td>Leaf, Fruit</td>
<td>Decoction of leaf and also cooked Pulses are burnt with stem of <em>Mangifera indica</em>, leaf of <em>Musa paradisiaca</em> and the leg skin of chicken. A paste is prepared from the ashes after burning and applied on gum and tooth by <em>Jamatia</em>.</td>
<td>10-20 ml daily</td>
<td><em>Mangifera indica</em> L. (Thaichuk), <em>Musa paradisiaca</em> L. (Jay Thalikw), chicken leg skin</td>
<td>-</td>
</tr>
<tr>
<td><em>Bacopa monnieri</em> (L.) Pennell</td>
<td>Scrophulariaceae</td>
<td>Bramhi (B)</td>
<td>Leaf</td>
<td>Leaf juice is given until cure</td>
<td>Decoction of leaf and also cooked Pulses are burnt with stem of <em>Mangifera indica</em>, leaf of <em>Musa paradisiaca</em> and the leg skin of chicken. A paste is prepared from the ashes after burning and applied on gum and tooth by <em>Jamatia</em>.</td>
<td>-</td>
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<tr>
<td><em>Cajanus cajan</em> (L.) Millsp.</td>
<td>Papilionaceae</td>
<td>Kamaranga (B/K)</td>
<td>Fruit</td>
<td>Fruit is advised to consume during jaundice</td>
<td>Advised to take daily</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Carica papaya</em> L.</td>
<td>Caricaceae</td>
<td>Kamaranga (B/K)</td>
<td>Fruit</td>
<td>Eaten raw or even curry is prepared</td>
<td>Advised to take daily</td>
<td>Warm rice</td>
<td>-</td>
</tr>
<tr>
<td><em>Citrus limon</em> (L.) Osbeck</td>
<td>Rutaceae</td>
<td>Kagajilebu (B), Janbi (J)</td>
<td>Root, Leaf</td>
<td>The root decoction is very effective in curing hepatitis. 2-3 leaves rubbed with finger, are given for smelling to bring sense. Washing with the water of the boiled leaves during ophthalmic problem</td>
<td>Root decoction taken one cup for a month.</td>
<td>Root decoction taken in empty stomach. Wash properly after cooling.</td>
<td>-</td>
</tr>
<tr>
<td><em>Citrus medica</em> L.</td>
<td>Rutaceae</td>
<td>Baranebu, Jamir (B), Jami (K)</td>
<td>Fruit</td>
<td>Decoction of ripe fruits is taken in more quantities.</td>
<td>-</td>
<td>-</td>
<td>Fruit must be ripened</td>
</tr>
<tr>
<td><em>Coccinia grandis</em> (L.) Voigt</td>
<td>Cucurbitaceae</td>
<td>Thelakuchu (B)</td>
<td>Leaf</td>
<td>Leaf decoction</td>
<td>Taken for 2-3 teaspoon for 5 days</td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Cocos nucifera</strong> L.</td>
<td>Arecaeeae</td>
<td>Narikol (B) Narikwra (K)</td>
<td>Fruit</td>
<td>Coconut milk, nutritive soft endosperm</td>
<td>Advice to take regularly</td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Costus speciosus</strong> (J. Koenig) Sm.</td>
<td>Costaceae</td>
<td>Kebuk (H), Kushtha, Keora (K)</td>
<td>Rhizome, Leaf, Root</td>
<td>Paste of rhizome taken during kidney stone. Taken as food. Leaves and root juice taken to cure diabetes.</td>
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<td>-</td>
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<tr>
<td><strong>Cascuta reflexa</strong> Roxb.</td>
<td>Convolvulaceae</td>
<td>Sarnalata (B), Ruiengte (H), Jirai (K)</td>
<td>Whole plant part</td>
<td>Decoction of the plant along with coconut water taken in severe jaundice. Stem is crushed, extracted, filtered and given to jaundice patient by Halam. Decoction is prescribed during cough and diabetes and also Plant scattered on the bed to prevent night bed urine.</td>
<td>Decoction (1-2 cups) taken for 2 weeks at early morning along with 2-3 cups of coconut water. 40-50 gm of stem must be crushed and extracted.</td>
<td>Cocos nucifera L.</td>
<td>It is advised to drink the decoction facing the sun in standing position and later get heated up in sunlight for 5 minutes.</td>
</tr>
<tr>
<td><strong>Enhydra fluctuans</strong> Lour.</td>
<td>Asteraceae</td>
<td>Helencha (B) Elencha (K)</td>
<td>Leaf</td>
<td>Boiled leaf</td>
<td>Boiled leaf and stem are taken with rice Can take any time</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ensete glaucum</strong> (Roxb.) Cheesm</td>
<td>Musaceae</td>
<td>Chisau (L)</td>
<td>Pseudo-stem</td>
<td>Pseudo stem is eaten raw</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Entada phaseoloides</strong> (L.) Merr.</td>
<td>Mimosaceae</td>
<td>Gila (B), Swkwi-bakhla (K)</td>
<td>Root bark</td>
<td>Paste of root bark is made and taken in very low quantity with water</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Garcinia pedunculata</strong> Roxb. ex Bach.-Ham</td>
<td>Clusiaceae</td>
<td>Borthekera (K)</td>
<td>Fruit</td>
<td>Advised to take raw fruits during jaundice</td>
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</tr>
<tr>
<td><strong>Glycosmis arborea</strong> (Roxb.) DC.</td>
<td>Rutaceae</td>
<td>TuluthaPoka (K)</td>
<td>Root</td>
<td>Decoction</td>
<td>5-6 teaspoon of decoction is mixed with milk</td>
<td>Milk</td>
<td>Patients suffering with rheumatic pain must avoid</td>
</tr>
<tr>
<td><strong>Hibiscus surattensis</strong> L.</td>
<td>Malvaceae</td>
<td>Sarba-ameli (B)</td>
<td>Leaf</td>
<td>Special type of curry is made by its tender leaves</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ichnocarpus frutescens</strong> (L.) R. Apocynaceae Br.</td>
<td>Apocynaceae</td>
<td>Dugdhalata, Perialata (B), Soya lata (S)</td>
<td>Root, Bark</td>
<td>Juice of the mixture of old root barks of the plant and Ziziphus oenoplia (L.) Mill.</td>
<td>Juice taken twice a day after filtration along with 1-2 spoon sugar Consumed with rice</td>
<td>Root bark of Ziziphus oenoplia (L.) Mill. (Banbadai)</td>
<td>The root bark must be old. Mixtures must be in equal ratio.</td>
</tr>
<tr>
<td><strong>Ipomoea aquatica</strong> Forssk.</td>
<td>Convolvulaceae</td>
<td>Kamli (B)</td>
<td>Stem, Leaf</td>
<td>Plant parts are boiled to prepare dish</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Species</td>
<td>Family</td>
<td>Common Name(s)</td>
<td>Part(s) Used</td>
<td>Uses</td>
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</tbody>
</table>
| *Mangifera indica* L.   | Anacardiaceae        | Am (B), Thaaychuk (J), Thaichuk (K) | Bark, Young leaf, Stem | Bark paste is boiled and water used during bath during Jaundice (*Pallang*).  
In this process few Calcium Hydro-oxide rubbed on the body and after few minutes that warm water slowly applied over the body. Then the water color quickly changes into orange color and is called *Pallang* by local medical practitioner.  
Soaked bark given in case of blood dysentery by *Jamatta*.  
Leaf is chewed to control obesity.  
Stem used as tooth brush to prevent dental diseases.  
Soup is prepared with its leaves and is included in regular for 15 days.  
Extract of fruits and twigs prepared and taken in small quantity  
Juice from crushed leaves and stems is taken very good tonic  
Given for 4-12 days regularly in empty stomach  
Advice to take 1-2 tea spoon once in empty stomach  
Must be given in empty stomach  

| *Marsilea minuta* L.    | Marsileaceae         | Susni (H)      | Leaf        | Decoction of leaf  
Given orally for some days  
Taken twice a day for 5-7 days  
Until cure  
Juice and paste must be used externally  |
| *Miconium integerrimum* (Roxb. ex DC.) Wight Arn. ex M. Roem. | Rutaceae             | Bon Jamir (B), Karai (K) | Fruit, Bark | Fruits are taken during jaundice.  
Bark decoction to cure dysentery.  

| *Momordica charantia* L. | Cucurbitaceae        | Korola (B), Gangla (K) | Fruits, twigs | Extract of fruits and twigs prepared and taken in small quantity  

| *Moringa oleifera* Lam. | Moringaceae          | Sajna (B/K/H)       | Leaf, stem   | Decoction of leaf  

| *Neptunia prostrata* Baill. | Mimosaceae          | Panilajuk (B), Kharai (K) | Whole plant | Very good tonic  

| *Ocimum tenuiflorum* L.  | Lamiaceae            | Tulsi (B)           | Leaf        | Decoction of leaf  

| *Oroxylum indicum* (L.) Benth. ex Kurz Pavetta indica* L. | Bignoniaceae       | Tokharung (K)      | Bark        | Decoction of bark is taken  

| *Phyllanthus niruri* Roxb. ex Wall | Euphorbiaceae | Bon amlokhi       | Fruit        | Fruit is eaten raw  
Green leaves are spread over the infected area for soft feelings  
Leaf juice externally used in jaundice.  
Root paste applied on snake bite.  
Leaves tied over the wound.  

| *Plumbago zeylanica* L.   | Plumbaginaceae      | Chita, Chitra (B), Jaundicea (S) | Leaf, Root   | Decoction of leaf  

| *Saccharum officinarum* L. | Poaceae             | Kussar (B)          | Stem        | Decoction of leaf  

| *Saccharum officinarum* L. | Poaceae             | Kuruk (K)           | Stem        | Bark soaked in water  
Calcium Hydro-oxide (*Chun*)  
Bark paste is boiled with water for about 10 minutes  
Bark is soaked overnight in a glass of water.  
Leaves and stem used must be young.  

Leaves must be matured.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Family</th>
<th>Medicinal Part</th>
<th>Preparation/Method</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schima wallichii (DC.) Choisy</td>
<td>Theaceae</td>
<td>Leaf</td>
<td>Decoction of the leaf crushed mixture along with <em>Cassia fistula</em> L. and <em>Solanum indicum</em> L.</td>
<td>-</td>
</tr>
<tr>
<td>Scoparia dulcis L.</td>
<td>Scrophulariaceae</td>
<td>Leaf, twigs</td>
<td>Extract is taken in empty stomach for a week</td>
<td>-</td>
</tr>
<tr>
<td>Smilax zeylanica L.</td>
<td>Smilacaceae</td>
<td>Root, Leaf</td>
<td>Mixture of root powder along with bark powder of <em>Ziziphus oenoplia</em> (L.) (Banbadai) and <em>Streblus asper</em> (Harka) used to cure hepatitis, nephritic and blood dysentery. Root paste is boiled with goat milk given for sexual stimulant.</td>
<td>Roots and barks must be dried. Mixture must be in the ratio of 3:2:1 in a warm water</td>
</tr>
<tr>
<td>Solanum nigrum L.</td>
<td>Solanaceae</td>
<td>Root</td>
<td>Powdered roots</td>
<td>Must be given orally</td>
</tr>
<tr>
<td>Terminalia bellirica (Gaertn.) Roxb.</td>
<td>Combretaceae</td>
<td>Fruit</td>
<td>Dried fruit dipped in water at least 2-3 hours before, then the water is taken.</td>
<td>-</td>
</tr>
<tr>
<td>Thunbergia grandiflora Roxb. Acanthaceae</td>
<td>Vako</td>
<td>Root</td>
<td>Stem is cut into small pieces and soaked in liver complaints and in vermifuges.</td>
<td>Soaked in a glass of water overnight</td>
</tr>
<tr>
<td>Tinospora cordifolia Miers Menispermaceae</td>
<td>Paddakuraj, Gulancha, Ghamacilata (B), Duksha-sundari (K)</td>
<td>Stem</td>
<td>Stem is cut into small pieces and soaked and given in empty stomach to cure diabetic complaints. Decoction of stem is used in liver complaints and in vermifuges.</td>
<td>-</td>
</tr>
<tr>
<td>Typhonium trilobatum (L.) Schott Araceae</td>
<td>Kharkun (B)</td>
<td>Leaf</td>
<td>Leaves are used as vegetable and taken regularly with the meat</td>
<td>-</td>
</tr>
<tr>
<td>Vanda tessellata Hook. ex G. Don Orchidaceae</td>
<td>Orchid, Rashna (B), Khumchuk (K)</td>
<td>Leaf</td>
<td>Mixture of the crushed leaf, along with root of <em>Carica papaya</em> L., <em>Allophylos racemosus</em> Sw. and little amount of snail flesh, few garlic and black pepper and small pills are made.</td>
<td>-</td>
</tr>
<tr>
<td>Ziziphus oenoplia (L.) Mill. Rhamnaceae</td>
<td>Chiyakul, Bonbaroi (B), Brui, Chiyangbufang (S/ K)</td>
<td>Bark</td>
<td>Grinded bark is taken 2 to 3 spoons daily with water.</td>
<td>Decoction of the bark must be taken and dry fruit can be used.</td>
</tr>
</tbody>
</table>

Note: B=Bengali, K=Kokborok, H=Halam, J=Jamatia, S=Santthal
et al.
tocopherol, biotin; caffeic, fl

isobutyl madecassic acid, asiaticoside, madecassoside, madacassic acid, betulinic acid, thankunic acid, isothankunic acid (Orhan 2012); a, thiamine, carbohydrates.


β-sitosterol, phenacetamidine, a chemical known for its antiulcer activity, flavonoid glycosides that are effective against ulcer (Rastogi and Mehrotra 1995).

Protein, carbohydrate, ascorbic acid, coumaric acid, hexadecenoic acid, dodecanoic acid.

Flavonoid glycosides that are effective against ulcer (Rastogi et al. 2001; Niranjan et al. 2010).

Protein, Crude fibre, Fat, Magnesium, Flavonoids, Tannins, Saponins, Polyphenol, Alkaloids (Atangwho et al. 2009).

Phytosterols, fatty acids, minerals, polyphenols, proanthocyanins, alkaloids, enzymes, carbohydrates, flavonoids, terpenoids, vitamins (Doss and Anand 2014).

Ascorbic acid, protein, polyphenol oxidase, proanthocyanidins, epicatechin (Gheeewala et al. 2012).

Alocasia indica (Roxb.) Schott.

Andrographis paniculata (Burm. f.) Wall. ex Nees

Averrhoa carambola L.

Azadirachta indica L.

Bacopa monn (L.) Pennell

Cajanus cajan (L.) Millsp.

Carica papaya L.

Cassia fistula L.

Centella asiatica (L.) Urb.

Active chemical constituents as reported by different workers

Table 2: Enumeration of the recorded plant species used in jaundice with their active chemical constituents reported by different workers

<table>
<thead>
<tr>
<th>Species</th>
<th>Active chemical constituents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allophylus racemosus Sw.</td>
<td>β-sitosterol, phenacetamidine, a chemical known for its antiulcer activity, flavonoid glycosides that are effective against ulcer (Rastogi and Mehrotra 1995).</td>
</tr>
<tr>
<td>Alocasia indica (Roxb.) Schott.</td>
<td>Protein, carbohydrate, ascorbic acid, alpha-tocopherol, nitric oxide, malonaldehyde, alkaloids, tannins, glycosides, saponins, flavonoids, β-hydroxyquebrachamine, 10-dicarboxylic acid, 2, 4 α-dihydroxy-1-methyl-8 methylene, 14α-lactone, 1,2-benzenedicarboxylic acid, 9-hexadecenoic acid, dodecanoic acid, linoleic acid and its ester, oleic acid, ethyl oleate (Pal et al. 2014).</td>
</tr>
<tr>
<td>Andrographis paniculata (Burmin.) Wall. ex Nees</td>
<td>Andrographolide, 14-deoxy-11-o xoandrographolide, 14-deoxy-11, 12-didehydroandrographolide, 14-deoxyandrographolide, neoandrographolide, andrographosyl, andrographane, andrographone, andrographysterin, andrographapin, α-sitosterol, stigmasterol, andrographin, monohydroxy trimethyl flavones, dihydroxy-di-methoxyflavone, panicolin, andrographone, andrographoside, andropaniculosin A, andropani-culoside A (Niranjan et al. 2010; Hossain et al. 2014).</td>
</tr>
<tr>
<td>Asteracantha longifolia Nees.</td>
<td>Phytosterols, fatty acids, minerals, polyphenols, proanthocyanins, alkaloids, enzymes, carbohydrates, flavonoids, terpenoids, vitamins (Doss and Anand 2014)</td>
</tr>
<tr>
<td>Averrhoa carambola L.</td>
<td>Ascorbic acid, protein, polyphenol oxidase, proanthocyanidins, epicatechin (Gheeewala et al. 2012).</td>
</tr>
<tr>
<td>Azadirachta indica L.</td>
<td>Protein, Crude fibre, Fat, Manganese, Selenium, Zinc, Iron, Copper, Magnesium, Chromium, Flavonoids, Tannins, Saponins, Polyphenol, Alkaloids (Atangwho et al. 2009).</td>
</tr>
<tr>
<td>Bacopa monn (L.) Pennell</td>
<td>Baco saponin (A, B, C and D) (Srivastava et al. 2009).</td>
</tr>
<tr>
<td>Cajanus cajan (L.) Millsp.</td>
<td>Protein, amino acid, steroid, phenolic compound (Mohanty and Chourasia 2011).</td>
</tr>
<tr>
<td>Carica papaya L.</td>
<td>Protein, fat, fibre, carbohydrates, calcium, phosphorus, iron, vitamin C, thiamine, riboflavin, niacin, caroxene, amino acid, citric acids, molic acid (green fruits), volatile compounds: linalol, benzylisothiocynate, cis and trans 2, 6-dimethyl-3,6 exopy-7 octen-2-ol. Alkaloid, α-carpine, benzyl-β-d glucoside, 2-phenylethyl-β-d-glucoside, 4-hydroxyl-phenyl-2 ethyl-b-d glucoside and four isomeric malonated benzyl-β-d glucosides (Nadkarni 1954; Bruneton et al. 1999).</td>
</tr>
<tr>
<td>Centella asiatica (L.) Urb.</td>
<td>Asiatic acid, madecassic acid, asiaticoside, madecassoside, madasatic acid, betulinic acid, thankunic acid, isothankunic acid (Orhan 2012); Flavonoid derivative s such as quercetin, kaempferol, patuletin, rutin, apigenin, castilliferol, castillicetin, and myricetin (Kuroda et al. 2001; Matsuda et al. 2001); centelllose (Wang et al. 2014); cadinol, acetoxycentellinol, centellin, centellicin, and asiaticin (Siddiqui et al. 2007) sterols (Rumalla et al. 2010); phenolic acids (Yoshida et al. 2005).</td>
</tr>
</tbody>
</table>
**Citrus limon** (L.) Osbeck
- Cymene, E-citral, DL-limonene, L-α-terpineol, β-pinene, α-terpinolene, terpinen-4-ol (Al-Jabri and Hossain 2014)

**Citrus medica** L.
- Alkaloids, flavonoids, phenols, carbohydrates, glycosides (Negi et al. 2011)

**Cocos nucifera** L.
- Sterols, tannins, flavonoids, proteins, amino acids, glycosides, phenols, saponins, alkaloids (Ummaheswari and Chatterjee 2008)

**Cortes species** (J. Koenig) Sm.
- Carbohydrates, vitamin C, vitamin E, flavonoids, phenols, glycosides, saponins, alkaloids and minerals like Zinc, Copper, Manganese, Selenium and Iron (Jagtap and Satpute 2014)

**Cucumis melo** (L.) Voigt
- Protein, total lipid (fat), carbohydrate, fiber, sucrose, glucose, fructose, mannitol, sorbitol, myo-inositol, scylo-inositol (Yong et al. 2009)

**Cucurbita moschata** (L.) Duchesne
- Scoparone, melantettin, quercetin, hyperoside, phenolic compounds, caffeoylquinic acids (Prajapati et al. 2006)

**Enhydra fluctuans** Lour.
- Sesquiterpene lactones (Husain 1992)

**Enotea glauca** (Roxb.) Cheesman
- The chemical constituents is not reported earlier for its root parts

**Entada phaseoloides** (L.) Merr.
- Entada saponin (ES)-III (Okada et al 1987), chalcone glycosides 4′-O-(6′-O-galloyl-β-D-glucopyranosyl)-2′,4′,di-hydroxychalcone; 4′-O-(6′-O-galloyl-β-D-glucopyranosyl)-2′-hydroxy-4-methoxychalcone; 4′-O-β-D-glucopyranosyl-2′-hydroxy-4-methoxychalcone (Zhao et al. 2011)

**Garcinia pedunculata** Roxb. Ex Buch.-Ham
- Protein, β carotene ,thiamine, riboflavin, ascorbic acid, calcium, phosphorus, magnesium, iron, sodium, potassium, copper, zinc, calcium (Islam et al. 2015)

**Glycosmis arborea** (Roxb.) DC.
- Carbazole alkaloids, glybomines (A, B and C), arborinine, arborine (Ito et al. 2004)

**Hibiscus surattensis** L.
- Monoterpenes, sesquiterpene compounds, β-caryophyllene, menthol, methyl salicylate, camphor, germacrene D, hexadecanoic acid, α-humulene, 1, 8-cineole, menthone (Ogundajo et al. 2014)

**Ichneocarpus frutescens** (L.) R. Br.
- Flavonoids, polyphenols, anthocyanins and simple phenolic acids (Kumarappan et al. 2012)

**Ipomoea aquatica** Forssk.
- Protein, ash, fiber ,fat, iron, magnesium, calcium, phosphate, manganese, sulphate, nitrates, vitamins (A, B1, C and K), alkaloids, flavonoids, steroids, phenols, glycosides, β-carotene, saponins and tannins (Igwenyi et al. 2011)

**Mangifera indica** L.
- Mangiferin (Nong et al. 2005); steroids, flavonoid, reducing sugar and cardiac glycosides anthraquinone, tannin (Aiyelaagbe and Osamudiamen 2009)

**Marsilea minuta** L.
- Sodium, potassium, calcium, phosphorus, protein, β-carotene (Dewanji et al. 1993)

**Micromelum integrerrimum** (Roxb. ex DC.) Wight. Arn. ex M. Roem.
- Coumarins as microintegerrin A, microintegerrin B, scopoletin, scopolin of leaf and bark. But chemical constituent is not available from roots (Wang et al. 2014)

**Momordica charantia** L.
- Glycosides, saponins, alkaloids, fixed oils, triterpenes, proteins and steroids (Raman and Lau 1996; http://www.raintree.com/bitmelon.htm), Vitamin C, Vitamin A, phosphorus and iron (http://momordica.allbio.org/). Several phytochemicals have been isolated such as momorcharsins, momordenol, momordicilin, momordicins, momordicinin, momordol, charantin, charine, cryptoxanthin, cucurbitins, cucurbitacins, cucurbitane, cycloartenols, diosgenin, elaeostearic acids, erythrodiol, galacturonic acids, gentisic acid, goyaglycosides, goyasaponins, multiflorenol (Husain et al. 1994; Xie et al. 1998; Yuan et al. 1999; Parkash et al. 2002). These are reported in all parts of the plant (Murakami et al. 2001).

**Moringa oleifera** L.
- Linalool, α-terpineol, p-vinylguaiacol, cis-dihydroagarofuran, eudesm-11-en-4-α,6α-diol, 1-octadecene, octadecane, 5-octadecin, n-hexadecanol, 1-eicosene, eicosane, n-octadecanol, heneicosane, cyclopentadecanol, 1-docosane, docosane, cis-9-eicos-1-ol, tricosane, tetracosane, pentacosane, hexacosane, heptacosane, octacosane, nonacosane, triacontane, hexenyl propanoate, phelylethyl alcohol, pseudo phytol (Marrufo et al. 2013); calcium, magnesium, potassium, sodium, iron, zinc, copper (Valdez-Solana et al. 2015)
<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Chemical Constituents</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Neptunia prostrata</em> Baill.</td>
<td>Glycosides, flavonoids, tannins, steroids, terpenoids, carbohydrate, protein, fat</td>
</tr>
<tr>
<td><em>Ocimum tenuiflorum</em> L.</td>
<td>Tannins, alkaloid, terpenoids, flavonoids, phlobatannins, glycosides, morphine, boldine, saponin, phlobatannins, steroid, ascorbic acid, carotenoids, phenols</td>
</tr>
<tr>
<td><em>Oroxyllum indicum</em> (L.) Benth. ex Kurz</td>
<td>Baicalein (5,6,7-trihydroxyflavone) [Derivatives: Baicalein 6-gluconuride, baicalein 7-gluconuride, baicalein 7-0-β-gentiobioside, tetulin (6-glucose of baicalein), 8,8”-bisbaicalein 1, baicalein-7-o-caffeate 2], oroxylin-a (5,7-dihydroxy-6-methoxyflavone), chrys (5,7-dihydroxyflavone)</td>
</tr>
<tr>
<td><em>Pavetta indica</em> L.</td>
<td>Tricyclin, benzaldehyde, sabinine, limonine, acetylphenone, linalool, perilline, thujupsa-3-one, β-carryophyene, β-edudesmoile, β-pinene, α terpenene, α humulene, α-guaiene</td>
</tr>
<tr>
<td><em>Phyllanthus niruri</em> Roxb. ex Wall</td>
<td>Phyllanthine, hypophyllanthine, flavonoids, quercetin, astralgin, quercitrin, isoquercitrin, rutine, alkaloids</td>
</tr>
<tr>
<td><em>Piper longum</em> L.</td>
<td>Piperine, piplatin, piperlongumine, piperlonguminine, methyl-3,4,5-trimehoxycinnamate, guineensine, piperonaline, pellitonine, piperamine</td>
</tr>
<tr>
<td><em>Plumbago zeylanica</em> L.</td>
<td>Plambagin, fatty acids and esters : palmitic acid, -essella acid (Do and Nguyen 1996), terpenoids (Gupta et al. 1998), taraxasterol (Rai et al. 2000), stigmasterol (Nile and Khobragade 2010), stigmasterol acetate, sitosterone (Gupta et al. 1995)</td>
</tr>
<tr>
<td><em>Saccharum officinarum</em> L.</td>
<td>Abscisic acid, apigenin, glycoside, methyl lapigenin, arabinose, arunodin, benzoic acid, campesterol, coumarin, cylindrin, orientin, fructose, glucose, glucose, phytoester, saccharans, scharfotisde, sucrose, invert sugar, ether, tricin and vicenin</td>
</tr>
<tr>
<td><em>Schima wallichii</em> (DC.) Choisy</td>
<td>Alkaloids, flavonoids, cardiac glycosides, saponins, tannin, florbatannin</td>
</tr>
<tr>
<td><em>Scoparia dulcis</em> L.</td>
<td>Alkaloid, Tannin, Carbohydrate, Glycoside (Zulfiker et al. 2010)</td>
</tr>
<tr>
<td><em>Smilax zeylanica</em> L.</td>
<td>Alkaloid, polyester, phenol, tannin, saponin, flavonoid, protein, amino acid</td>
</tr>
<tr>
<td><em>Solanum nigrum</em> L.</td>
<td>Alkaloids, saponins, terpenoids (Gogoi and Islam 2013; Djaffar et al. 2014).</td>
</tr>
<tr>
<td><em>Terminalia bellirica</em> (Gaertn.) Roxb.</td>
<td>Glycosides, flavonoids, tannins, phenols, saponins, diterpenes, proteins, amino acids</td>
</tr>
<tr>
<td><em>Thunbergia grandiflora</em> Roxb.</td>
<td>Not reported for its root pharmacognostical analysis.</td>
</tr>
<tr>
<td><em>Tinospora cordifolia</em> Miers</td>
<td>Proteins, carbohydrates, phenols/tannins, flavonoids, saponins, glycosides, steroids, terpenoids and alkaloids</td>
</tr>
<tr>
<td><em>Typhonium trifolatum</em> (L.) Schott</td>
<td>Flavanoids, alkaloids, saponins and tannins (Roy et al. 2012)</td>
</tr>
<tr>
<td><em>Vanda tessellata</em> Hook. ex G. Don</td>
<td>Terpenoids, flavonoids, phenols, alkaloids, tannins, steroids, glycosides</td>
</tr>
<tr>
<td><em>Zingiber officinale</em> L.</td>
<td>Protein, calcium, fat, phosphorous, polyphenols, soluble fibre, tannin, flavonoids insoluble fibre, zinc, carbohydrate, copper, vitamin c, manganese, carotenoids, chromium</td>
</tr>
<tr>
<td><em>Ziziphus oenoplia</em> (L.) Mill.</td>
<td>Alkaloids, 7a-hydroxy-6-isopropenyl-3,3a,5,6a,10,10-11b,octamethyl-hexadecahydro-benzol[de]anthracene; 5-carboxylic acid identified from root bark (Prabhavathi and Vijalakshmi 2015).</td>
</tr>
</tbody>
</table>
constituents. Therefore, proper and intensive inventorying of medicinal plants specific to certain health problems becomes necessary. The diminishing pattern of the knowledge system is in danger leading to more in-depth study across the genders and age to know the transfer system. It is necessary to carry the ethnobotanical study of these plants which would help in the preservation of their knowledge and can be utilized in the conservation of these potential plants. It however requires detail work initiated with inter-cultural study and representing about the status and usage of the same species in curing different ailments coupled with chemical analysis. In this context, activities of phytochemical against jaundice may forward an interesting theme for the future studies to screen out and testing their explicit function. Furthermore, pharmacological-ethnobotanical index of such plants may ascribe the indigenous community’s knowledge to higher rates of validation that logically support erosion of traditional knowledge which really needs to be revitalized.

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REFERENCES


Gogoi P, Islam M. 2012. Ethnomedicinal Study of Solanum nigrum L, and


