



## **An Introduction to the Traditional Phyto-Remedies for the Treatment of Jaundice In Majuli: Challenges and Opportunities**

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### **Abstract**

A survey on medicinal plant, used for the treatment of Jaundice has been conducted in remote areas of Majuli, Jorhat district, Assam. The local people of the district use some locally available herbal medicine for the treatment of Jaundice. But selection of plant species as well as parts utilized has been found to be variable from one area to other.

Key Words: Phyto-remedial, Jaundice, local people, Jorhat, Socio-economics.

### **INTRODUCTION**

#### ***a. General Outline***

Man has been using plants in various ways as his food, shelter and cloth since the beginning of human life. In search of food and the ways to cope up successfully with human suffering, primitive men began to distinguish those plants suitable for

nutritional purpose from others with definitive pharmacological action. This relationship between plants and man has kept on growing, and many plants have now come to be used as medicine. Herbal medicine is currently experiencing a revival in the world, along with other complementary therapies such as traditional Chinese Medicines, Osteopathy and Homeopathy (Shinwari and Gilani, 2003).

Although different workers from various regions of the world have documented medicinal plants, no systematic investigation of medicinal plants for the treatment of jaundice with reference to the socio-economic conditions of the source communities has been made till date to the best of our knowledge. In that sense, the present study on antiviral application of medicinal plants for jaundice is one of its first kinds.

The remainder of the paper has the following structure: in §1c & §1d the Indian scenario in relation to phyto-medicine and an introduction to the signs and causes of jaundice are presented. §2 treats the description of the study area and the methodology followed under the heading of methods and materials. §3 offers a discussion on the biological background of phytochemical. In §4, the basic inventory of the phytomedicine used by the local people of Majuli is presented. §5 highlights the constraints in developing traditional medicine and §6 presents a discussion of the economic opportunities in the field of phytomedicine. §7 concludes with an invitation for the preservation of the phytomedicine attested in Majuli. First, however, we will present a discussion of the role of phytomedicine in human society in §1 b.

### ***b. Role of Phytomedicine in Human Society***

People on all continents have used hundreds to thousands of indigenous plants for the treatment of various ailments since prehistoric times (Levetin and McMahon, 2002). Indigenous healers often claim to have learned by observing that sick animals change their food preferences to nibble at bitter herbs they would normally reject (Huffman, 2003). Lowland gorillas take 90% of their diet from the fruits of *Aframomum melegueta*, a relative of antiviral, antibacterial, antifungal and antihelminthic properties, a plausible case can be made for self-medication by animals in the wild (Engel, 2002). A plant that is harmless to a particular animal may not be safe for humans to ingest (Denney and Gardener, 2003). A reasonable conjecture is that these discoveries were the ginger plant that is a potent antimicrobial and apparently keeps shigellosis

and similar infections at bay (Engel, 2002). Sick animals tend to forage plants rich in secondary metabolites, such as tannins and alkaloids (Hutchings et al., 2003). Since these phytochemicals often have traditionally collected by the medicine people of indigenous tribes, who then passed on safety information and cautions.

During the 1960s, for the first time, Red Lapacho (*Tabebuia impetiginosa*, *syn. Tabebuia avellanedae*) attracted considerable attention in Brazil and Argentina as a 'wonder drug'. Two main bioactive components have been isolated from *T. impetiginos*: lapachol and betalapachone. Beta-lapachone is considered to be the main anti-tumour compound, and pro-apoptotic effects were observed *in vitro* (Castellanos et al., 2009).

Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including opium, aspirin, digitalis, and quinine. The World Health Organization (WHO) estimates that 80% of the world's population presently uses herbal medicine for some aspect of primary health care. Herbal medicine is a major component in all traditional medicine systems, and a common element in Ayurvedic, homeopathic, naturopathic, traditional Chinese medicine, and Native American medicine (Pandey et al., 2011).

### **c. *The Indian Context***

India ranks as one of the World's top 12 mega-diversity countries containing rich varieties of biological community (McNeely et. al., 1990). It provides a diverse topographical and climatic condition coupled with a large variety of habitat which has contributed immensely to the rich and unique biodiversity with about 45,000 species of flora and 89,000 species of fauna (BSI, 2009). Diverse climatic conditions of Indian territory provide a suitable environment for its rich and good spectrum of vegetation of angiospermic flora.

### **d. *What is Jaundice?***

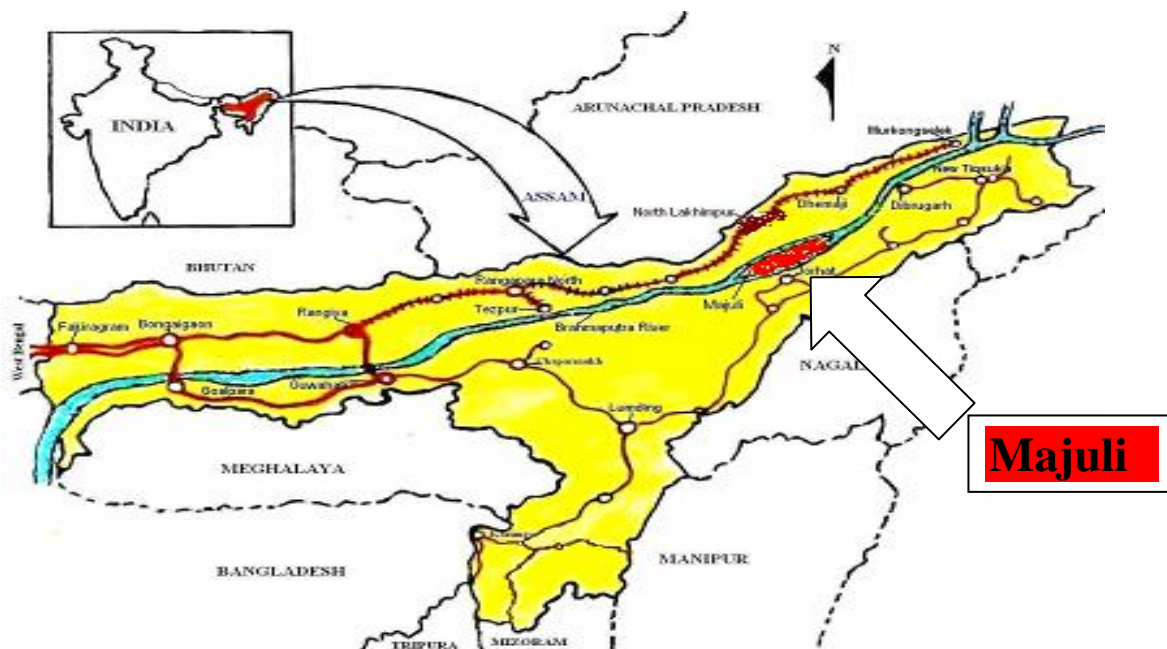
Jaundice is not a disease but rather a sign that can occur in many different diseases. Jaundice is the yellowish staining of the skin and sclera (the whites of the eyes) that is caused by high levels of chemical bilirubin in the blood. The colour of the skin and sclera varies depending on the level of bilirubin. When the

bilirubin level is mildly elevated, they are yellowish. When the bilirubin level is high, they tend to be brown (Wahab et al., 2004). Jaundice may result from various diseases or conditions that affect the liver, like Hepatitis A, Hepatitis B, Hepatitis C, Hepatitis D, Hepatitis E, Liver cirrhosis, Liver cancer, Hemolytic anemia and Malaria. There is no modern allopathic and homeopathic medicine to be prescribed for the treatment of jaundice. The prevention of jaundice, particularly the infective variety, is important in countries such as India, where the incidence of infection is very high.

## **MATERIALS AND METHODS**

### *a. The study area*

**Majuli** or **Majoli** is a large river island in the Brahmaputra River in the Indian state of Assam. Majuli is the largest river island in the world. It is in the Jorhat district covering an area in between  $26^{\circ} 40'N - 27^{\circ} 10' N$  Latitude and  $93^{\circ}37' E - 94^{\circ}50'E$  Longitude. Majuli had a total area of 1,250 square kilometres (483 sq mi), but having lost significantly to erosion it has an area of only 421.65 square kilometres (163 sq mi) in 2001(Figure 1).



### Figure 1, The Majuli island

The island is formed by the Brahmaputra river in the south and the Kherkutia Xuti, an anabranch of the Brahmaputra, joined by the Subansiri River in the north. Majuli island is accessible by ferries from the City of **Jorhat**. The island is about 200 kilometres east from the state's largest city — Guwahati. The island was formed due to course changes by the river Brahmaputra and its tributaries, mainly the Lohit. Majuli is also the abode of the Assamese neo-Vaisnavite culture.

It is absolutely isolated from the rest of the world and is one of the country's bio-diversity and cultural hot spots. It is perhaps the largest populated river island, with a population of 2.15 lakhs.

#### ***b. Methodology***

Intensive ethno-botanical explorations were undertaken in selected places of Majuli to find out various medicinal plants used for the treatment of jaundice either in flowering or fruiting stage. The freshly collected samples of plants were arranged properly within the folded sheets of pressing papers (12''/18''), each of which was placed between two dry blotters of same size. The whole piles of blotters and pressing sheets was then locked up in a field press for 24 hours. Since drying of plants was done without heat, it needed five changes of blotters and pressing sheets properly spread over a span of 10 days. Each specimen was mounted on a white card sheet (11.5''/16.5'') by using white gum paste. To know the uses plants, different categories of people like family heads, healers, old experienced and knowledgeable informants were repeatedly interviewed. Specific questions based upon Performa designed by Jain and Goel(1995) were asked and the resultant information's were recorded in the ethno-botanical field notebook along with important medicinal uses.

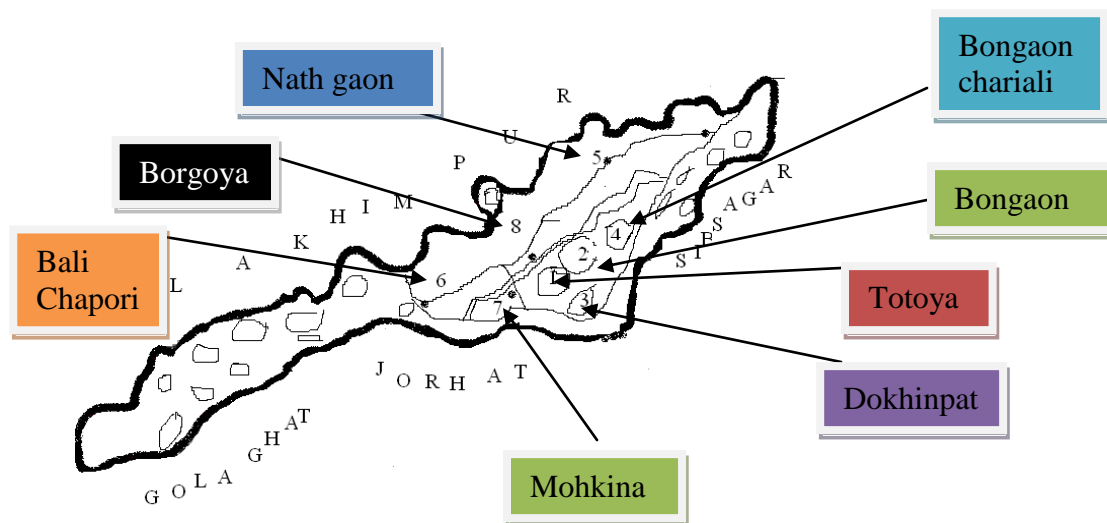


Figure 2. The numerical 1, 2, 3, 4, 5,6,7,8 are the areas of field work in **Majuli**.

Frequent field trips were made to the different villages, as shown against the numerical of Figure 2, situated in the remote areas of Majuli during the year 2009-2010. The oral folklore of health care information were collected as suggested by Schultes (1963) Jain (1963,1964,1967), Borthakur(1976) on the basis of interviews and cross examination of the inhabitants and village medicine men commonly known as BEZ during these field trips. Voucher specimens were collected, identified and preserved as herbarium specimens in the Department of Botany, North Lakhimpur College. Identification of the plants were done by following the reference books of, Dutta(1975), Hooker(1872-97) and Kanjilal *et al.*(1934-40).

## **PHYTOCHEMICALS: BIOLOGICAL BACKGROUND**

All plants produce chemical compounds as part of their normal metabolic activities. These include primary metabolites, such as sugars and fats, found in all plants, and secondary metabolites found in a smaller range of plants, some useful ones found only in a particular genus or species. It is the secondary metabolites and pigments that can have therapeutic actions in humans and which can be refined to produce drugs.

These plant based drugs are efficient to work as phytomedicines in the human body ( Pandey et al.,2011).

Plants up regulate and down regulate their biochemical paths in response to the local mix of herbivores, pollinators and microorganisms (Baldwin, 2002). The chemical profile of a single plant may vary over time as it reacts to changing conditions. Plants synthesize a bewildering variety of phytochemicals but most are derivatives of a few biochemical motifs (Pandey et al.,2011).

### **PHYTO-MEDICINE USED BY THE LOCAL PEOPLE OF MAJULI**

As inhabitants of an isolated world, the people in Majuli are still dependant on herbal medicine for the treatment of diseases like jaundice, fever etc. In the present investigation, 17 medicinal plant species, belonging to 14 Families of plants, used to treat jaundice were attested. The present study reveals the uses of angiospermic plants to cure jaundice which have a potential for bringing about a socio-economic change in the life of the people in this area.

The data obtained from the present investigation have been compiled and provisionally classified into seven categories-leaves, tender shoot, stem, the whole plant, a mix of bark, root and fruit, a mix of bark, root and cloves, and a mix of fruit and seeds- depending on the parts of the plants used. The different parts of the plants used to prepare the medicines for the treatment of jaundice are leaves, stems, fruit, bark, root, shoots and all the parts together. Out of these, the most frequently and commonly used part is the leaf which is followed by tender shoots, stem, the whole plant, a mix of bark, root and fruit, a mix of bark, root, and cloves, and a mix of fruit and seeds. For each of the categories of Phyto-medicine, detailed accounts of the botanical names of the plant species, family, local name, parts used, preparation and application are provided.

#### ***a. Medicine prepared from Leaves***

The plants used to prepare this variety, as shown in Table 1, of the medicine are '*Abutilon indicum* (L) Sweet', '*Cajanus cajan* Linn', '*Bryophyllum calycinum* Salisb', and '*Drymeria cordata* Willd'. The local names for these plants are 'jopa', 'rahar dali', 'dupor

tenga’, and ‘lajabori’ respectively. They belong to the Malvaceae, Fabaceae, Crassulaceae, and Caryophyllaceae family. The part used for the preparation of this variety of the medicine is the leaf. Generally, the unmixed juice extracted from the leaves is served to the patient, as in the case of the medicines prepared from *Cajanus cajan* Linn’ and ‘*Bryophyllum calycinum* Salisb’, with an addition of a little amount of sugar as in the case of the medicine prepared from ‘*Drymeria cordata* Willd’. But an additional procedure has to be undertaken in the case of the medicine prepared from ‘*Abutilon indicum* (L) Sweet’ where the leaves are dried, powdered, and boiled in water in high flame for about ten minutes and the filtrate is used as a medicine. The patient is given certain amounts of the medicine daily one time in the morning till he is cured (Table 1).

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Abutilon indicum</i> (L) Sw	“Jopa”	Malvaceae	leaves	The leaves are dried, powdered and boiled in water. The filtrate is used for jaundice	Approximately 50 ml /day until cured
2	<i>Cajanus cajan</i> Linn	“Rahar Dali”	Fabaceae	leaves	Leaf juice	20 ml daily until cured
3	<i>Bryophyllum calycinum</i> Salisb	“Dupor tenga”	Crassulaceae	leaves	Leaf juice	100 ml daily two times until cured
4	<i>Drymeria cordata</i> Willd	“lajabori”	Caryophyllaceae	leaves	Leaf juice mixed with sugar	50 ml daily one time until cured

Table 1-medicine prepared from leaves



***b. Medicine prepared from tender shoots***

This variety of medicine is prepared from the tender shoots of ‘*Mirabilis jalapa* Linn’ or ‘godhuligopal’(local name). The botanical name of this plant is ‘Nyctaginaceae’. The shoot is beaten and the juice is extracted from the plant. Then, it is mixed with a little amount of cow milk. The patient is served 250 ml one time daily in the morning at empty stomach (Table 2).

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Mirabilis jalapa</i> Linn	“godhuli gopal”	Nyctaginaceae	Tender shoot	Shoot extraction mixed with a little amount of cow milk	250 ml daily at empty stomach until cured

Table 2-medicine prepared from tender shoots

***c. Medicine prepared from stem***

This medicine (Table 3) is prepared from ‘tubuki lota’ or ‘*Stephania elegans*, H.K.’ of Menispermaceae family. The stem of this plant is grinded and made into a paste. The preparation is then mixed with a certain amount of water and sugar. The patient has to drink 200 ml of the medicine daily until he is cured.

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Stephania elegans</i> , H.K	Tubuki lota	Menispermaceae	Stem	Grind and make a pest, mixed with water and sugar	200 ml daily until cure.

Table 3- medicine made from stem

***d. Medicine made from the whole plant***

‘Bon amlokhi’ or ‘*Phylenthus neuri* Linn’ of the Euphorbiaceae family is the plant used for the preparation of this medicine. It is different from the other varieties of medicine in the sense that all the parts--leaves, bark, stem, and fruit—are used in the preparation. The plant is beaten until the extraction of the juice from the plant is possible and then mixed with 100 ml of cow milk. The patient has to consume 100 ml of the medicine twice daily—morning at empty stomach and evening before food. The medicine has to be taken on alternate days for three days (Table 4).

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Phylenthus neuri</i> Linn	Bon amlakhi	Euphorbiaceae	Whole Plant	Extraction of the plants mixed with 100ml of cow milk	100 ml daily 2 times at early morning and evening at empty stomach. alternately three days

Table 4 –medicine prepared from the whole plant

***e. Medicine prepared from a mix of root, bark and fruit.***

This medicine requires three different parts of four different plants belonging to four different families for its preparation. They are--the root of ‘simolu’ or *Bombax ceiba* Linn of Bombacaceae family, the bark of ‘bor jamu’ or *Eugenia jambulena* Lam of Myrtacaceae family, the root of ‘jom lakhuti’ or *Dracaeana angustifolia* Roxb of Liliaceae family, and the fruit of ‘ anarash’ or *Anonus comosus* (L) Merr family. All these parts of these plants are grinded and mixed, and then a little amount of ‘mishiri’ (sugar) and water are added to it. The patient has to drink approximately 500 ml once daily at empty stomach until cured (Table 5).

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Bombax ceiba</i> Linn	“simolu”	bombacaceae	Root	Grind all the items and mix it, then the mix is added a little amount of mishiri, and water	Approx. 500 ml/ day until cure
2	<i>.Eugenia jambulena</i> Lam.	Bar jamu,	Myrtaceae	Bark		
3	<i>Dracaena angustifolia.</i> Roxb	Jam-lakhuti	Liliaceae	Root		
4	Anonas comosus (L) Merr.	Anarash	Bromaliaceae	Fruit		

Table 5- medicine prepared with a mix of root, bark and fruit.

***f. Medicine prepared with a mix of bark, root, and cloves***

It is again a medicine prepared with the combination of different parts of plants of different families. The bark of ‘nuni’ or *Morus indica* Linn of Moraceae family, the root of ‘mekurimah’ or *Mucona bractea* of Fabaceae family, and the cloves of ‘jaluk’ or *Piper nigrum* of Piperaceae family are used in the preparation of this medicine (Table 6). For a daily dose, 20 gm of the root of ‘nuni’, 5 gm of ‘mekurimah’ and half of a clove of ‘jaluk’ are grinded and the extraction is mixed with 250 ml of cow milk. The medicine is to be taken orally early in the morning at empty stomach continuously for at least three days. If the patient is not cured within these three days, the dose has to be continued for the next seven days.

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Morus indica</i> Linn	Nuni	Moraceae	Bark 20 gm	Grind and Extraction is mixed with 250ml cow milk	Daily early morning at empty stomach for 3 days
2	<i>Mucona bracteata</i>	Mekurimah	Fabaceae	Root 5 gms.		
3	<i>Piper nigrum</i>	Jaluk	Piperaceae	Cloves ½ Nos		

Table 6 –medicine prepared with a mix of bark, root, and cloves.

***g. Medicine prepared with a mix of fruit and seed***

This variety of medicine (Table 7) is the last in the list of medicine attested in the villages of Majuli during the investigation period. It is prepared from the fruit of ‘athia kol’ or *Musa paradisiaca* of Musaceae family, seeds of ‘dhan’ or *Oryza satiba* of Poaceae family, and seeds of ‘bootmah’ or *Cicer arientum* Linn of Fabaceae family. To prepare a dose of this medicine, a ripe fruit of ‘athia kol’ has to be cut into small slices and kept overnight with a few nos. of seeds of ‘dhan’ and ‘bootmah’ in 500 ml of water. The filtrate has to be mixed with sugar. The patient has to drink the medicine once daily early in the morning at empty stomach until he is cured.

Sl. No	Scientific name of the plant	Local name	Family	Parts used	Process of use	Amount of the drug to be taken
1	<i>Musa paradisiaca.</i>	Athia kal	Musaceae	Fruit 1No.s	Cut the ripe fruit of 'athia kal' and drop in 500ml water with seeds of dhan and bootmah for a night	Filtrate mixed with sugar daily at empty Stomach until cure
2	<i>Oryza sativa</i>	Dhan	Poaceae	Seed few No.s		
3	<i>Cicer arientum.</i> Linn	Bootmah	Fabaceae	Seed few No.s		

Table 7-medicine prepared from fruit and seed

It is noteworthy that all the important ingredients of these medicines are easily found in the villages where this investigation was made with a little bit of variation in the level of availability as in the case of 'tubuki lota' or 'jom lakhuti' where it is low being rare plants even in Majuli, largely due to the continuous erosion, and as in the case of 'athia kol' where it is high being highly suited to environment of Majuli. It is attested that the most dominant family of plant used in the preparation these medicines is Fabaceae with three species used.

### **CONSTRAINTS IN DEVELOPING TRADITIONAL MEDICINE**

A large portion of the population in a number of developing countries still relies mainly on traditional practitioners, including traditional birth attendants, herbalists and bone-setters, and local medicinal plants to satisfy their primary health care needs. Practices involving use of

traditional medicine vary greatly from country to country and from region to region as they are influenced by factors such as culture, mentality and philosophy ( Pandey et al.,2011).

Despite its existence over many centuries and its expansive use during the last decade, in most countries, traditional medicine, including herbal medicines has not yet been officially recognized, and in most countries the regulations and registration of herbal medicines have not been well established(Pandey et al., 2011). Being an isolated island, the knowledge of these medicines in Majuli has not reached to the greater mass of the country. Difficulty in travelling, lack of proper communication facilities and ignorance of the possibilities that these medicines may lead to are the common obstacles on the way to the popularity and publicity of these medicines.

Furthermore, research and training activities for traditional medicine has not received due support and attention. As a result, the quantity and quality of safety and efficacy data are far from sufficient to meet the demands for the use of traditional medicine in the world. Safety and efficacy data exist only in respect of much smaller number of plants and their extracts and active ingredients, as well as preparations containing those (Pandey et al., 2011). No orientation programs or workshops on the research scopes and potentials of these medicines have been organized so far in the area. The people in the area are virtually ignorant of the fact that such medicines have been looked at in a new way in the contemporary world of health and hygiene. They are not aware that further research and more organized studies on these medicines will open up new platform and possibilities for these medicines.

## **ECONOMIC BENEFITS**

### ***a. Local Reports***

A large number of people in Majuli are earning their livelihood through the practice of this medicine. Some of them have reported to have been earning more than two hundred rupees per day. Because of the high success rate of the treatment provided by these rural herbalists , most of the jaundice patient of the area in and around the Majuli island and the neighbouring districts of Sibsagar, North Lakhimpur, and Sonitpur come for treatment. Almost the majority of the villagers in Majuli prefer these medicines to the costly allopathic counterparts for the treatment of jaundice. If more co-ordination and proper marketing skills are provided to the practitioners of these medicines, the practice of these medicines could open the door of golden opportunity for the people in Majuli. As water-borne diseases are very common among the populace of this region

and considering the high success rate of these medicines, it could well serve as a replacement for the western mode of treatment. The local experts could extend their market to other parts of the state as well as the country and could make it into a highly paying profession.

*b. Role of Private Sector in Phytomedicine*

The interest in natural therapies has increased international trade and attracted most pharmaceutical companies interested in commercializing phytomedicine (Okigbo and Mmeka, 2006). The private sector plays a crucial role in developing economic activities relating to herbal biopro-specting, using the skills and knowledge of local peoples and compensating them for their knowledge. In both developing and developed countries, traditional medicine plays a significant role in primary care and is often part of the “informal” private sector. In the last few years developing countries have felt the increasing pressure of what has now become known as bioprospecting and biopiracy. The pressure has come especially in the sector of traditional medicine( Pandey et al.,2011). In parts of Asia and Africa, 80% of the population report frequent use of traditional medicine. In developed countries, nearly 80% have used traditional medicine services. Herbal medicine, a form of traditional medicine, is a billion dollar industry. Policies for traditional medicine exist in over 100 countries, but regulating quality and safety for patient use and sustaining knowledge and resources remain challenges (WHO, 2008). Given the fact that in most countries, very little legislation is in place, civil society groups and governments have reacted increasingly strongly. The production, processing and sale of phytomedicine products create employment for the producing countries (Gunasena and Hughes, 2000). Communities are looking for concrete short term benefits and, in most cases, monetary benefits. Therefore, they would not be interested in long drawn out access and benefit agreements. There is a need for funding agencies and bio prospectors to start funding the communities or the service providers to communities to work through the process of value addition to both potential and existing products, through a bottom up approach (Pandey et al., 2011).

The sheer size of the knowledge in Phyto-medicine stored in the Majuli island is invitation enough for the private sector companies to work there. For that to happen, the information of these medicines has to spread to people and the credibility of these medicines has to be accepted by the users. This can alternately lead to the development in areas like road, tele-communication, education and other important fields in Majuli.



## **CONCLUSION: A CALL FOR PRESERVATION**

The use of these medicines to treat various illnesses is very common among the communities living in Majuli for various reasons like their poor economic conditions, the high cost of and difficulty in accessing the allopathic medicines. The majority of the attested species used for the preparation of these medicines are wild. That is the most telling reason why these medicines ask for an urgent need to be conserved so that such vital resources are used in the primary health care system before they are lost forever. At the moment, conservation of this traditional knowledge is being handicapped both by factors related to modernization leading to deforestation in the region and lack of interest in traditional healers. But the loss of traditional knowledge within cultures undergoing rapid change is just as irreversible as the loss of species (Joshi and Joshi, 2005). Hence, efforts should be made to document the various uses of plants before some of these plants are completely extinct from the area, or before the knowledge is lost and the inhabitants shift over to modern remedies. It is high time that we have proceeded to save the cultural heritage of the natives in Majuli by confirming the therapeutic value of the plants by scientific means. To conclude, screening for the active substances to test their activities against jaundice and the conditions that cause the organisms to form could be the first step towards preservation.

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