

HERBAL MEDICINES USEFUL FOR THE TREATMENT OF DIABETES IN NORTH-EAST INDIA: A REVIEW

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ABSTRACT

Aim: Diabetes mellitus (DM) is a group of metabolic disorder characterized by hyperglycemia, which is associated with abnormalities in carbohydrate, fat and protein metabolism result in chronic complications. The main objective of the study to presenting the medicinal plants used in North-East India for anti-diabetic purposes. This study emphasizes potential sources for the development of new anti-diabetic drugs from indigenous medicinal plants found in North-East India. **Methods:** The North-east India is the indigenous for its biodiversity aspect. The herbal drugs which have the anti-diabetic properties are documented here on the basic of the information of articles published on the popular journal in different times and based on the information of extensive field survey. **Results:** There are 141nos. of medicinal plant have documented. Traditionally most of the plants show promising anti-diabetic activity. Whole plant and parts of the plant such as bark, leaf, fruit etc. are being used by the ethnic community to cure diabetes. In compares to the other parts of the plant the leaves are the mostly used by the traditional people as anti-diabetic purposes of the different plant. **Conclusion:** The traditionally used medicinal plants have possessing potent anti-diabetic properties that has not still explored scientifically. The article summarize the significance of medicinal plants that are used in north-east India as anti-diabetic purposes and the requisite level of activity as well as toxicity would be considered for further scrutiny to develop the potential drug molecules.

KEY WORDS

Medicinal Plants, anti-diabetic drugs, diabetes mellitus, North East India.

INTRODUCTION

The prevalence of diabetes is rising all over the world due to population growth, aging, urbanization and an increase of obesity and physical inactivity. Unlike in the West, where older persons are most affected, diabetes in Asian countries is disproportionately high in young to middle-aged adults. This could have long-lasting adverse effects on a nation's health and economy, especially for developing countries. The International Diabetes Federation (IDF) estimates the total number of people in

India with diabetes to be around 87.0 million by 2030 [1]. Diabetes mellitus is a common and very prevalent disease affecting the citizens of both developed and developing countries. It is estimated that 25% of the world population is affected by this disease [2]. Diabetes is the condition where the fasting and post prandial (after food) blood glucose level become high (normal 120mg/dl after 2 hours of meal, adult male) due to mainly improper metabolism of carbohydrates, fats and proteins. Diabetes mellitus is a group of syndromes characterized

by hyperglycemia altered metabolism of lipids, carbohydrates, and proteins and an increased risk of complications form vascular disease. Most patients can be classified clinically as having either type 1-diabetes mellitus (type 1DM, formerly known as insulin-dependent diabetes or IDDM) or type 2- diabetes mellitus (type 2DM, formerly known as non –insulin-dependent diabetes or NIDDM) [3].

Generally the four types of cells (α , β , γ and Δ) are in the islets of langerhans gland of pancreas in a human body. Within these the alpha (α) and the beta (β) cells take important role to secrete insulin and glucagon hormone respectively for the balancing of blood glucose level. In case of Type I diabetes mellitus (IDDM) there is the destruction of pancreatic beta cells majority of cases due to autoimmune antibodies. This type of diabetes mellitus is less common to the population. The International Diabetes Federation and the World Health Organization estimate that, worldwide over 100 million people suffer from type II diabetes and 50% of those cases are undiagnosed. Over 90% cases of diabetes mellitus is in Type II (NIDDM) where generally no loss or moderately loss of β -cell mass occur; insulin in circulation is low and no β -cell antibody is demonstrable [4].

Plants have been the basis of many traditional medicine systems throughout the world for thousands of years and continue to serve mankind with new remedies. At present, there is a worldwide movement or assessing the plant resources which are of medicinal and economical value and importance. Researchers are focusing mainly on ethnobotanical & ethnomedicinal investigations to fulfill the increasing demand of herbal products. In the last few decades there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less

side effects [5]. WHO estimate that, about 80% of the population in the developing countries depends directly on plants for its medicine [6, 7]. WHO listed 20,000 medicinal plants globally, [8] within these India's contribution is 15-20% [9]. In India 2,000 medicinal preparations used are of plant origin.

Indian has an ancient heritage of traditional medicine. Indian Materia Medica includes about 2000 drugs of natural origin almost all of which are derived from different traditional system and folklore practices. Out of these drugs derived from traditional system, 400 are of mineral and animal origin while the rest are of vegetable origin. The plant based indigenous knowledge was passed down from generation to generation in various parts of the world throughout its history and has significantly contributed to the development of different traditional systems of medicine [10]. India has a rich heritage of traditional medicine and the traditional health care system have been flourishing for many centuries. It mainly consists of three major systems namely the Ayurveda, the Siddha and the Unani. Lot of efforts has been taken by the government and private sectors for the development of the traditional system based on these three methods.

The North-East region of India (22° - 29° N; 89° - 97° E) comprises the Sikkim and the seven sister states namely Assam, Arunachal Pradesh, Nagaland, Meghalaya, Mizoram, Manipur and Tripura. This region of India has several hill ranges interspersed with valleys and is by large sparsely populated. Nearly 40% of the total geographical area of this region is covered by evergreen forest. Each state of the North-East inhabited by number of ethnic tribes characterized by their native languages, rituals, costumes and housing pattern. There are more than 180 major tribal communities of the total 427 tribal communities found in India [11, 12].

The north-east region is also rich in medicinal plant wealth. Many medicinal plant species having industrial potential are growing wild in this region [13]. A large no of people belonging to various groups of the north-eastern region of India still practicing their own traditional health care systems. The traditional treatment systems adopted by these ethnic communities are being used generation wise without any scientific validation. They have the vast knowledge about various plants that are used for food and as medicine.

Since the discovery of insulin several synthetic oral hypoglycemic drugs (OHDs) are available in market. But these synthetic drugs are not sufficient to treat this deadly disease, particularly type II. Most of these synthetic drugs have some serious side effects. In this respect our traditional herbal therapeutic system can act as an alternative to synthetic drugs. Generally these phytochemicals have fewer side effects. Many of them are helpful in preventing the secondary complications of diabetes [14]. The herbal

medicines are generally cost effective and readily accessible in compares to synthetic drugs. The adverse side effects and higher cost of the existing anti-diabetic drugs necessitate the search for novel, well tolerated, efficient and easily available herbal remedies to tackle the deadly diabetes.

MATERIALS AND METHODOS

Medicinal plants provide a promising bargain since they are easily accessible and affordable. The North-eastern communities of India use traditional herbal medicines for controlling the disease some of which are reported to be highly potent and promising. Herbal preparation of different plant parts such as leaf, root, fruit, bark and also the whole plant are used by numerous communities [15,16]. The data were collected based on the available literature published in the form of journal [14, 17, 18, 19, 20], popular articles and active field survey. Some medicinal plants that are used as anti-diabetic purposes are listed in **Table No 1**.

Table No– 1. Medicinal Plants used as anti-diabetic purposes in North-East India.

Sl. No	Botanical Name & Family	Local Name	Part Used	Preparation to used
1.	<i>Acacia Concina</i> DC (Mimosaceae)	Khangthur	Leaves	The leaves infusion is taken orally.
2.	<i>Aconiotum hetrophylloides</i> Ranunculaceae	Bish, Seli, Chandu	Dried tuberous roots	Decoction of root is used
3.	<i>Adhatoda vasica</i> Nees Acanthaceae	Bogabahok	Roots	Infusion of roots is used
4.	<i>Aechmea fasciata</i> Bromeliaceae	Aechmea	Whole plant	Crushed and mixed with water
5.	<i>Aegle marmelos correa]</i> Rutaceae	Bel	Leaves	Leaves boiled with water
6.	<i>Ajuga bracteosa</i>	Neel-kantha	Leaves	Leaves boiled

	Lamiaceae			with water
7.	<i>Albizzia procera</i> Benth Mimosaceae	Koroi Siris	Roots, leaves, flowers	Leaves juice is taken orally
8.	<i>Alocasia indica</i> schott Araceae	Mankachu	Rhizomes	Dried rhizome is used
9.	<i>Aloevera tournex</i> .Linn Liliaceae	Ghrita kumari	Leaves	Leaves paste is used
10.	<i>Alstonia scolaris</i> R.Br. Apocynaceae	Satiana	Leaves, Bark	Leaves paste and bark extract is taken.
11.	<i>Anana scomosus</i> (L) merr Bromeliaceae	Matikathal	Fruits, Whole plant	Fruit juice is used.
12.	<i>Andrographis paniculata</i> Nees Acanthaceae	Kalmegh	Whole plant	Crushed and boiled with water
13.	<i>Annonareticulata</i> Linn Annonaceae	Aatlas	Barks	Dried barks decoction is used
14.	<i>Annona squamosa</i> Linn Annonaceae	Manga	Leaves	Leaves boiled with water
15.	<i>Annona reticulata</i> L. Annonaceae	Atlas	Leaves, Fruits	Leaves, Fruits juice is used
16.	<i>Antidesmaacidum</i> Retz Euphorbiaceae	Nikhutenga	Leaves	Leaves juice is used orally
17.	<i>Antocarpus heterophyllus</i> Linn Moraceae	Kothal	Leaves	Leaf juice is used orally
18.	<i>Areca catecheu</i> Linn Arecaceae	Tamul	Nut	Dried and soaked with water.
19.	<i>Argyreia speciosa</i> Linn. F. Convulaceae	Takoria alu	Stem, Leaves	Stem, Leaves paste is used.
20.	<i>Artocarpus lokoocha</i> Roxb Moraceae	Diwatenga	Barks	Barks infusion is used
21.	<i>Artemisia maritma</i> Asteraceae	Chinglaibaknag	Leaves	Boiled leaves extract
22.	<i>Averrhoacarambola</i> Linn Oxalidaceae	Kardoi	Barks	Bark infusion is used.
23.	<i>Beta vulgaris</i> L. Chenopodiaceae	Beet	Roots	Root juice taken orally

24.	<i>Boenninghausenia albiflora</i> Rutaceae	Yomri, Nukmam	Roots	Root juice is taken orally
25.	<i>Bombox malabaricum</i> DC Bombacaceae	Simolu	Roots	Mixed with water or root juice is used.
26.	<i>Bougainvillea spectabilis</i> Willd. Nyctaginaceae	Kagaz phul	Leaves	Leaves paste is anti-diabetic but not used by human.
27.	<i>Brassica juncea</i> (L)Czern. Brassicaceae	Sorih	Leaves, Seeds	Seed powder with milk taken orally
28.	<i>Caesalpinia crista</i> Linn. Caesalpinaceae	Lataguti	Seeds	Crushed powder is used.
29.	<i>Caesalpinia pulcherrima</i> Caesalpinaceae	Guletura	Flowers	Flower juice is used
30.	<i>Cajanus cajan</i> Mill Papilionaceae	Rahar	Leaves	Powder leaves mixed with water.
31.	<i>Calotropis gigantea</i> (L) W. Aiton. Asclepiadaceae	Akon	Leaves	Leaves, Flower paste is used
32.	<i>Canna indica</i> Linn Cannaceae	Parijat	Leaves, Stem	Dried leaves are used.
33.	<i>Cannabis sativa</i> Linn Cannabaceae	Bhang	Leaves, stem, flowers	Leaves and stem soaked with water
34.	<i>Carrica papaya</i> Linn Carricaceae	Amita	Seeds	Seed powder mixed with water
35.	<i>Casia alata</i> Linn. Caesalpinaceae	Khorpat	Tender leaf	Leaves mixed with water
36.	<i>Cassia angustifolia</i> Linn Caesalpinaceae	Channa	Leaves	Infusion of leaves is used
37.	<i>Cassia fistula</i> L. Caesalpinaceae	Sunaru	Barks	Bark powder is used
38.	<i>Cassia occidentalis</i> Linn. Caesalpinaceae	Bonoriadadol	Seeds, stem	Seeds powder is used
39.	<i>Cassia sophera</i> Linn Caesalpinaceae	Bonmadelua	Seeds, stem, bark	Seeds and bark powder is used
40.	<i>Catharanthus roseus</i> (L.) G. Don.	Nayantara	Whole plant	Boiled extract of leaves,

	Apocynaceae			flowers taken orally
41.	<i>Centella asiatica</i> (L.)Urban. Apiaceae	Manimuni	Whole plant	Whole plant juice is taken in empty stomach
42.	<i>Ciceracida</i> Linn Euphorbiaceae	Holfoli	Leaves	Infusion of leaves is used
43.	<i>Cichorium intybus</i> Asteraceae	Kasni	Seeds	Seeds powder is used
44.	<i>Cinnamomum tamala</i> fr. Nus Lauraceae	Tezput	Bark. roots	Bark powder made infusion
45.	<i>Citrus aurantifolia</i> Linn Rutaceae	Nemu	Fruits	Fruit juice is used
46.	<i>Clerodendrum infortunatum</i> L. Lamiaceae	Vetetita	Leaves	Leaf paste is taken orally.
47.	<i>Coccinia indica cogn</i> Cucurbitaceae	Balipoka	Fruits, root	Fruits juice is used.
48.	<i>Cocos nucifera</i> L. Arecaceae	Narikol	Oil	Oil is taken out and consumed.
49.	<i>Coix lacrymajobi</i> Poaceae	Chaning angouba (Manipur)	Roots	Crushed extract of roots is used.
50.	<i>Colocasia esculenta</i> (L) Scholl Araceae	Kolakachu	Roots	Roots boiled with water
51.	<i>Coptis teeta</i> Ranunculaceae	Rings, Mishimetectga	Dried root and rhizomes.	Roots and rhizomes juice is orally taken in empty stomach.
52.	<i>Coriandrum sativum</i> Linn Apiaceae	Dhania	Leaves	Leaves infusion is used
53.	<i>Costus speciosus</i> (Koeing).Smith Zingiberaceae	Jamlakhati	Rhizomes	Rhizome paste taken oral
54.	<i>Curcuma domestica</i> val Zingiberaceae	Halodhi	Leaves, rhizomes	Powdered rhizomes are used.
55.	<i>Curcuma aromatic</i> Salisb Zingiberaceae	Bonoria Halodhi	Rhizomes	Powder rhizome is used
56.	<i>Cucumis melo</i> Roxb Cucurbitaceae	Sal kumura	Seeds	Seed powder is used.
57.	<i>Cynodondactylon</i> Pers	Dubori	Whole plant	Crushed and

	Poaceae			boiled with water
58.	<i>Dalbergia sisco</i> Roxb. Papilionaceae	Sishu	Stem barks	Bark powder is used.
59.	<i>Daucus carota</i> Linn Apiaceae	Gajor	Roots	Paste or juice is used.
60.	<i>Debregeasia longiafolia</i> Wedd. Urticaceae	U-khajing Manipur	Tubers	Thirst of diabetic patient
61.	<i>Dilleniaindica</i> Linn. Dilleniaceae	Aautenga	Fleshy perianth	Juice is used.
62.	<i>Dioscorea alata</i> Linn. Dioscoreaceae	Kath alu	Rhizome	Boiled with water and taken.
63.	<i>Eichhornia cussipes</i> F- NF	Kachuripana	Whole plant.	Crushed powder infusion is used.
64.	<i>Enhydra fluctuanas</i> Lour Asteraceae	Komperek Manipur	Nodes of the plant	Boiling the nodes of plant with water
65.	<i>Equisetum debile</i> Roxb. Equisetaceae	Lai-utang Manipur	Whole plant	Boiled with root of male <i>Carica papaya</i> .
66.	<i>Erythairina indica</i> Linn Papilionaceae	Moder Gadela (Assam)	Roots	Root powder is used
67.	<i>Eugenia jambolana</i> Linn Myrtaceae	Kala Jamu	Fruits, Barks, Seeds.	Fruit juice is used orally.
68.	<i>Euphorbia hirta</i> Linn. Euphorbiaceae	Gakhirotibon	Whole plant	Crushed and made infusion
69.	<i>Ficus benghalensis</i> Linn. Moraceae	Bot	Stem, barks	Bark infusion or decoction is used
70.	<i>Ficus religiosa</i> L Moraceae	Dhup	Leaves, Fruits	Leaf, fruit taken orally
71.	<i>Flacourita jangomas</i> Lour Flacourtiaceae	Heitroi	Fruits	Raw fruits are used.
72.	<i>Garcinia padunculata</i> Roxb. Clusiaceae	Borthekera	Fruits	Fruit juice or raw fruit is used.
73.	<i>Gloriosa superba</i> Linn.	Gloriosa	Whole plant	Made infusion

	Liliaceae			and used.
74.	<i>Glycine max</i> Merr Papilionaceae	Soyabeen	Seeds	Seed soaked with water.
75.	<i>Gmelina arborea</i> Roxb Verbenaceae	Gomari	Leaves, fruits	Leaves juice is used.
76.	<i>Grewia abutilifolia</i> Juss Tiliaceae	Petuk	Fruits	Fruit juice is used.
77.	<i>Heliotropium indicum</i> Linn. Heliotropiaceae	Hatisur	Aerial part	Dried and infusion is filtered before used.
78.	<i>Holoptelia integrifolia</i> Planch Ulmaceae	Holoptelia	Barks	Bark powder is used
79.	<i>Holorrhena antidysenterica</i> wall Apocyanaceae	Kutaz	Barks, fruits	Fruit juice is used
80.	<i>Hydrocotyle rolundifolia</i> Roxb Apiaceae	Soru manimuni	Whole plant	Crushed to make paste.
81.	<i>Ichnocarpus frutescent</i> R. Bn. Apocyanaceae	Syamalota	Roots	Roots decoction is used
82.	<i>Imperata cylindrical</i> Beauv Poaceae	Ulukher	Roots	Root infusion is used.
83.	<i>Ipomoea aquatica</i> Forssk. Convolvaceae	Kalmou	Leaves	Dried leaf powder mixed with <i>Piper nigrum</i> and taken orally.
84.	<i>Ipomoea batata</i> (L) Lam. Convolvaceae	Mitha alu	Leaves	Leaf boiled and juice is taken orally.
85.	<i>Jatropha curcus</i> Linn. Euphorbiaceae	Bongaliara	Leaves, twigs	Leaves juice is used
86.	<i>Jussieua repens</i> Onagraceae	Ishing-kundo	Leaves, whole plant	Boil extract of the plant is used.
87.	<i>Justicia adhatoda</i> Acanthaceae	Nongmang-khaangouba	Leaves	Boil the leaves with the leaf of <i>Clerodendron spihonanthus</i> .
88.	<i>Kyllinga triceps</i> Rottb	Chumthang	Whole plants	Boiled extract

	Cyperaceae	namthibi		of the plant.
89.	<i>Lawsonia inermis</i> L. Lythraceae	Jetuka	Leaves	Leaves juice mixed with cow's milk taken once in a week.
90.	<i>Leucaena glauca</i> Mimosaceae	Cialag Manipur	Leaves	Leaves decoction is used.
91.	<i>Leucas aspera</i> Spreng. Lamiaceae	Doron	Whole plant	Stomach along with Monopterus cuchia fish.
92.	<i>Lindernia bracheata</i> Linn Scrophulariaceae	Kachidoria	Whole plant	Juice used.
93.	<i>Litsea glutinosa</i> (lour) CB Robins Lauraceae	Haluca	Leaves	Leaves juice is used.
94.	<i>Ludwigia octovalvis</i> Jacq.	Kabo Kaji	Whole plant	Boiled extract is used.
95.	<i>Madhuka indica</i> Gmel Sapotaceae	Mohua	Barks, Seeds	Bark and seed crushed and infusion is used.
96.	<i>Mangifera indica</i> Linn Anacardiaceae	Aam	Fruits	Fruit juice or raw fruit is used.
97.	<i>Melia azadirachta</i> Linn Meliaceae	Mohaneem	Leaves	Leaves juice is used.
98.	<i>Mentha arvensis</i> Lamiaceae	Nungshi-hidak	Plant part	Mixed with honey.
99.	<i>Meyna spinosa</i> Roxb. Rubiaceae	Lam-heibi	Fruits	Boiled extract of fruits
100.	<i>Mimosa pudica</i> Linn. Mimosaceae	Nilazibon	Whole plant	Whole plant boiled with water.
101.	<i>Mirabilis jalapa</i> L. Nyctaginaceae	Gopal godhuli	Roots	Root juice is taken.
102.	<i>Moringa oleifera</i> Linn Moringaceae	Sogina	Barks, flowers, leaves	Barks infusion is used.
103.	<i>Mormordica charantia</i> Linn Cucurbitaceae	Tita-Karela	Leaves, fruits	Leaves and fruit juice is used

				orally.
104.	<i>Morus indica</i> Linn Moraceae	Nuni	Tender leaves	Eat with any roasted fish
105.	<i>Mucunapruriens</i> DC. Papillionaceae	Bandarkakura	Roots	Roots powder soak with water
106.	<i>Murraya koeningii</i> Sprang Rutaceae	Narasingha	Leaves	Leaves juice is used
107.	<i>Musa paradisiacal</i> Linn Musaceae	Kashkol	Flowers, fruit	Fruit juice is used.
108.	<i>Nelumbo nucifera</i> Gaertn Nelumbaceae	Podumful	Tender leaves	Crushed and pinch of powder taken with water.
109.	<i>Nictanthus arbor tristis</i> Linn Oleaceae	Sewali	Leaves, flowers	Young Leaf juice, flower paste is taken orally.
110.	<i>Nigella sativa</i> Ranunculaceae	Keman	Seeds	Seeds powder is used.
111.	<i>Ocimum sanctum</i> L. Lamiaceae	Tulsi	Leaves	Leaf powder taken with honey to treat Diabetes.
112.	<i>Osbeckiana palensis</i> Hook Melastomaceae	Photkola (Boga)	Tender shoot	Crushed powder is used
113.	<i>Oxalis corniculata</i> L. Oxalidaceae	Tengesi	Aerial part	100 gm aerial part are wrapped with banana leaf and after roasted in firewood is given with salt once daily 3 days interval.
114.	<i>Parkia timoriana</i> (A.DC) Mimosaceae	Yongchak	Barks	Decoction of bark with <i>Centella asiatica</i> and <i>Ficus glomerata</i>

				fruits is used.
115.	<i>Peristrophe fera</i> C.B. Clarke Acanthaceae	Ishing langthrei	Leaves or whole plants	Extract of the plant is used
116.	<i>Phologocanthus tubiflorus</i> Nees. Acanthaceae	Sang-chi	Barks	Decoction of bars with decoction of <i>Zingiber officinale</i>
117.	<i>Phyllanthuse emblica</i> Linn Euphorbiaceae	Amlakhi	Fruits	Fruit juice or raw frit is taken orally.
118.	<i>Phyllanthus niruri</i> Linn Euphorbiaceae	Bonamlokhi	Whole plant	
119.	<i>Phyllanthuse urinaria</i> Linn	Heikruman	Leaves or whole plant	Boiled extract is used orally.
120.	<i>Plumeria acuminata</i> Apocyanaceae	Sun-champa	Barks	Powder bark decoction is used.
121.	<i>Portulaca oleraceae</i> Portulacaceae	Kulfa	Whole plant	Crushed powder is used.
122.	<i>Pouzolzia zeylanica</i> (L) Benn Urticaceae	Borali bakua	Whole plant	Decoction is used
123.	<i>Premnalatifolia</i> Roxb Verbenaceae	Agnimantha	Leaves, Barks	Leaves juice is used.
124.	<i>Psidium guyava</i> Linn Myrtaceae	Madhuri	Fruits, leaves	Leaves infusion is used.
125.	<i>Swertia chirata</i> L Gentianaceae	Chirata	Whole plant	Whole plant extract is consumed.
126.	<i>Saraca indica</i> Linn Caesalpiniaceae	Ashok	Fruits	Fruit juice is used.
127.	<i>Scleria teristris</i> (Linn) Cyperaceae	Thangjou	Plant part	Boiled extract of the plant part is used.
128.	<i>Sesamum orientale</i> Pedaliaceae	Senum	seeds	Seeds.
129.	<i>Sesbaniasaban</i> (Linn) Merr. Fabaceae	Chuchurangkei	Leaf or tender shoot	Boiled extract of leaves.
130.	<i>Smilax lanceifolia</i> Roxb. Smilacaceae	Kwa manbi	Roots	Boiled extract of root.
131.	<i>Solanum indicum</i> Linn. Solanaceae	Bhakuritita	Fruits	Fruit juice is used.

132.	<i>Spondias mangifera</i> wild Anacardiaceae	Amara	Fruist	Raw fruit is used.
133.	<i>Sterculia villosa</i> Roxb Starculiaceae	Udal	Roots	Root infusion is used.
134.	<i>Syzigium cumini</i> (Linn.) Myrtaceae	Jamhei	Seeds	Boiled extract of seeds.
135.	<i>Tabernaemontana divaricata</i> (L) R. Br. Apocynaceae	Kothal pool	Leaves and flowers	Fresh flower soaked with water.
136.	<i>Terminalia chebula</i> Roxb. Combretaceae	Selekha	Fruits	Fruit juice is used.
137.	<i>Thevetia peruviana</i> (pers) Merill Apocyanaceae	Halodhia-korobi Utonglei	Barks	Powder bark is used.
138.	<i>Inospora cordifolia</i> Miers Menispermaceae	Sidhilota	Leaves, bark	Powder bark infusion is used.
139.	<i>Trigonella foenumgraceum</i> Linn Papilionaceae	Mithi	Seeds	Seeds soaked with water and taken in the morning.
140.	<i>Vinca rosea</i> Linn Apocyanaceae	Nayantora	Leaves	Leaves chewed at morning or juice is used.
141.	<i>Zanthoxylum armatum</i> DC. Rutaceae	Muthrubi	Leaves and roost	Roots and leaves decoction is used.

RESULT AND DISCUSSION

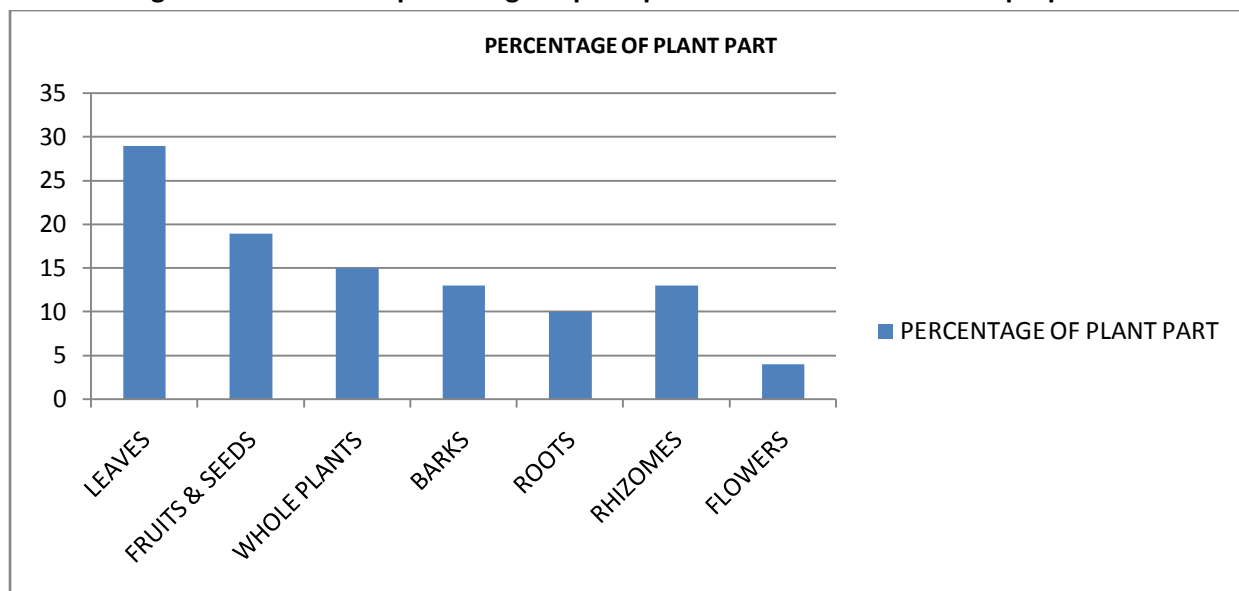
Herbs have been used for healing purposes and to promote wellness since from the ancient times and are not categorized as medicines but treated as food since they are natural products. Nowadays, herbal medicines, health and dietary supplements are flooding the markets. The use in the right way provides effective and safe treatment for many ailments and the effectiveness is mostly subjective to the Patient [21]. One of the major advantages of the herbal

drug is that it is cost effective and easily affordable. In compares to the synthetic drugs they became less toxic or least side effects. From the ancient times the people of the north-eastern part of India have been using the herbal medicines for curing the diabetes. Most of the plant has possessing prominent activity in this literature there are 141 nos. of plants have mentioned from the North-east India that are used for anti-diabetic purposes. The figure 1 shows the percentage use of plant part of the

herbal medicine. Leaves: 29%, Whole plants: 15%, Roots: 10%, Fruits and Seeds: 19%,

Rhizomes and tubers 13%, Bark: 13%, and Flowers: 4%.

Figure 1: It shows the percentage of plant parts is used for anti-diabetic purposes.



The ethnomedicinal information from the above table and figure (Tab-1 & Fig-1) shows that the peoples of this region are too much habituated for the use of herbal drugs in diabetes. The ethnomedicinal knowledge emphasizes the significance of the crude drugs. The north-eastern communities have the ethnic knowledge to use the anti-diabetic plant. They use these plants generously without any scientific modification. So it is utmost necessary to screen these traditional medicines scientifically for proper investigation into their use. It is necessary to keep in mind that most of the medicinal plants have number of allied species that are morphologically similar and are difficult to distinguish. Plant parts used in preparations are usually collected by common people without any attention to botanical authentication. So, there is the possibility of incorporation of wrong plant or parts of the plant with less activity or without any activity. Therefore, it is very essential to evaluate the botanical identity and quality of the

medicinal plants used in the traditional preparation. Pharmacognostic studies are usually adopted for standardization and quality evaluation of botanical drugs.

CONCLUSION

The North-East India is stands for it is glory of eminent bio-diversity aspect and the ethnic communities of this region provide the footstep for the traditional knowledge. By the advancement of the concept of living peoples of the ethnic communities practicing less dependency to their traditional knowledge. So the knowledge which is generously rolled, facing a critical barrier for advancement, gradually. So it will be the aim to documented of the ethnic knowledge and preserved thereof. Different natural products with anti-diabetes activity have been described in the literature. There is a need for a multidisciplinary approach to develop potentially effective drugs. Within the list many of the medicinal plants have possessing potent anti-diabetic properties that has not still

explored scientifically. The article summarize the significance of medicinal plants that are traditionally used in north-east India as anti-diabetic purposes and the requisite level of activity as well as toxicity would be considered for further scrutiny to develop the potential drug molecule.

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