

**INTERNATIONAL JOURNAL OF ADVANCES IN  
PHARMACY, BIOLOGY AND CHEMISTRY****Review Article****An overview and future scope on traditionally used  
herbal plants of Assam having Antidiabetic activity**

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**Abstract**

The use of Traditional plant in the treatment of diabetes has shown a good interest in the last few decades. Therefore, the purpose of this study was to identify the plants having hypoglycemic effect. Different types of herbs are found in North East region specially in Assam which are traditionally used to cure Diabetes. Some herbs are proven to help in the regeneration of beta cells, which are main components of insulin synthesis. The eastern region of India especially Assam, recognized as a high potential area of herbal industrialisation, because of easy availability of different types of herbs.

**Keywords-** Assam, herbal plants, hypoglycemic, insuline, diabetes.

**INTRODUCTION**

Diabetes is a common and very prevalent disease affecting the citizens of both developed and developing countries<sup>1</sup>. It is characterised by hyperglycemia that is induced by decreased cellular glucose uptake. Diabetes mellitus is also called a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. It is classified as insulin dependent Diabetes mellitus (Type-I) and insulin independent Diabetes mellitus (Type-II). First one is due to destruction of beta cell in pancreatic islet, which are responsible for insuline synthesis. Due to some abnormalities in gluco receptor, appropriate amount of insuline is not uptake by different tissue and caused Type-II diabetes mellitus. There are lots of complication seen in diabetes mellitus patients including diabetes retinopathy, sexual dysfunction, weakness etc<sup>2,3,4,5,6</sup>. North east region specially Assam, is a land of different types of herbs. Traditionally, different types of plants are used to cure different types of disease. Some herbal alternatives assist prevention of the secondary complications of the disease. Some herbs

have been also proven to help in the regeneration of beta cells. To date over 600 traditional plants, treatments for diabetes have been reported but only a small number of these have scientific and clinical evaluation to assess their efficacy<sup>7,8</sup>. More than 80% of Asia's population (WHO), medicinal plants are easily accessible, affordable and culturally appropriate sources of primary health care. Poor and marginalized, who cannot afford formal health care systems, are especially dependent on these culturally familiar, technically simple, financially affordable and generally effective traditional medicines. Now a time, there is widespread interest to promote the traditional health care systems to meet primary health care needs. This is especially true in Asia, coast of modern synthetic medicines are very high and governments find it increasingly difficult to meet the cost of pharmaceutical-based health care<sup>9,10</sup>. As it is not possible to discuss all the plants which are used traditionally in Assam for Diabetic treatment. Only ten plants are chosen in this paper.

**Antidiabetic effect of traditionally used medicinal plants:****1. *Momordica charantia* (bitter melon):**

*Momordica charantia* is a flowering vine in the family Cucurbitaceae. It is a topical plant that is widely cultivated in Assam, India for its intensely bitter fruits that are commonly used in cooking and as a natural remedy for treating diabetes. It is a useful medicinal and vegetable plant for human health and one of the most promising plants for diabetes. These different compounds may act either separately or together to exert their medicinal effects. In relation to diabetes, only charantin, insulin-like peptide and alkaloid-like extracts possess hypoglycaemic properties similar to the plant itself or its crude extracts<sup>11</sup>.

**2. *Aegle marmelos* (Linn):**

*Aegle marmelos* (Linn) correa, commonly known as bael (or bel), belonging to the family Rutaceae, is a moderatesized, slender and aromatic tree. A number of chemical constituents and various therapeutic effects of leaves of *Aegle marmelos* have been reported by different workers. Broadly, *Aegle marmelos* leaves contain alkaloids, Phenylpropanoids, terpenoids and other miscellaneous compounds whereas potential pharmacological activity of the leaves are hypoglycemic, anti-inflammatory, antimicrobial, anticancer, radioprotective, chemopreventive and anti-oxidative activity. Hema *et al.* studied the effect of the aqueous, alcoholic extracts of *A. marmelos* for the hypoglycaemic and other pharmacological actions and observed that the aqueous and alcoholic extracts at 500 mg/kg dose produce hypoglycaemia in diabetic fasted rabbits<sup>12</sup>.

**3. *Dillenia indica* (Linn):**

*Dillenia indica* plant belongs to family Dilleniaceae, commonly called *Dillenia*. The fruit shows laxative properties and is used for relieving abdominal pain, bark and leaves have astringent effect, juice of leaves, bark and fruits are mixed and given orally for the treatment of cancer and diarrhea. Fruits and leaves extract of *D. indica* are reported to have antioxidant activity, CNS depressant activities and anti-inflammatory in mice. Traditionally, the plant is also used for treatment of diabetes. Sunil Kumar *et al.* studied that 250 and 500 mg/kg p.o. is the effective dose which shows antidiabetic activity<sup>13</sup>.

**4. *Carica papaya*:**

It is an herbaceous plant, member of the small family Caricaceae. This plant is widely cultivated for its edible pleasant fruit, which provides good nutritional

value and easy digestion. Different parts of *C. papaya* are used in Indian folk medicine to treat various diseases such as diarrhea, inflammation and diabetes. There is evidence that *C. Papaya* leaves reduce symptoms of asthma, worming and dysentery. papaya leaf extracts also used as a traditional remedies for cancer and infectious diseases. Juárez-Rojop *et al.* studied the aqueous extract of *Carica papaya* (0.75 g and 1.5 g/100 mL). There are significantly decreased blood glucose levels ( $p < 0.05$ ) in diabetic rats, according to their study. It also decreased cholesterol, triacylglycerol and amino-transferases blood levels also<sup>14</sup>.

**5. *Cannabis sativa* Linn:**

In Assam *Cannabis* plant is known as Bhang. This plant produce a unique family of terpeno-phenolic compounds called cannabinoids, which produce the "high" one experiences from smoking marijuana. In the United States there has been considerable interest in its use for the treatment of a number of conditions, including glaucoma, AIDS wasting, neuropathic pain, treatment of spasticity associated with multiple sclerosis, and chemotherapy-induced nausea. Clinical trials have shown the efficacy of cannabis as a treatment for cancer and AIDS patient. Tehranipour *et al.* observed that the ethanolic extract 25, 50mg/kg (ip) of *Cannabis sativa* shows the antidiabetic activity<sup>15</sup>.

**6. *Cinnamomum tamala*:**

The leaves of *Cinnamomum tamala* is used in preparation of different traditional food item in Assam as a flavouring material. The leaves are known as Tezpat in Assam. Leaves and bark have aromatic, astringent, stimulant and carminative qualities and used in rheumatism, colic, diarrhoea, nausea and vomiting. Ancient literature has revealed that in the first century A.D., dried leaves and bark of this plant were prescribed for fever, anemia. Its seeds were crushed and mixed with honey or sugar and administered to children for dysentery or cough. CTLEt was administered at doses of 125 and 250 mg/kg body weight respectively on streptozotocin induced diabetic rats for 3 weeks. Chakraborty *et al.* found that these leaves extract showed the hypoglycaemic activity<sup>16</sup>.

**7. *Moringa oleifera* Linn:**

*Moringa oleifera* belongs to the family of Moringaceae, a fast growing drought-resistant tree native of Sub-Himalayan tracts of Northern India but now distributed worldwide in the tropics and sub tropics. The tree's leaf and seed pod are widely consumed as food. The bark, leaf and root have

ethno-medicinal properties . *Moringa oleifera* is a common vegetable in Assam. However, apart from ethno-medicinal and nutritional uses, the plants are having lots of biological activities. These include hypotensive activities , hypocholesterolemic effects, anti-inflammatory and anti-helminic, analgesic, management of heart diseases, dyspepsia and ulcers. The leave extract of *Moringa oleifera* have shown anti diabetic activity at a dose of 200, 400 and 800 mg/kg body weight of rats respectively<sup>17</sup>.

#### 8. *Musa paradisiaca*:

*Musa paradisiaca* of family Musaceae is widely distributed throughout the tropical regions. It is a tall herb with aerial pseudostem dying after flowering, leaves oblong, narrowed to the base. The fruits are sweet and its having different pharmacological activities. This plant is used as antihelmintic, tonic, astringent, emollient, depurative and aphrodisiac. The roots are used as antihelmintic, depurative, scabies, leprosy, and skin disease and fresh root juice has antidiabetic activity. The leaves have been studied as treatment for bronchitis, cold and eye infections. Plaintain juice was used as an antidote for snake bite in Assam. The result of phytochemical screening on the stem juice of *Musa paradisiaca* reveals that the extract contained various pharmacologically active compounds such as tannins and alkaloids. Plants contain a large number of free radical scavenging molecules which posses both hypoglycemic and antioxidant activities. Suneetha *et al.* evaluate the stem juice of *Musa paradisiaca* for its antidiabetic and antioxidant activities at two different doses (1 and 2 g/kg, b.wt, p.o)<sup>18</sup>.

#### 9. *Centella asiatica* :

*Centella asiatica* (L.) (Family-Umbelliferare) Urban, known as manimuni in assam, guta kola (Indian) and bua-bok (Thai), is a small creeping herb that has long been used in traditional medicine and various purposes. *Centella asiatica* is a common vegetable in Assam It is a tropical medicinal plant with a long history of therapeutic used for many conditions such as vascular diseases ,dermal disorder, inflammatory and microangiopathy. In glucose tolerance test, the methanolic and ethanolic extract of *centella asiatica* had shown protection and lowered the blood glucose levels . In alloxan induced diabetic rats the maximum reduction in blood glucose was observed after 3h at a dose level of 250 mg/kg of body weight. The percentage protections by ethanolic and methanolic extracts were 30 and 48% respectively<sup>19</sup>.

#### 10. *Mimosa pudica* Linn:

It is traditionally used as medicine in different tradition of Assam for the treatment of diabetes. The stem bark extract of *Mimosa pudica* Linn has been reported for the treatment of hyperglycemic patients, but other parts of plants such as leaves or pods have not been studied widely. Hence a wide scope is there worthwhile to screen different extracts of leaves of *Mimosa pudica* Linn for its anti-diabetic effects. N.G. Sutar *et al.* reported the Antidiabetic activity of the leaves of *Mimosa pudica* Linn in albino rats. According to their study the ethanolic extract (600mg/kg) reduced serum glucose level to 50.35% as compared to Metformin as standard drug (500mg/kg) which was 62.44% on 7th day<sup>20</sup>.

#### The feature scope of herbal medicine in Assam:

The use of traditional medicine (TM) has increased significantly over the past few years. Different herbal companies are set up and manufactured different types of cosmetics like shampoos, soaps, body lotion cream etc, across the world. Those products having the tremendous market now a days. The eastern region of the country of India especially Assam, recognized as a high potential area. The region, having rich natural resources but utilization of these resources is not proper. Major pharmaceutical companies are currently conducting extensive research on plant materials gathered from the rain forests and other places for their potential medicinal value. In all the countries of South Asia, medicinal and aromatic plants (MAPs) play a significant role in the subsistence economy of the people, especially those living in the rural interiors. The collection, simple processing and trading of medicinal plants contribute significantly to the cash income of the poor and women in these regions. The healing properties of many drugs have been recognised already and their use is well established in different countries. Herbal industrialisation gives the opportunity to the nation for developing and producing lots of employments. Selection of medicinal plant species for cultivation is an initial important step for the development of the medicinal plants sector. Economic feasibility is the major rationale for a decision to bring medicinal plant species into cultivation. Now a days, Diabetes mellitus is a common and very prevalent disease affecting the citizens of both developed and developing countries. Proper plantation, cultivation and industrialisation of the anti diabetic plants which are found in Assam, have tremendous possibility to increase the economy of the country like India.

### Discussion and Conclusion

In this review we discussed about folklore medicinal plants for the treatment of Diabetes mellitus. Folklore medicinal plants are mostly used for rural areas; because of its easy availability. Therefore, treating diabetes mellitus with plant derived compounds which are accessible and do not require laborious pharmaceutical synthesis seems highly attractive. In

the present review an attempt has been made to investigate the antidiabetic medicinal plants and may be useful to the health professionals, scientists and scholars working in the field of pharmacology and therapeutics to develop antidiabetic drugs. This review also covers the futures prospectives of herbal medicine, which are found in Assam.

**Table 1: Distribution of medicinal plants** <sup>21,22</sup>

Country or region	Total number of native species in flora	No of medicinal plant species reported
World	297000	52885
India	17000	7500
Indian Himalayas	8000	1748
Assam	-	350



1. *Dillenia indica*



2. *Carica papaya*



3. *Cannabis sativa*



4. *Musa paradisiaca*



5. *Mimosa pudica*



6. *Moringa oleifera*

7. *Momordica charantia*8. *Aegle marmelo*9. *Centella asiatica*10. *Cinnamomum tamala*

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