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## ANTI DIABETIC PLANT PROFILES: A REVIEW

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### Abstract

Synthetically prepared drugs are been used effectively in diabetes management. Natural drugs also give a greater scope for therapy. The various plants available in market are been considered and different research works are been done. Diabetes is a dominating disease in the current scenario. Keeping this in mind current work is on the crude plants that have played an effective role in diabetes management since mankind. The following research work gives a detailed study regarding the identification characteristics along with its cost in the local market. They are arranged according to botanical name, vernacular name, local name (Asian) family characterization, crude principles and their role in diabetic treatment. Even the plants belonging to their respective families are been characterized and also the active plant part that has played an important role in giving extracts that show anti diabetic activity are been listed.

**Key words:** Hypoglycemia, Reactive, Market Research, Method, Survey.

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## INTRODUCTION

Nature has been an indispensable gift since origin of mankind. From the nature i.e. the flora and fauna, the flora has contributed a lot in the ailments of mankind [1]. With the advancements in the science field, the natural plants are been collected and active constituents are been extracted widely. Then the extracts are been analyzed and reported for its medicinal property. A concomitant knowledge of pharmacology pharmaceutics and pharmaceutical chemistry is important. Then using the analysis techniques like extraction, chromatography and various newer techniques the extracts are been analyzed for the content uniformity and various properties like purity, stability and factors affecting the biosynthesis are been analyzed [2].

Diabetes is a chronic disorder characterized by increased glucose levels in blood. For a person with diabetes the various symptoms he faces are dehydration extreme thirst unexplained weight loss changes in vision extreme fatigue. Some complications like nephropathy neuropathy and cardiac myopathy are associated along with the symptoms. Another serious problem is limb amputations. Type-1 diabetes is called as juvenile diabetes. It is seen in children and younger dogs. Type-1 occurs when, all of the insulin producing cells are been destroyed. Insulin is specially produced from the pancreatic cells called the Beta cells. When Beta cells fail to produce insulin this may result in type-1 diabetes. The actual reasons may be due to an injury in the pancreas or genetic mutations and structural disturbances in the Beta cells [3]. So type-1 diabetes patients depend upon the insulin and injections are been regularly taken. But the proximity of occurrence is only 5%. The remaining 95% is suffering from type-2 diabetes which is caused by the lack of responsiveness of the cell towards insulin. The cells become resistant for insulin binding capacity thereby even though enough insulin is there, the cells develop insulin resistance and all insulin gets wasted. Type-2 diabetes is caused mainly due to family history (hereditary) high cholesterol and high blood pressure. Mostly obese persons are prone for type-2 diabetes since they may develop high cholesterol levels and high blood pressure in due course. Diabetes can be prevented if the person is maintaining a strict diet and regularly engaging in exercises [4].

## Market Survey

In order to collect the relevant data, more than 8 shops which are located in Hyderabad city were selected for collecting the information. Hyderabad city is also called as Pearl City of India. The city is surrounded by forest area like Vikarabad forest towards west. So the information was collected and recorded for the specimens (crude drugs) who are used by the local people for various purposes.

The list of all species included in the study was prepared with the help of published literatures cited at the reference column below. The anti-diabetic activities of crude drugs have been collected from various reference books and research papers.

**Fig 1: Images of few plants**



Plantago ovata



Allium sativum



Momordica charantia



panax ginseng



Flacourtia jangomas



costus speciosus



barleria prionitis



avena sativa



Andrographis paniculata

Pterocarpus marsupium

Allium cepa

Anacardium occidentale



Terminalia chebula

### List of Plants Having Anti Diabetic Activity with Details

1. **Botanical name:** Terminalia chebula, Terminalia belerica, Embleca officinalis

**Family:** Combretaceae

**Vernacular name:** Myrobalan

**Local name:** Vibhitaki haritaki amalaki

**Characterization:** Leaves are alternate. Fruit is a drupe [11]

**Part being used:** Methanolic extract of whole plant

**Active principles:** Chebulic acid

2. **Botanical name:** Momordica charantia

**Family:** Cucurbitaceae

**Vernacular name:** Indian kino

**Local name:** Karaila

**Characterization:** Herbaceous tendril. Yellow male flowers [11]

**Part being used:** Vegetable itself

**Active principles:** AMPK (adenosine monophosphate kinase) , lectin

**Role:** increased insulin sensitivity towards cells.

**3. Botanical name:** Trigonella foenum-graceum**Family:** Fabaceae**Vernacular name:** Fenugreek**Local name:** Methi**Characterization:** Cuboidal shaped yellow colored seeds [11]**Part being used:** Leaves and seeds**Active principles:** Saponins like diosgenin, Polysaccharide, galactomann**Role:** Improves glucose Tolerance**4. Botanical name:** Plantago ovata**Family:** Plantaginaceae**Vernacular name:** Psyllium**Local name:** Isapgula**Characterization:** Seeds are hard, transparent with reddish grey oval spot at the centre.<sup>11</sup>**Part being used:** seeds**Active principles:** Pentosan Aldobionic acid**Role:** extracts showed reducing glucose levels in the blood**5. Botanical name:** Allium sativum**Family:** Liliaceae**Vernacular name:** Garlic**Local name:** Lahsun**Characterization:** White colored bulbs [11]**Part being used:** Bulbs**Active principles:** APDS (allyl propyl disulphide )**Role:** Regulates blood sugar levels**6. Botanical name:** Allium cepa**Family:** Liliaceae**Vernacular name:** Onions**Local name:** Pyaaz**Characterization:** Reddish brown bulbs [11]**Part being used:** Bulbs

**Active principles:** Allicin

**Role:** Increases insulin sensitivity

**7. Botanical Name:** Hemidesmus indicus

**Family:** Apocynaceae

**Vernacular name:** Indian sarsaparilla

**Local Name:** Anatmul Nannari

**Characterization:** Twiny woody stems.Rust colored bark. [11]

**Parts being used:** Roots

**Active Principle:** p-methoxy salicylic aldehyde

**Role:** Reduces glucose levels in blood

**8. Botanical Name:** Pterocarpus marsupium

**Family:** Leguminosae

**Vernacular name:** Indian kino

**Local Name:** Bijasal

**Characterization:** Glistening, transparent ,breaking with vitreous fractures [11]

**Parts being used:** Wood

**Active Principle:** (-)- epicatechin

**Role:** Regenerates functionality of Beta cells [4]

**9. Botanical Name:** Panax ginseng

**Family:** Araliaceae

**Vernacular name:** Asian ginseng

**Local Name:** Pannag

**Characterization:** Yellowish brown translucent [11]

**Parts being used:** Root

**Active Principle:** Panaxadiol, Panaxatriol, Oleanolic acid

**Role:** Enhances release of insulin from pancreas

**10. Botanical Name:** Vaccinium myrtillus

**Family:** Ericaceae

**Vernacular name:** Bilberry

**Characterization:** Sharp edged Green branched black wrinkled berries [16]

**Parts being used:** Leaves

**Active Principle:** Anthocyanide called myrtillin

**Role:** Ethanolic extract prevented complications of diabetes [15]

**11. Botanical Name:** Avena sativa

**Family:** Poaceae

**Vernacular name:** Oats

**Local Name:** Vilaiti jaon

**Characterization:** Husks are pear shaped and oat grains is inside.

**Parts being used:** grains

**Active Principle:** Beta glucan

**Role:** Delays absorption of food thus prolongs the digestion. May be effective in managing cholesterol stress which might prevent diabetes [17]

**12. Botanical Name:** Oryza sativa

**Family:** Poaceae

**Vernacular name:** Rice bran

**Local Name:** Choker

**Characterization:** Pericarp very smooth and scaly [11]

**Parts being used:** Bran( outer layer of cereal )

**Active Principle:** Gamma oryzanol Toco-trienols

**Role:** Decreases sugar levels in the blood at a rate of consumption of 20gms/day [17]

**13. Botanical Name:** Cyanara cardunculus

**Family:** Asteraceae

**Vernacular name:** Artichoke

**Local Name:** Agathi

**Characterization:** Perennial thistle [17]

**Parts being used:** whole plant

**Active Principle:** Contains insulin itself [12]

**Role:** Effective in type-1 Diabetes

**14. Botanical Name:** Glycine max**Family:** Fabaceae**Vernacular name:** Soyabean**Local Name:** Edamame**Characterization:** Seeds are brownish [11]**Parts being used:** Bean seed**Active Principle:** Omega 6 –fatty acids**Role:** Helpful in preventing cholesterol buildup**15. Botanical Name:** Anacardium occidentale**Family:** Anacardiaceae**Vernacular name:** Cashewnut**Local Name:** Kaju**Characterization:** Nut protrudes out of fruit**Parts being used:** Leaves**Role:** Hypoglycemic activity and renal protective action.**16. Botanical Name:** Annona squamosa**Family:** Annonaceae**Vernacular name:** Custard apple**Local Name:** Sithaphal**Characterization:** Clusters of sharp thorny green colored fruit**Parts being used:** Seeds, leaves**Active Principle:** Maupinamide, Sachanoic acid [10]**Role:** Hypoglycemic activity and maintains cholesterol levels in the blood [10]**17. Botanical Name:** Annona muricata**Family:** Annonaceae**Vernacular name:** Soursop**Characterization:** Oblong and oval leaves**Parts being used:** Leaves**Active Principle:** Annonacin [10]**Role:** Hypoglycemic activity [10]



**18. Botanical Name:** Borhaavia diffusa

**Family:** Nyctaginaceae

**Vernacular name:** Red hog weed

**Parts being used:** Leaves

**Role:** Potentiates insulin release from beta cells [13]

**19. Botanical Name:** Ficus hispida

**Family:** Moraceae

**Vernacular name:** Hairy fig

**Characterization:** Bark is rigid ovate and lance shaped

**Parts being used:** Bark

**Role:** Hypoglycemic activity [8]

**20. Botanical Name:** Bougainvillea spectabilis

**Family:** Nyctaginaceae

**Parts being used:** Leaves

**Role:** Hypoglycemic activity

**21. Botanical Name:** Costus speciosus

**Family:** Costaceae

**Vernacular name:** Crape ginger

**Parts being used:** Rhizome

**Role:** Potentiates insulin from pancreatic cells [8]

**22. Botanical Name:** Flacourtia jangomas

**Family:** Salicaceae

**Vernacular name:** Indian cherry

**Local Name:** talispatri

**Parts being used:** Leaves and stem

**Role:** Methanolic extract shows Hypoglycemic activity [5]

**23. Botanical Name:** Cassia occidentalis

**Family:** Salicaceae

**Vernacular name:** Indian cherry

**Local Name:** talispatri

**Parts being used:** Leaves and stem

**Role:** Methanolic extract shows Hypoglycemic activity [5]

**24. Botanical Name:** Andrographis paniculata

**Family:** Acanthaceae

**Vernacular name:** Kalmegh

**Local Name:** talispatri

**Parts being used:** Leaves and stem

**Active Principle:** - Andrographolide [9]

**Role:** Leaf extract reduced the blood glucose levels [9]

**25. Botanical Name:** Barleria prionitis

**Family:** Acanthaceae

**Vernacular name:** Kalmegh

**Local Name:** talispatri

**Parts being used:** Leaves

**Active Principle:** 6-Hydroxyflavone

**Role:** Leaf extract reduced the blood glucose levels [12]

## DISCUSSION

The various plants available in the vicinity of the forest area are been collected and characterized into a specific order including botanical name, vernacular name, local name, family, characterization, plant part showing activity, pharmacological action. [Table 1] [5-17].

It is estimated that, the demand for herbal medicines and plant based pharmaceuticals will reach 4500 billion dollars in worldwide sales through the year 2000.

Though there are many biogenic approaches for treatment of diabetes indigenously it is pertinent to make it socially acceptable is difficult one because of its odor and taste. The pharmacists must take care in this aspect and try to make it into a suitable dosage form which can improve compliance. Traditionally intake of some of these is being cultured through our system, it is necessary to propagate the significance and importance of these biointakes to the generation's

explicitally so that the propagation of these beneficial effects will take on its own course of time. The market potentiality of certain drugs like *Andrographis paniculata*, *Hemidesmus indicus*, *Boerhaavia diffusa*, *Plantago ovata*, are really demanding. Certain traditional ayurvedic drugs like *Terminalia chebula*, *Aegle marmelos* are also having equal demand in the current market scenario of India. Some allied species like *Cyanara cadunculus* commonly called as Artichoke has very good benefits in terms of diabetes.

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