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.

Keywords: 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
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. [11]  
   **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
   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
   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
   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: Anacardiacea  
   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: Anonna 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: talispati
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
explicitly 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.

REFERENCES


