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An Overview On Diabetes

R.Ramasubramania raja M.Sekar P.Lathasri, Paula preethi

Department of Pharmacognosy, Narayana Pharmacy college, Nellore, A.P

ABSTRACT

In India more than 62 million diabetic individuals currently diagnosed with the disease. The prevalence of diabetes is more in India and is increasing rapidly. Herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven antidiabetic and related beneficial effects of herbal drug used in treatment of diabetes is compiled.

Keywords: diabetic, India, Herbal formulations, Treatment

*Correspondence to Author:

Dr.R.Ramasubramania raja M. Pharm.,Ph.D.,
Department of Pharmacognosy,
Narayana Pharmacy college, Nellore, A.P

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INTRODUCTION:-

Diabetes is a **chronic incurable condition** with an estimated 2.6 million individual diagnosed in United Kingdom equivalent to 4% population. As estimated 2.3 million have type 2 diabetes and 0.3 million is having type 1 disease and another 5, 00,000 are probably undiagnosed.

Generally diabetes is of two types

I. DIABETES MELLITUS

II. DIABETES INSIPIDUS

DEFINITION OF DIABETES MELLITUS:-

Diabetes mellitus is defined as a heterogeneous metabolic disorder characterized by chronic features of chronic hypoglycemia with disturbance of fat and protein metabolism. It is a chronic condition due to impaired insulin secretion with or without insulin resistance.

Diabetes mellitus may be classified according to aetiology most commonly of two types. They are

- TYPE 1 DIABETES MELLITUS AND
- TYPE 2 DIABETES MELLITUS

TYPE 1 DIABETES MELLITUS: -

It constitutes about 10 % of cases of Diabetes Mellitus. It is also called as Insulin Dependent Diabetes Mellitus (IDDM) or Juvenile Onset Diabetes (JOD). IDDM is because it was known that these patients have absolute requirement for insulin replacement as therapy and JOD is known due to its occurrence in younger age.

In type Diabetes Mellitus beta cell destruction usually leading to absolute insulin deficiency.

Based on underlying etiology Type 1 Diabetes Mellitus is further divided into 2 subtypes.

SUB TYPE 1 A (Immune mediated Diabetes mellitus):- It is characterized by Auto immune destruction of beta cells which usually leads to insulin deficiency.

SUB TYPE 1 B (Idiopathic Diabetes Mellitus) :- It is characterized by insulin deficiency with

tendency to develop ketosis but these patients are negative for autoimmune markers.

TYPE 2 DIABETES MELLITUS :-

It comprises about 80 % cases of Diabetes Mellitus. It is also called Maturity onset diabetes or Non Insulin Dependent Diabetes Mellitus (NIDDM). Of obese and non obese type. It predominantly affects older individuals, it is not known that it also occurs in obese adolescent and in children. More over many type 2 diabetic mellitus patients also require insulin therapy to control hyperglycemia or to prevent ketosis.

MAJOR RISK FACTORS FOR TYPE 2 DIABETES MELLITUS

- Family history of type 2 diabetes mellitus
- Obesity
- Habitual physical inactivity
- Race and Ethnicity (Blacks ,Asians ,Pacific Islanders)
- Previous identification of impaired fasting glucose or impaired glucose tolerance
- History of Gestational diabetes or delivery of baby higher than 4 kg
- Hypertension
- Dyslipidaemia (HDL level < 35 mg / dl or Triglycerides >250 mg /dl)
- Polycystic ovary disease and Acanthosis nigricans
- History of vascular disease

SYMPTOMS

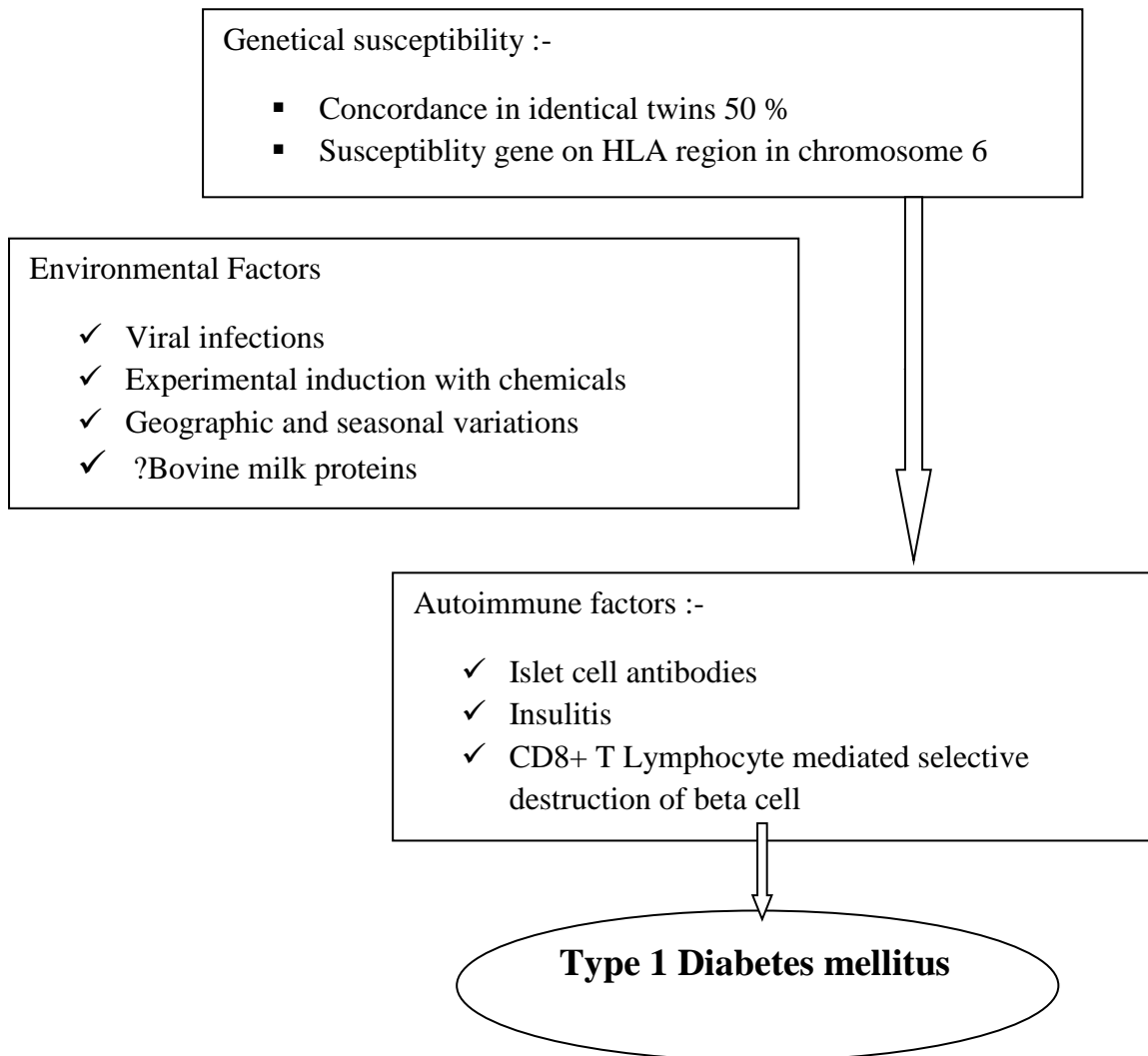
Diabetes symptoms vary depending on how much your blood sugar is elevated. Some people especially those with pre diabetes or type 2 diabetes may not experience symptoms initially. In type 1 diabetes, symptoms tend to come on quickly and be more severe.

Some of the signs and symptoms of Type 1 and Type 2 diabetes are

- Increased thirst
- Frequent urination
- Extreme hunger
- Unexplained weight loss
- Presence of ketones in urine

- Fatigue
- Irritability
- Blurred vision
- Slow healing sores
- Frequent infections , such as gums or skin infection and vaginal infections

PATHOGENESIS OF TYPE 1 DIABETES



OTHER SOME NON TYPICAL DIABETES MAY BE

Latent Auto immune Diabetes in Adults (LADA) :- Occurs in younger , leaner individuals who appear to have Type 2 diabetes as they do not become ketotic and may manage with out insulin for a time .

Anti glutamic acid Decarboxylase (GAD) antibodies may be present and the individual usually progresses to insulin more rapidly than those with other varieties of Type 2 Diabetes

Maturity Onset Diabetes of the Young* (MODY) :- It is noted over 30 years ago and described a subset of Type 2 diabetes of the

young onset , often with a positive family history .

GESTATIONAL DIABETES MELLITUS :- It is a condition in which women first exhibit levels of elevated plasma glucose during pregnancy . Women previously diagnosed with diabetes prior to pregnancy are excluded from this classification

After pregnancy , the diagnostic classification of Gestational diabetes may be changed based on post partum testing

DIABETES INSIPIDUS :- It is an uncommon disorder characterized by intense thirst , despite the drinking of fluids (Polydipsia) and excretion of large amounts of urine (Polyuria) .

In most cases ,it is the result of the body not properly producing , storing or releasing a key hormone . But diabetes insipidus can also occur when kidney are un able to respond properly to that hormone .

Rarely diabetes insipidus can occur during pregnancy (Gestational Diabetes Insipidus) .

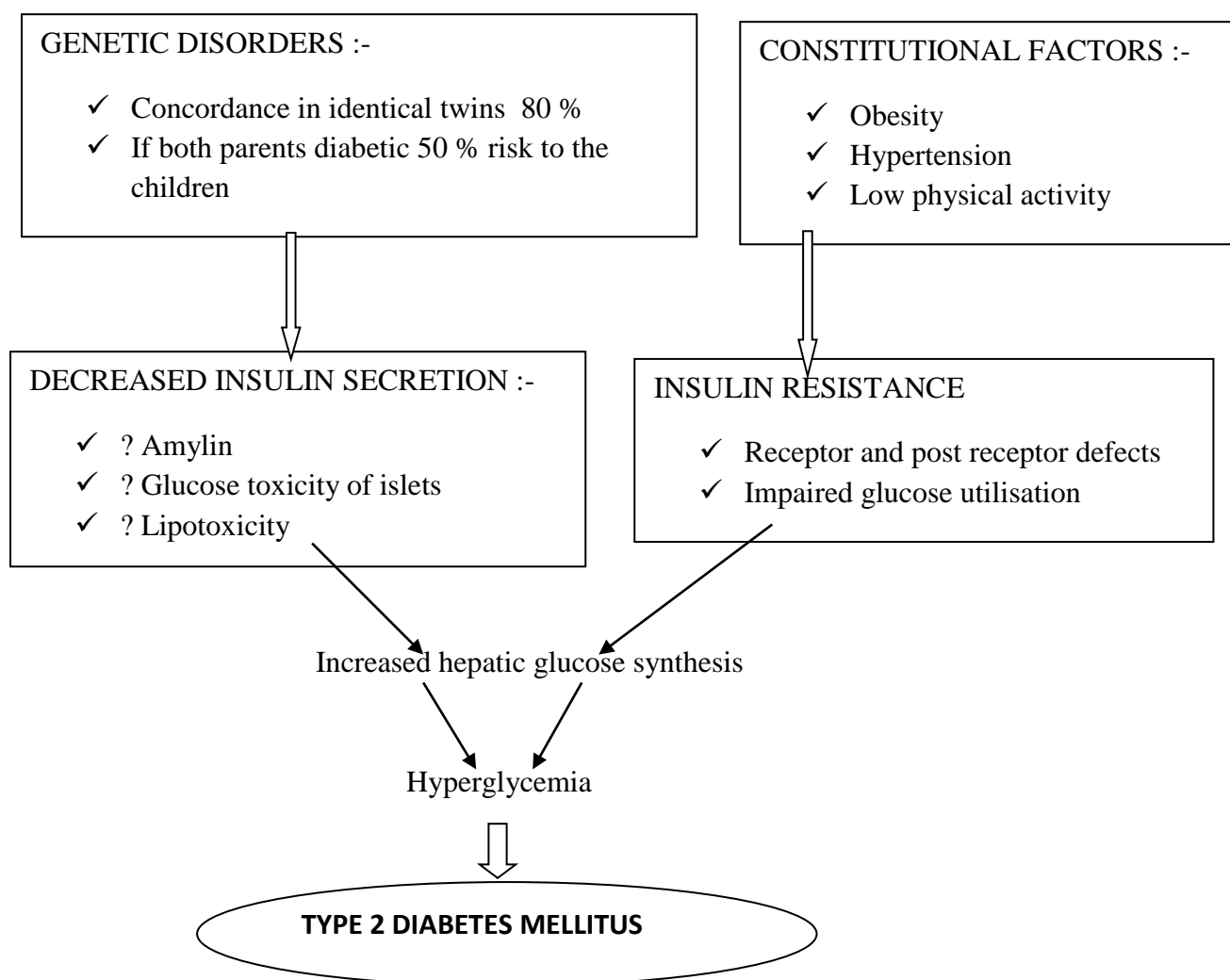
SYMPTOMS :-

The following common signs and symptoms of diabetes insipidus are

- Excretion of an excessive amount of diluted urine
- Infants and Young children who have diabetes insipidus may also have following signs and symptoms
- Un explained fussiness or inconsolable crying
- Unusually wet diapers
- Fever , Vomiting and Diarrhea
- Dry skin with cool extremities
- Delayed growth
- Weight loss

- Extreme thirst

PATHOGENESIS OF TYPE 2 DIABETES MELLITUS



TREATMENT FOR DIABETES

Depending on what type of diabetes you are having blood sugar monitoring , insulin and oral medications may play a role in treatment .

Eating a healthy diet maintaining a healthy weight and participating in regular activity also are important factors in managing diabetes

HEALTHY EATING :- includes more Fruits , and low in fats and calories and cut down of Vegetables , Whole grains should be present animal products , refined carbohydrates and i.e.. foods that are high in nutrition , and fiber sweets

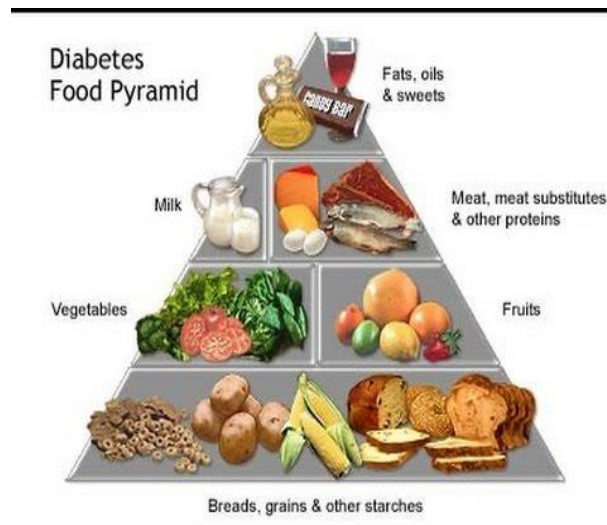


Fig :- Showing healthy diet for diabetic patients

PHYSICAL ACTIVITY :- People needs regular aerobic exercise . Exercise lowers the blood sugar level by moving sugar into the cells where it is used for energy . It also increases sensitivity to insulin , which means body needs less insulin to transport sugar to cells , and activities like swimming , Walking ,or Biking also play important role .

Treatment for Type 1 Diabetes involves insulin injections or the use of an insulin pump , frequent blood sugar checks and carbohydrate count .

Treatment for Type 2 Diabetes involves primarily monitoring of blood sugar along with diabetic medications or insulin or both .

For type 1 Diabetes they need insulin therapy to survive . Many people with type 2 diabetes or Gestational diabetes also need insulin therapy .

Many types of insulin are available including Rapid acting insulin (Insulin Lispro , Aspart , Glulisine) , Long acting insulin (Insulin glargine , detemir) , Intermediate acting insulin (NPH or Isophane insulin , Insulin zinc suspension) , Short acting insulin (regular soluble insulin) .

MOSTLY USED ORAL HYPOGLYCAEMIC OR ANTIDIABETIC DRUGS

A number of generic and branded antidiabetic drugs are used like

AMYLINOMIMETIC DRUG :- Pramlintide is an amylinomimetic drug . It is an injectable drug used before meals . It reduces glucagon secretion after meals . Lowers blood sugar and reduces appetite through a central mechanism .

Most commonly used medications for type 2 diabetes are oral drugs . However a come as injections . Some people with type 2 diabetes may also need to take insulin .

ALPHA GLUCOSIDASE INHIBITORS :-

These help in breaking down starchy foods and table sugar . This effects lowers blood sugar levels . For best results should be taken before meals . It include drugs like Acarbose , Miglitol

BIGUANIDES :- Decrease how much sugar Liver is making and Intestine absorbing and make the body more sensitive to insulin and help muscles absorb glucose . Most common biguanide is Metformin.

DOPAMINE AGONIST :- Bromocriptine (Parlodel) is a dopamine agonist . It is not

known exactly how this drug effectively treat Type 2 diabetes . It may affect rhythms in body and prevent insulin resistance .

DPP-4 INHIBITORS :- Help the body continue to make insulin . They work by reducing blood sugar without causing Hypoglycemia . These drugs also help pancreas to make more insulin .These drugs include drugs like Alogliptin .

GLUCAGON LIKE PEPTIDES (INCRETIN MIMETCS) :- These drugs are similar to natural hormone called incretin . They increase B – cell growth and insulin use in body and decrease appetite and glucagon use in body .They also slow stomach emptying . These are all important actions for people with diabetes . It include drugs like Albiglutide , Dulaglutide , Exenatide , Liraglutide .

MEGLITINIDES :- These help the body release insulin . However in some cases , they may lower blood sugar too much . So these should be given carefully . It include drugs like Nateglinide , Repaglinide .

SODIUM GLUCOSE TRANSPORT 2 INHIBITORS (SGLT):- These drugs work by preventing the kidney from holding glucose and get rid of glucose through urine . These include drugs like Dapagliflozin , Canagliflozin , Empagliflozin .

SULFONYL UREAS :- These are the oldest diabetic drugs and used still today . They

work by stimulating the pancreas with help of beta cells .This causes the body to make more insulin . It include drugs like Glimiperide , Glipizide , Gliburide .

THIAZOLIDINEDIONES :- These medications work by decreasing glucose in liver . They also help fat cells use insulin better . These drugs come with an increased risk of Heart disease . So heart functioning should be monitored during this drug usage . These drugs include Rosiglitazone , Pioglitazone .

Other drugs to treat conditions common with diabetes are

Aspirin for Heart health , Drugs for high cholesterol and high blood pressure medications .

THE ROLE OF ANTIDIABETIC DRUGS IN TREATMENT:-

These are not designed to cure diabetes but they help diabetes patients to keep their condition under control and lower the risk of diabetic complications .People with diabetes may need to take anti diabetic drugs for their whole lives in order to control their blood glucose levels and avoid hypoglycemia and hyperglycemia .

HERBAL MEDICATIONS FOR TREATMENT OF DIABETES

ALOE (ALOEVERA) :



Fig :- Aloe

Biological source :- Dried juice of leaves of Aloe vera ,Aloebarbadensis, Aloeferox

Family :- Liliaceae

Active constituents:- Barbaloin , Aloe Emodin , Anthrone c-10 glucoside , Aloin

Uses :- Aloe juice is a bitter yellow exudates from per cyclic tubules just

beneath the outer skin of leaves extracts of aloe gum effectively increases glucose tolerance. It helps in treatment of chronic but not single dose of exudates of Aloebarbadensis leaves.

ALLIUM SATIVUM (GARLIC):-



Fig :- Allium sativum

Biological source	:- Bulbs of plant Allium sativum	Uses	:- It shows significant hypoglycemic activity. It is due to increased hepatic metabolism, increased insulin release from pancreatic beta cells or insulin sparing effect.
Family	:- Liliaceae		
Active constituents	:- Allicin, Alliin, Allyl propyl disulphide, Diallyl disulphide.		

CINNAMON:-



Fig :- Cinnamomum zeylanicum

Biological source	:- Dried inner bark of the shoots of coppiced trees of Cinnamomum zeylanicum , cinnamomum verum	,Phellandrene ,Pinene ,Cymene , Caryophyllene.
Family	:- Lauraceae	
Active constituents:-	Cinnamaldehyde ,Eugenol ,Benzaldehyde ,Cuminaldehyde	Uses
		:- It is responsible for ant diabetic effects .Active components of cinnamon may have insulin mimetic effects.
		GINGKO:-



Fig : Dried leaves of Ginkgo biloba

Synonyms	:- Maiden hair tree , Kew tree	Active constituents	:- Flavonol glycosides, Triglycosides of kaempferol, Quercetin, Isorhamnetin, Biflavonoids like Ginkgetin, Iso Ginkgetin , Ginkolic acid, Bilobetin
Biological source	:- Dried leaves of Ginkgo biloba	USES	:- It acts as an Antidiabetic and also helps in lowering blood pressure.
Family	:- Ginkgoaceae		

MILK-THISTLE (SILYMARIN):-



Fig :- Milk thistle

Biological source :-Ripe seeds of milk thistle
Silybum marianum

Family :- Asteraceae (composite)

Chemical constituents:- Silybin , Silycrystin , Silydianin , Flavonolignans like Dehydrosilybin , Silyhermin , Neosilyhermin , silybionome , Betaine , Apigenin and silybonol.

Uses:-It helps to control the blood sugar level. It is used for treating type 2 diabetes .It also helps in decreasing in LDL cholesterol , Triglycerides , Glycosylated hemoglobin

NEEM:-



Fig :- Aerial parts of Neem

Biological source :-It consists of all aerial parts of plant known as Azadirachta indica.

Family :- Meliaceae

Active constituents:- Diterpenes like (Sugiol , Nimbiol) , Triterpenes like Beta –sitosterol , Limonoids like Maliantriol , Nimbidinine , Azadirachtin, Nimbendiol

Uses:- It shows anti-hyperglycemic activity .It helps increase in glucose uptake and glycogen deposition. Apart from anti-diabetic activity it also having Antibacterial, Anti malarial and antioxidant effects.

MOMORDICA:-



Fig :- Fresh fruits of Bitter guard

Biological source :- It consists of fresh green fruits of the plant known as Momordica charantia(Bitter Ground)

Family :- Cucurbitaceae

Active constituents :- Charantin , Saponin , Glucoside , Alkaloids , Ascorbic acid.

Uses :- Juice of fresh fruits reduce the blood sugar level and hence used for treatment of diabetes mellitus .It also used for treatment of rheumatism ,gout and disorders of spleen and liver

LIQUORICE:-



Fig :- Liquorice

Synonyms : Glycyrrhizae radix ,Glycyrrhiza, Mulethi.

Biological source :- Glycyrrhiza glabra

Family :- Leguminosae

Active constituents :- Glycyrrhizin , Glycyrrhonic acid, Glycyrrhetic acid,Asparagin

Uses :- It contain antidiabetic substances known as amorfrutins which are capable of reducing blood sugar levels and perventing inflammation associated with diabetics.

MANGO:-



Fig :- Mango

Synonyms :- Amra , Aam

Biological source :- Mangifera indica

Family :- Anacardiaceae

Chemical constituents:-Mangiferin , Alanine , Glycine , Aminobutyric acid ,kinic acid and shikimic acid

Uses :- The leaves of this plant are used as an antidiabetic agent in Nigerian folk medicine .Its aqueous extract when given orally did not alter blood glucose level is normoglycemic condition.

TULSI :-



Fig :- Tulsi

Synonym

Holybasil

Sacred basil ,

Uses

:- Its aqueous extract

Biological source

:- Fresh and dried leaves of Ocimum sanctum or Ocimum tenuiflorum

of leaves shows significant reduction in blood sugar level, and also significant reduction in fasting blood glucose , uronic acid , total cholesterol .It also shows antiasthmatic , antistress ,antibacterial and antifungal ,antiviral, gastric anti ulcer activity, antioxidant and immune stimulant activities .

Family

:- Lamiaceae.

Chemical

constituents:-Eugenol

,Methyleugenol , Eugenol methylether , Caryophyllin ,Carvacrol.

GUGGUL:-



Fig :- Guggul

Synonyms

:-Scented Bdellium ,Gum guggul ,Commiphora.

Active

constituents:-

Guggul

sterones,Ethaphon,Steroids,Diterpinoids,Pentosan and Furfural.

Biological source

:- Commiphora weightii

Family

:- Burseraceae.

Uses

:-It is used as herbal

medicine for treating diabetes.

FENUGREEK :-



Fig :- Fenugreek

Biological source

Foenumgraecum.

:- Trigonella

Conclusion:

Herbal medicine is without side effect long term easily usable. Crude drugs are potent activity in the treatment of diabetes. Here mentioned the valuable crude drugs are used for further research doing persons.

Family

:- Fabaceae.

Active constituents

:- 4-hydroxyleucine

Uses

:-Seeds contain

Hypoglycemic properties. It is used in preparing herbal medicines for treating diabetes.

REFERENCES:-

1. Grover J.K , Yadav s ., Vats V. Medicinal plants of India with Anti diabetic potential .J. 2000; 81 :81-100 [Pub Med]
2. Scartezzin P., Sporni E. Review on some plants of Indian traditional medicine
3. Oberley L.W. Free radicals and Diabetics
4. Matteucci E., Giampietro O. Oxidative stress in families of type 1 diabetic complications
5. Lipinski B. Pathophysiology in diabetes mellitus

6. Dey L., Anoja S.A., Yuan C-S Alternative therapies for Type 2 diabetes
7. Kumari K Mathew B.C., Augusti K.T . Antidiabetic effects of s- methyl cysteine sulfoxide
8. Roman – Ramos R., Flores –Saenz J.L., Aarcon – Aguilar F.J. Anti hyper glyceic effects of some edible plants
9. Bever B.O. Zahnd G.R., Plants with oral hypoglycemic action
10. Davis R.H., Maro N.P. Aloe Vera anti inflammatory activity in diabetes
11. Anderson R.A ., Chromium and Polyphenols from Cinnamon improve insulin sensitivity
12. Bash E., Gabardi S, Ulbricht C. Bitter melon

