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GYMNEMA: A HERBAL MEDICINE FOR MANAGEMENT OF DIABETES MELLITUS

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ABSTRACT

Diabetes mellitus (DM) is a disease that arises all the world and about 30 million or more than 30 million people are affected by diabetics are there in the world. The occurrence of diabetes disease is growing for the reason that female diabetics to have diabetic children. The prevalence of diabetes persons above 40 year of age is higher. Females especially the married ones are more susceptible to to get this disease. Obesity dietary factors and heredity are the other contributory factors for diabetes. Alcoholic beverages increases appetite, encourage increases weight and when taken in excess damage pancreas and thereby increase the chance of diabetes. Gymnema or gurmar, to use its common Hindi name, means sugar destroyer, because it was noted that chewing the fresh leaves temporarily destroyed the taste of sugar in the mouth. Gymnema is a herbal medicine used for treatment of diabetis from centuries as a herbal medicine. This plant also used to control obesity form of gymnema tea. It is potent anti-diabetic plant and used for ayurvedic and homeopathic system of medicine. It is used in management and treatment of asthma, Eye related complaints and Family planning and snake bite. The substances used to in treatment of diabetes i.e. Diabetes mellitus are known as antidiabetics (Greek : dia : through and bainein : to go). Thus, diabetes is the inability of the body to utilize glucose, due to failure of pancreas to secret insulin in sufficient quantity. This review emphases on the diabetes mellitus and gymnema a herbal drug in the management of diabetis Apart from several synthetic antidiabetic, the natural oral antidiabetic drug are

gymnema (gymnema sylrestre). This review emphases on overview on diabetes mellitus and gymnema a herbal medicine used for management of diabetes, its taxonomical classification, plant description, synonyms, vernacular name, biological source, chemical constituents, geographical distribution, pharmacological uses and mechanism of action of gymnema etc.

KEYWORDS: Gymnema, Sugar destroyer, Diabetes mellitus, Gymnema sylvestre, Insulin, Blood sugar.

INTRODUCTION

Diabetes mellitus (DM) is a disease that arises all the world and about 30 million or more than 30 million people are affected by diabetics are there in the world. The occurrence of diabetes disease is growing for the reason that female diabetics to have diabetic children. The prevalence of diabetes persons above 40 year of age is higher. Females especially the married ones are more susceptible to to get this disease. Obesity dietary factors and heredity are the other contributory factors for diabetes. Alcoholic beverages increases appetite, encourage increses weight and when taken in excess damage pancreas and theraby increase the chance of diabetes.

Diabetes is a hereditary disorder with metabolic and vascular dearrangements. The word diabetic means to flow through was introduced by greek physician Aeretaeus, in the first centuary A.D. Mellitus means sweet, The sugar present in the urine of diabetic persons was proved by Dobson.

It is stated that disfunctioning of Beta-cells of pancrease, or lack of total insulin,or deficiency of insulin, leads to total reduces or slightly decreases in the transfer of glucose in cells, formation of glycogen from glucose diminishes, protein is converted abnormally to glucose at a high rate.

Gymnema is a herbal medicine used for treatment of diabetis from centuries as a herbal medicine. This plant also used to control obesity form of gymnema tea. It is potent anti-diabetic plant and used for ayurvedic and homeopathetic system of medicine. It is used in management and treatment of asthma, Eye related complaints and Family planning and snake bite.[1]

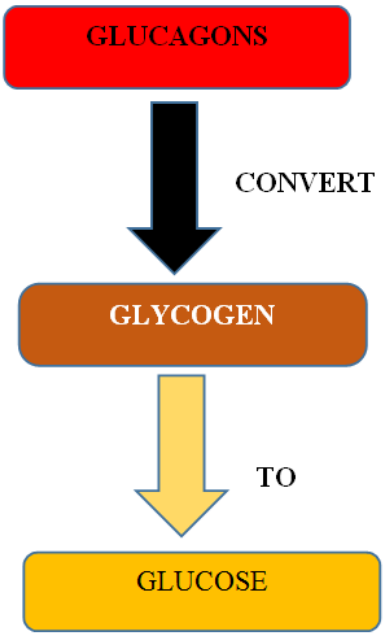
The substances used to in treatment of diabetes i.e.diabetes mellitus are known as antidiabetics(Greek: dia: through and bainein: to go). Thus, diabetes is the inability of the

body to operate glucose, due to failure of pancreas to secret insulin in sufficient quantity. Apart from several synthetic antidiabetic, the natural oral antidiabetic drug are gymnema(gymnema sylvestre).

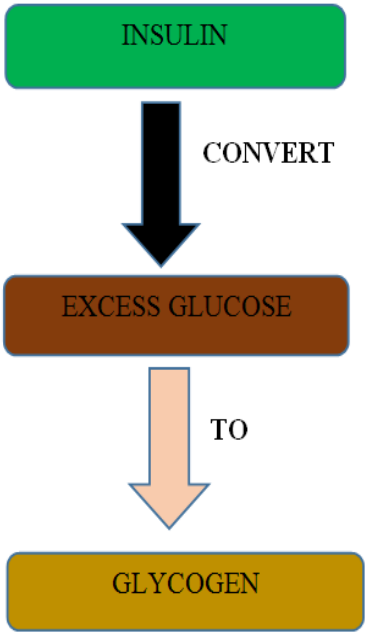
The first studied in india studied by the British 19th century, herbal crude drug has attentive on the use of the leaf of gymnema used to decrease blood sugar. According to or based on the various reviews article and research papers on gymnema is the herb used frequently for the studies for clinical trials on humans, either as a single remedy of herbal drug or used in combination with other ingredient used in traditional Ayurvedic formulations.[2]

In normal condition Pancreas is partly endocrine in nature. It is composed of Islets of Langerhans with alpha and beta cells, which secrete hormones. These hormones regulate blood sugar level as follows:

a) Alpha cells secrete: Glucagons is a peptide hormone produced by alpha cells of pancrease which convert glucagons into glycogen i.e. stored glucose when energy is required then this stored glucose get process in glycogenolysis means break of glycogen into glucose. Glucose is a source of energy.



b) Beta cells Secrete: Beta cells of pancrease islet of langerhens secrete insulin this insulin get converted into excess glucose then this excess glucose into glyconeogenesis i.e. The making from its own breakdown of glucose, and formation of glycogen.



[3][4]

Diabetes Mellitus

Diabetes mellitus(DM) is a disorder of glucose metabolism which is either due to

a) Incapability city of pancreas to produce sufficient insulin needed for the body or
b) Incapability of the body cells to use the insulin available.

It is stated that disfunctioning of Beta-cells of pancrease, or lack of total insulin,or deficiency of insulin, leads to total reduction in the transfer of glucose in cells, synthesis of glycogen from glucose diminishes, protein is converted abnormally to glucose at a high rate..

Diabetes could be caused not only by deficiency of insulin but also due to disturbances in the level of certain other substances like adrenalin, pituitary hormones, thyroid hormones, oestrogens, glucagons etc. all these substances produce their effect on blood sugar level so glucose tolerance curve should be determined which will be most useful test for diabetes.[5]

Types of diabetes Mellitus

Clinically diabetes is of two types

1. An Insulin dependent diabetes or juvenile onset kind of diabetes:

This kind of diabetes usually progresses at a age during first 40 years of life and has a very fast onset. Pancrease produce very little or no insulin dependent diabetes in this type of diabetes.

2. Non Insulin dependent diabetes or The adult or maturity onset kind of diabetes:

This form of diabetes usually grows after 40 of age or elderly persons which are obese and progresses slowly. In this type of diabetes, the pancreas produce inadequate amount of insulin.

Sign and Symptoms

I. Frequent urination and passing large volume of urine
II. Increased dehydration
III. Increased hunger
IV. Loss of body weight
V. Common weakness and tiredness
VI. Ache in the legs
VII. Prickliness
VIII. Shortage of concentration
IX. Susceptible to to infection
X. Wound healing

All diabetics do not have all these symptoms but from No. (IV) to (X) are definite indications for diabetes.

Possible Complications of Diabetes

Slow blood circulation in legs, heart disease, kidney failure, poor vision, numbness, paraesthesia, feelings of pins and needless, loss of sensation are common complications of diabetes but if blood sugar is controlled to normal range i.e. 120-150 mg per 100 ml then most of the above complications can be prevented, As a result of these complications of long term like heart disease, kidney damage, and even blindeness may occur.

Prevention and Control: Diabetes can be prevented and controlled by adopting following measures:

I. The diabetic case should be detected as early as possible. A pre-diabetic has no symptoms of diabetes, has normal blood sugar but shows impaired glucose tolerance curve
II. A diabetic should not marry with another diabetic otherwise their children will also be diabetic.
III. The obesity should be reduced by restricting the diet and going for normal physical exercise
IV. The body weight should be 10 percent less than normal body weight

V. Personal hygiene including care of feet and skin should be taken care of
VI. Regular check up of urine sugar and blood sugar should be done
VII. The patient should try to avoid emotional and social stress and strain in life are associated with diabetes.

Treatment Diabetes Mellitus

Diet, physical exercise and drug may be recommended for the treatment of diabetes. The treatment should be done under supervision of a qualified diabetologist. The patient undergo full biochemical test, eye check up and obtain advice for foot care at least once a year.

The commonly used drugs in controlling the diabetes are insulin which is administered by parenteral route in case of insulin dependent diabetes. For non-insulin dependent diabetes various types of oral tablets are available.[6][7]

Gyamnema

It is a mgical herb which are used in the treatment of diabetes mellitus. It is potent anti-diabetic plant and used for ayurvedic and homeopathetic system of medicine. These herbal drug obtained from the leaves of Gymnema Sylvestre belonging to the Asclepiadaceae family. It has different vernacular name according to the different languages. Mechanism action of these drug are given in the figure-6.

Plant Discription

Figure 1: Gymnema Plant.

Synonym: Gudmar, Madhunashi

Biological Source: Gymnema Sylvestre.[8][9][10][11]

Family: Asclepiadaceae.[12][13][14][15]

Vernacular name

- Gujrati - Marbasingi
- Hindi - Gurmar
- Kannada – Sennegerasehambu
- Malyalam – Kalikardodi
- Marathi - Meshashringi
- Sanskrit – Adigam
- Tamil – Podapatri
- Bengali - Merasingi

Taxonomical classification of Gymnema plant are as follows:

Taxonomical clssification

- Kingdom: Plantae
- Divison: Magnoliophyta
- Order: Gentianales
- Class: Magnolopsida
- Family: Apocynaceae
- Genus: Gymnema
- Species: Gymnema sylvestre[16][17][18][19]

Geographical distribution

A woody climber found in India, common in Deccan – Peninsula and Northern and Western parts of India. It is occasionally cultivated for medicinal purposes.

Organoleptic characters

Colour : Green

Odour : Pleasant and aromatic odour.

Taste : Testless

Size : 3 – 5 x 1-2 cm.

Shape : Elliptic or ovate with acute or acuminate apex

Gymnema plant has green in colour, It has pleasant and aromatic odour and elliptic, ovate or acuminate apex in shape and has testless in taste.

Figure 2: Gymnema dried leaves and its extract.

Extra Features

The leaves when chewed, have remarkable property of paralysing the taste glands for few hours against sweet and bitter taste lower surface of leaf is more pubescent and base is rounded or chordate.

Microscopic characterisation

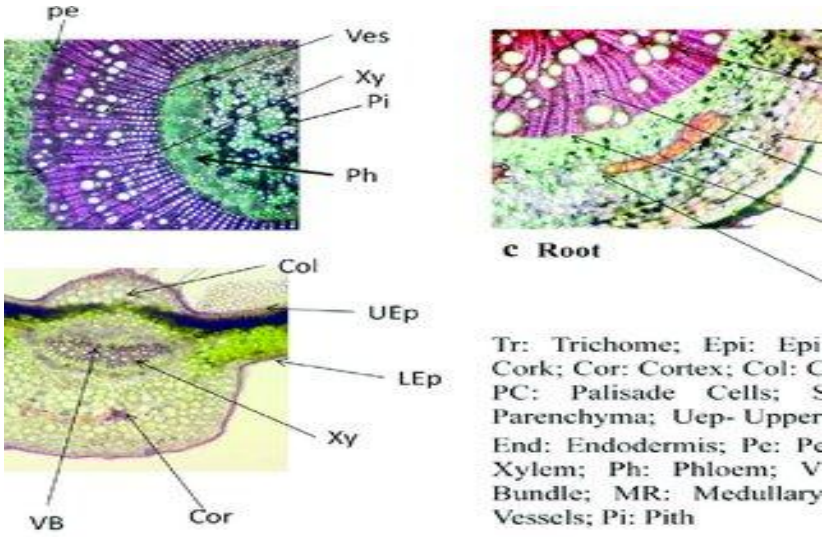


Figure 3: T.S. Gymnema Sylvestr.

Chemical Constituents

The leaves content hentriacontan, pentriaacontana, phytin, alpha and beta chlorophylls, resins, tartaric acid, formic acid, butyric acid, mucilage inositol, d-quircitol, gymnemic acid and anthraquinone derivatives.

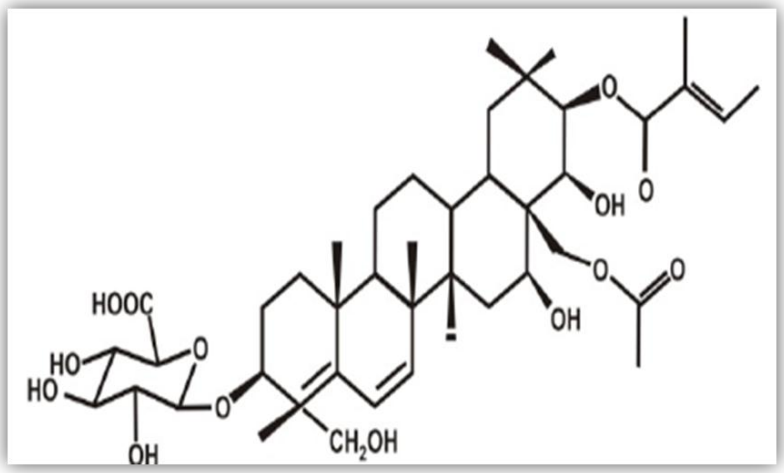


Figure 4: Structure of Gymnemic Acid[20][21]

Identification

I. Dilute solution anaesthetizes sweets taste buds

II. Leaves shaken with water gives copious foam on addition of dilute hydrochloric acid forms voluminous precipitate.

Therapeutic uses: Therapeutic Uses of Gymnema are as follows:

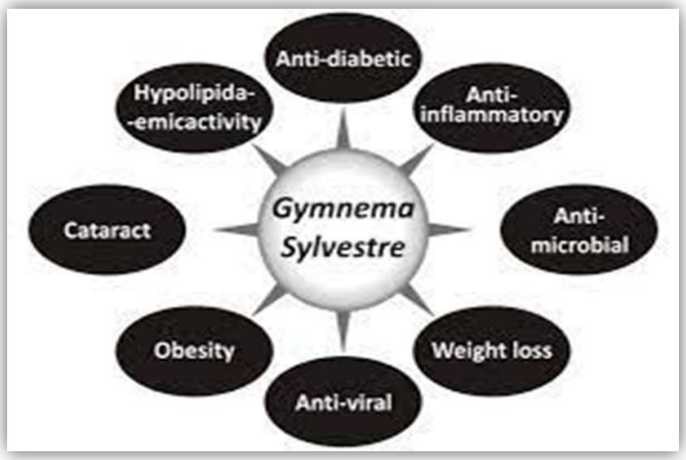


Figure-5: Thetrapeutic uses of gymnema[22][23][24]

Mechanism of action of Gymnema Sylvestre: Mechanism of action of Gymnema Sylvestre carried out by the following mechanisms.

- Prevent absorption of glucose in blood
- By blocking Sugar receptor in the intestine
- Help in regeneration of insulin and beta cells

- Gymnema Salvestre act by preventing the absorption of glucose in blood when Gymnema drug directly affect on its absorption then its help to stop the absorption of glucose in blood and which may result reduces blood sugar level.
- By blocking Sugar receptor in the intestine means gymnemic acid is the main active constituents which is present in the in this plant, this gymnemic acid blocks sugar receptor in intestines result prevent absorption of sugar by intestine.
- Its help in regenerating insulin and beta cells which result in increases secretion of insulin from Beta cells of pancrease.

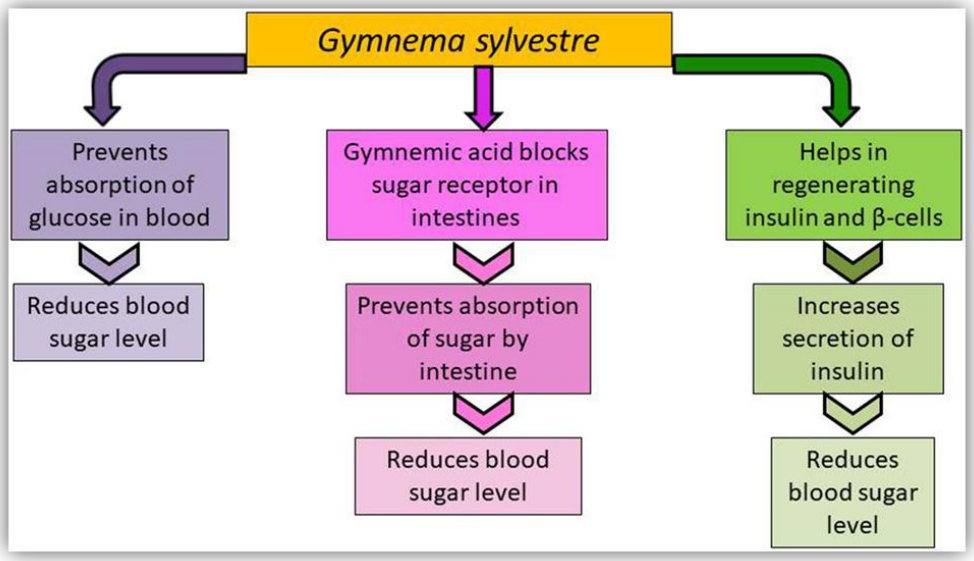


Figure 6: Mechanism of action of Gymnema Sylvestre[25][26][27][28]

CONCLUSION

On the basis of the World Health Organisation (WHO), Gymnema plant serve as important source of medicine and about 80 to 90 percent of the world population used these medicinal plant for the management or prevention of various disease or disorder G. Sylvestre is most important and most popular medicine in traditional systems of medicine and Its such a effective herb show its effect by treating various life threatning diseases in the human being or animal.

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