Fenugreek seeds: its antidiabetic activity

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Abstract

Recently use of herbal medicines, have been considered as an alternative for therapeutic usage. So, this study was undertaken to evaluate the hypoglycemic and hypolipidemic effects of fenugreek seeds in type2 diabetic patients, to know how fenugreek seed acts as antidiabetic and to motivate the people to use the fenugreek seed powder instead of allopathic medicine. This study shows that fenugreek seeds can be used as an adjuvant in the control of type 2 diabetes mellitus in the form of soaked in hot water. Fenugreek can regulate cholesterol level & control blood pressure which reducing the risk factor of heart & develop the health of the heart.

Keywords: fenugreek seeds, diabetes, & cardiovascular disease, allopathic medicine,

1.0 Introduction

Fenugreek (Trigonellafoenumgraecum) is an annual plant belongs to the family Leguminosae. It is one of the popular spices. The green leaves and seeds of fenugreek are used in food but also in medicinal purpose that is the old practice in human history. Seeds of fenugreek spice have medicinal properties such as hypocholesterolemia, antibacterial, gastric stimulant, for anorexia antidiabetic agent and anticancer (**Srinivasan, 2006**). Fenugreek is known for its palatably bitter, lightly sweet seeds (**Betty, 2008)**. Diabetes mellitus is a chronic disorder of carbohydrates, fats & protein metabolism. An inadequate insulin secretary response, which converts into impaired carbohydrate (glucose) use, as it is resulting hyperglycemias (**Kumar *et al.*, 1992**). Diabetes mellitus is a chronic condition in which pancreas can't produce insulin. It is an endocrine disorder due to impaired of insulin activity (**Ross and Wilson, 2010**). Although diabetes can be control but it lasting lifetime(**Singha *et al.*, 2015**).The development of heart disease or CVD, including inadequate diet, increasing cholesterol, high blood pressure, lack of exercise are risk factor. Worldwide as the death rate is increasing (**Wang *et al.*, 2016**). Fenugreek can regulate cholesterol level &control blood pressure which reducing the risk factor of heart & and develop the health of the heart.

1.1 Types of diabetes:

1.1.1 Type-1 diabetes

Type-1 diabetes mellitus, autoimmune disorder that conduct the impairment of insulin-generating pancreatic beta cells. Insulin is an indispensable anabolic hormone that various effect of glucose, lipid, protein and mineral metabolism, as well as growth. People can get better life through long insulin replacement therapy without insulin, diabetic ketoacidosis develops **(Shehab *et al.*, 2015).**

1.1.2 Type-2 diabetes mellitus

People with type 2 diabetes MELLITUS are known as non-insulin dependent diabetes MELLITUS, characterized by hyper glycemia, insulin resistance, and relative insulin deficiency **(Chauhan *et al.*, 2016).**

This result when the pancreas produces insulin but the cells can't able to use it sufficiently. This effect is known as 'Insulin Resistance'.

Approximately 90% of diabetes cases are types -2 than type-1 due to genetic or hereditary predisposition obesity and inactive life style **(De Meester *et al.*, 2008).**

1.1.3 GDM (Gestational Diabetes Mellitus)

Diabetes in pregnancy can develops through insulin resistance and hyperinsulinemia **(Singh *et al.*, 1998).**

1.2 Cause of diabetes mellitus (DM):

Hyperglycemia and diabetes are caused by inadequate production of insulin and cells can't able to use insulin proper are known as Insulin resistance **(Esposito *et al.*, 2004).** The chief disorder in type -1 diabetes is inadequate of insulin that affects producing beta cell in pancreas **(Salas-Salvado *et al.*, 2008).**

In type -2 diabetes, the blood sugar increase due to degeneration of beta cell. If someone has insulin resistance, the pancreas produces more insulin and blood sugar level will be normal. After sometime, when pancreas wouldn't able to produce insulin as vigorously, the insulin can't release and again hyperglycemia develops **(Singh *et al.*, 2015).**

3.0Fenugreek with its Medicinal applications:

Said that fenugreek is one of the supplements used to support non-insulin dependent diabetes mellitus, Fenugreek seed helps by not only reducing blood sugar levels due to its high concentrations of phytochemicals, but it has also helped reduce low density cholesterol.

Fenugreek has an extensive variety of actions which are likely to protect human body against a number of abnormalities. Inspire of various actions of Trigonellafoenum-graecum on chronic disorders, the Rstill to be

the area of research. In this review article, various activities like antidiabetic, antioxidant, anticarcinogenic, antiulcer, antifertility, immunomodulatory and many more discussed last three decades **(Madar *et al.*, 2010).**

3.1 Fenugreek seed affects intestinal microbiota and immunological variables in piglets after weaning:

Revealed that fenugreek seed has been shown to affect the intestinal microbiota and immunological responses in animals. A feeding trial with male castrated piglets was performed over 28 d without or with the addition of 1.5 gm fenugreek seeds/kg complete diet in ten and eleven piglets, weaned at 21 d. In the intestinal tract, PH, lactate and SCFA were measured as major bacterial metabolites. Immune cell phenotypes, phagocytic activity and lymphocyte proliferation after stimulation with pokeweed mitogen, concanavalin A and phytohemagglutinin M were measured by flow cytometry. Health status and performance of the piglets were not affected by fenugreek. The PH in the caecum and colon were reduced compared with the control **(Gupta *et al.*, 1999).**

3.2 Fenugreek Productivity, nutritional value and uses:

fenugreek is a unique flavouring crop whose resources are being found with the resumed interest in conventional medicine. As rich sources of protein, lipids, fatty acids and minerals, fenugreek seeds and leaves serve to the body"s needs for essential nutrients and provide many health benefits. This sustainable plant has a high number of developing requisition in the production of food and feed, medicine, cosmetics and pharmaceutical industries due to its nutrient and nutraceutical content. The findings presented in this review paper will be useful for consumers hoping to improve their health by incorporating healthy biogenic elements and fatty acids into their diet **(Ali *et al.*, 1995).**

3.3 Fenugreek seeds Decrease Blood Cholesterol and Blood Glucose as Adjunct to Diet Therapy in Patients with Hypercholesterolemia:

Therapeutic diet is a diet which is given to the patient who is suffering from any type of disease condition **(Tewari, 2019).** Said that the proatherogenic Western diet appears to be an important pathway for the development of cardiovascular disease (CVDs) and other chronic disease, among individuals and populations with an underlying lack of general and health education. Hypercholesterolemia, Diabetes and obesity are risk factors of CVDs, and most agencies advise a Prudent low-fat diet, regular moderate physical activity and cessation of Tobacco and alcohol consumption for prevention of these disease. Obesity and central obesity are important in the pathogenesis of Dyslipidemia, metabolic syndrome and type2 diabetes mellitus. Epidemiological studies and intervention trials indicate that adherence to Functional food dietary patterns in conjunction with other healthy lifestyle Practices can protect against CVDs **(Amin *et al.*, 1988)**.

3.4 Anti-diabetic effects off fenugreek (trigonellafoenum-graecum):

Proposed that diabetes is a metabolic disorder characterized by Hyperglycemia resulting from abnormalities in insulin secretion and action. Herbal products have been generally used throughout history for the Treatment of several disease. After all the delineation and obtain mechanisms of action of these natural products remain unclear, Researchers are trying to assessed their useful reaction on human health as well as

their viable adverse effects. Fenugreek's Pharmacological Effects are allocated to a range of bioactive compounds such as polyphenols, Steroids, lipids, alkaloids, saponins, flavonoids, hydrocarbons, carbohydrates, Galactomannan fiber, and amino acids. Several scientific groups studied its Antidiabetic effect. **(Madar *et al.*, 1984).**

3.5 Anti- Glycation and Glycation Reversing potential of Fenugreek (TrigonellaFoenum-Graecum) Seed Extract:

Proposed that the study of Fenugreek seed extract on obstruction of protein glycation, potential to lay aside Glycated end products and antioxidant potential in vitro. Inspections were Carry off ply deftly initiated, extensively used authenticate, repeatable, sensitive & authentic bioassays in vitro. BSA glucose glycation model is more applicable to the biological system of human. Fenugreek Seed extract was used as it is claimed to have anti-diabetic properties in the Sri Lankan traditional system of medicine. Further, there are numerous Studies on antidiabetic properties of fenugreek seed vitro and in vivo models and also in clinical studies. However, protein glycation inhibitory activity of Fenugreek seed is limitedly investigated. Further, glycation reversing ability of fenugreek seed is not reported to dare. The result of the present study demonstrated that fenugreek seed extract Had both anti-glycation (IC50) glycation reserving (EC50) of fenugreek seed Extract to inhibit protein glycation was moderate compare to the reference drug **(Roberts *et al.*, 2015).**

3.6 A Simple dietary addition of fenugreek seed leads to the reduction in blood glucose levels:

Trigonellafoenum-graecum is extensively used in the Indian continent as dietary supplement. It is known that it since long possess antidiabetic properties. The several techniques are already narrated and fine studied in different studies. Scientists have denoted that the amino acid 4-OH Ile in fenugreek seeds enlarge glucose produced insulin release in vitro in human and rat pancreatic islet cells **(Sauvaire *et al.*, 1998).**

Whole fenugreek raw seeds, extracted seed powder, cooked seed (25g) and gum isolated of seeds reduced postprandial seeds (25g) appeared small effect as indicated in the review article **(Neelakantan *et al.*, 2014).**

4. Conclusion:

Diabetes is a widespread chronic disease that affects the body's ability to control blood glucose levels and increases the risk of heart disease and Stroke. For centuries, herbal remedies have been used to control diabetic Symptoms. One such herb is fenugreek, a plant that grows widely in India, Egypt, and several Middle Eastern Countries. A final Consideration is whether the beneficial components of the Fenugreek seed can be obtained from other food sources. Fenugreek seeds Contain soluble fiber which is known to slow the digestion and absorption of Food from the intestinal tract. This could contribute to lower blood glucose Levels. Soluble fiber is abundant in fruits, vegetables and grains, such as oats and barley. Fenugreek seeds also contain a group of chemical compounds Called saponins which may reduce cholesterol Production in the liver. Saponins are found in legumes such as beans, peas and lentils. Additional research is needed to identify whether there are any Advantages to using fenugreek seeds for diabetic control rather than food rich in soluble fiber and Saponins.

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