

# Benefits and Effect of Fenugreek Seeds in the prevention and the management of Type 2 Diabetes.

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**Abstract:** Fenugreek is a powerful plant that has its roots in Central Asia and is a member of the Fabaceae family. It has a powerful maple flavour and is widely sought-after as a seasoning component in tobacco, food, and drinks as well as a component of spice mixes. Furthermore, it is also regarded as a herb that has also been used in alternative medicine to treat various health conditions, such as diabetes, high cholesterol, and obesity (3,4,5). Fenugreek's dietary fibre reduces blood sugar and cholesterol levels after meals and controls the liver's ability to produce cholesterol (6). These impacts' processes are not entirely understood. What's interesting is that the gum in fenugreek seeds is made up of galactose and mannose, and the seeds themselves contain 45.4% dietary fibre (32% insoluble and 13.3% soluble) and through thorough research, we have realised that reduced glycemia and hyperlipidemia are linked to the latter substances (7,8,8,10). Fenugreek's hypoglycemic effect has been especially documented in humans and animals with type 1 and type 2 diabetes mellitus (10,11,12). All in all, some of the beneficial uses for fenugreek are, labour induction, aiding digestion, and as a general tonic to improve metabolism and health. Fenugreek may help increase breastmilk production, enhance testosterone levels, and promote blood sugar control. It has also been linked to other health benefits, which we as a society, will slowly but shortly discover. By the same token, Ayurvedic and Chinese medicine have also traditionally been using fenugreek for medicinal purposes for over centuries.

**Keywords:** Fenugreek, Ayurvedic Medicine, Chinese Medicine, Herbs, Hypoglycaemia, Antihyperlipidemic, Diabetes Mellitus.

## Introduction

One of the oldest medicinal plants, fenugreek (*Trigonella foenum-graecum* L. Leguminosae), comes from India and Northern Africa (3,4,5). Although the small brown seeds are well known for their use in medicine, the leaves are also tasty. Fenugreek was used for the first time in history in Egypt around 1500 B.C. The seeds have historically been utilised as both a spice and a medicinal throughout the Middle East and South Asia. Fenugreek is an annual plant that typically reaches a height of two feet. To create extracts or powders for therapeutic purposes, the leaves and seeds—which mature in long pods—are employed. Fenugreek was utilised in ancient Egypt for a variety of purposes, including incense and mummy embalming.

Fenugreek is still added to wheat and maize flour in contemporary Egypt to make bread. Fenugreek was allegedly used to facilitate childbirth and delivery in ancient Rome. Fenugreek seeds are used in traditional Chinese medicine as a tonic and a remedy for leg oedema and weakness. Fenugreek is a herb that is frequently eaten as a condiment and used medicinally to stimulate breastfeeding in India. Fenugreek is also used for a variety of other folk remedies, such as the treatment of baldness and indigestion. The outcomes of experimental animal and human experiments have revealed that oral fenugreek seed powder may have hypoglycaemic and antihyperlipidemic characteristics.

## Diabetes Mellitus

The fast-acting, incurable illnesses that occasionally make headlines come to mind when people think of the deadliest diseases in the world. However, a lot of these illnesses don't make the list of the top 10 global killers.

In 2019, there were an estimated 55.4 million fatalities worldwide, and 74% of these deaths were caused by chronic, slow-progressing noncommunicable diseases (1). The reality that many of the most devastating illnesses are largely preventable may be even more shocking. The location of a person's home, their availability to preventive treatment, and the calibre of their medical care are all non-preventable factors that affect risk.

Diabetes is a long-term (chronic) illness that affects how your body converts food into energy.

The majority of the food you consume is converted by your body into sugar (glucose), which is then released into your bloodstream. Your pancreas releases insulin when your blood sugar levels rise. In order for blood sugar to enter your body's cells and be used as energy, insulin functions like a key.

When you have diabetes, your body either produces insufficient insulin or uses it improperly. Too much blood sugar remains in your bloodstream when there is insufficient insulin or when cells cease reacting to insulin. That can eventually lead to major health issues like renal disease, eyesight loss, and heart disease (2).

Uncontrolled diabetes over time can harm blood vessels and neurons. Complications include decreased wound healing, renal failure, and blindness may result from this.

Because they have less access to the medications and technologies needed to control their blood sugar levels, people in low- and middle-income nations are more likely to die from diabetes-related complications.

The World Health Organisation (WHO) released the Global Report on Diabetes in April 2016, which urges action to decrease exposure to the known risk factors for type 2 diabetes and to enhance access to and the standard of care for those with all types of the disease.

## Background

Fenugreek supplementation is thought to influence glucose homeostasis and perhaps prevent diabetes mellitus in those with prediabetes. The goal of the current study is to ascertain whether fenugreek can prevent T2DM in individuals who are prediabetic but not diabetic.

The databases of PubMed, Google Scholar, Scopus, and the Cochrane Library were searched electronically for studies that evaluated changes in fasting blood sugar, postprandial blood sugar, and haemoglobin A1c in people receiving fenugreek treatment and in the control group.

## Fenugreek in the Treatment of Diabetes

A total of 894 people took part in the trials in one of the research, according to the reviews. Eight of the fourteen trials that were featured took place in India, three in Iran, one in China, one in France, and one in Egypt. A parallel design was used for all RCTs (4,16). Patients with T2DM were enrolled in twelve investigations. Pre-diabetic people were included in one study, which also included overweight, healthy participants. The amount of fenugreek used in each trial was different. One, two, or three doses of fenugreek were given each day. In seven studies, the control group received no placebos. Fasting blood glucose levels were the result of 13 studies. HbA1c values were reported in seven trials, whereas postprandial glucose levels were recorded in six research. The FENFURO capsule was used in two trials as an experimental product. The trial lasted anything from one week to three years.

FBG ( Fasting Blood Glucose ) levels were lower in the treatment group than in the control group, although the difference was not statistically significant (15). Additionally, the treatment group's postprandial glucose levels were shown to be lower. Nevertheless, the treatment group's HbA1c levels were much lower than those in the control arm, demonstrating the benefits of fenugreek seeds for diabetic individuals.

## Conclusion

Because of its high fibre content, fenugreek seeds, according to recent biochemical research, offer anti-diabetic characteristics by delaying stomach emptying time and reducing glucose uptake in the small intestine, which slows down carbohydrate metabolism and lowers blood glucose levels. Additionally, pancreatic cells are restored by protecting Beta-cells (17,18), and serum insulin levels are increased by stimulating islet cell regeneration or insulin release from pre-existing islet cells. Additionally, fenugreek increases the activity of glycogen synthase and encourages the synthesis of glycogen in the liver and muscles (19). In addition to promoting the regeneration of depleted glycogen, this also lowers levels of pancreatic enzymes and pro-inflammatory cytokines, modifies the activity of insulin-sensitive carbohydrate metabolic enzymes (19), and modifies the serum lipid profiles. By improving insulin action at the cellular level, lowering HbA1c levels by utilising glucose in peripheral tissues, and stabilising blood glucose levels, fenugreek may improve insulin sensitivity (17,18,19,20). Fenugreek is appropriate for treating metabolic diseases since it not only affects blood sugar but also appears to improve lipid profiles, according to numerous reviews (4,9,15,20,21). Fenugreek may have many, interconnected mechanisms of action. For example, its biochemical features may be connected to the metabolism of lipids, sugars, or both (20,21).

Fenugreek is used for a multitude of things and is inexpensively available in many nations. Fenugreek is also generally safe to use in people with diabetes or lipid disorders because it has no known negative effects. If more research helps to validate the effects and advance our knowledge of its biochemical mechanisms of action, there is a possibility that

fenugreek will be consumed and used more widely given the findings of this study and other findings about its impact on metabolism.

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