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**Original Research Article**

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**Study of Effects of Consumption of Powdered Fenugreek Seeds on Serum Lipid Profile in Patients with Type 2 Diabetes Mellitus**

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**Abstract**

**Objectives:** The aim of our study was to determine the role of fenugreek seed powder on serum lipid profile in patients of type 2 Diabetes Mellitus.

**Methods:** Of all the patients attending the medicine OPD of Muzaffarnagar Medical College & Hospital from June 2012 – August 2014, 100 patients of Type II Diabetes Mellitus were selected randomly, including both male and female of age group 40-75 years. They were then divided into 2 groups, study group and control group. One group consisting of fifty patients was given only Anti-Diabetic treatment (control group) and another group consisting of fifty patients was given 50gm of powdered fenugreek seeds in two divided doses in their diet along with their Anti-Diabetic treatment (study group). All the hundred patients included in the study were on lifestyle modification also. Their serum fasting lipid profile levels were repeated every two months for a study period of six months and then the data from study and control group was evaluated and compared.

**Results:** There was significant reduction in total cholesterol, low density lipoprotein, very low density lipoprotein, and triglyceride and significant rise in the high density lipoprotein levels.

**Conclusion:** The result support the hypothesis and the research question that fenugreek supplement with usual medical care for Type II Diabetes Mellitus is more effective than the usual medical care alone. Therefore, it is recommended that fenugreek supplementation is safe and may be considered in Diabetic patients as a potential means to lower the serum lipid profile level.

Keywords: Powdered Fenugreek Seeds, Type 2 Diabetes Mellitus

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**1.Introduction**

Type 2 Diabetes Mellitus is one of the most prevalent and fastest growing diseases in India. Diabetes not only affects prosperous nations, but often reaches its highest frequency in poor and disadvantaged communities that can least afford the heavy burden of treatment and long term complications[1]. Hyperlipidaemia is the current medical as well as social problem, specially associated with diabetes mellitus leading to increasing morbidity and mortality[2]. Though adequate therapeutic services and modalities are widely available complementary and alternative medicines

(CAM) therapies are used often with or without consulting their physicians. In spite of the presence of known antidiabetic medicine in the pharmaceutical market, remedies from medicinal plants are used with success to treat this disease[1]. It has been attributed that the antihyperglycemic effect of these plants is due to their ability to restore the function of pancreatic tissue by causing an increase in insulin output or inhibit the intestinal absorption of glucose or to the facilitation of metabolites in insulin dependent processes. Hence treatment with herbal drugs has an effect on protecting beta cells and

smoothing out fluctuation in glucose levels[3]. One such CAM therapies commonly used is Fenugreek seeds (*Trigonella foenum-graecum*). It is one of the oldest medicinal plants, dating back to Hippocrates and ancient Egyptian times[4] Fenugreek contains saponins, glycosides and other chemical constituents[5] which has beneficial effects in pancreatic and other tissues and improves glucose absorption, hyperlipidaemic state as well as decrease insulin resistance[6][7][8]. Insulin resistance is often associated with increased triglycerides (TG) and decreased High Density Lipoprotein (HDL-C) concentrations and increased small LDL particles.

## 2. Materials and methods

The study was conducted in the department of medicine of Muzaffarnagar Medical College and Hospital, Muzaffarnagar from 01/06/2012 to 01/06/2014. Institutional ethical clearance was taken and institutional ethical clearance number was MMC/IHEC/2013/MMC/1323. The study included

patients of Diabetes Mellitus Type 2 of age 40 years to 75 years attending the medicine outpatient department and Diabetic clinic of Muzaffarnagar Medical College & Hospital. The number of patients included in the study was hundred. Informed consent was obtained from all the participants recruited in the study. These patients were randomised into two groups of fifty each, study group (with Fenugreek supplementation) and control group (without fenugreek supplementation). The patients of study group were given powdered fenugreek seeds 50gm in two divided doses in addition to the recommended oral hypoglycaemic drugs for a period of 6 months. The patients of control group were on their usual oral hypoglycaemic drugs. Fasting lipid profile was repeated every two monthly for a study period of six months and then after the study was over all the data from study and control group was evaluated and compared. Statistical analysis was carried out using unpaired 't' test to determine the significance between the two groups.

## 3. Results

The results of the study are depicted in the tables.

**Table 1: Laboratory parametric values of Study group (Mean±2S.D.)**

Parameters	Day 1	2 months	4 months	6 months
<b>Total cholesterol</b>	196.92±26.50	186.28±24.36	176.82±23.42	166.00±23.36
<b>LDL</b>	101.80±16.58	94.64±14.22	87.22±13.08	79.26±12.26
<b>HDL</b>	49.12±4.74	51.38±4.42	53.38±4.38	56.04±5.18
<b>VLDL</b>	43.90±15.46	39.40±14.58	34.96±14.12	30.26±14.01
<b>TG</b>	164.00±39.98	156.40±37.98	149.50±37.56	141.58±36.06

The effects of fenugreek seeds and lifestyle modification on lipid profile in a type 2 Diabetes mellitus patient are depicted in table 1.

**Table 2: Laboratory parametric values of Control group (Mean±2S.D.)**

Parameters	Day 1	2 months	4 months	6 months
<b>Total cholesterol</b>	173.90±26.06	166.56±25.62	161.28±24.96	156.62±23.98
<b>LDL</b>	102±10.96	95.70±8.52	90.64±8.48	85.78±8.04
<b>HDL</b>	48.72±4.08	50.04±3.82	51.54±3.92	53.08±4.5
<b>VLDL</b>	40.58±6.26	38.18±14.58	35.60±14.12	33.30±6.30
<b>TG</b>	142.62±25.50	137.76±23.68	133.70±22.06	129.74±22.12

Table 2 presents the effect of lifestyle modification only (Control group) on lipid profile.

**Table 3: Comparison between the lab parametric values of subjects receiving fenugreek and control after 6 months (Mean±2S.D.)**

Parameters	Study group	Control group	P value
<b>Total cholesterol</b>	166.00±23.36	156.62±23.98	<0.001**
<b>LDL</b>	79.26±12.26	85.78±8.04	<0.001**
<b>HDL</b>	56.04±5.18	53.08±5.18	<0.001**
<b>VLDL</b>	30.26±14.01	33.30±6.30	<0.05*
<b>TG</b>	141.58±36.06	129.74±22.12	<0.001**

\*\* Highly Significant, \* Significant

Comparison value between the study group and control group after six months is presented in table 3, which shows significantly lower mean values in lipid profile.

#### 4. Discussion

Our study demonstrates that six months treatment with fenugreek seeds along with lifestyle modification has an influence on lipid metabolism and it showed a significant level of decrease in TG and increase in HDL which is supported by Abu saleh *et al*[2] and Lucy *et al*[9].

Our study further supported a progressive decline in total cholesterol level and a significant reduction in LDL and VLDL fraction which implies the action of saponins[10] suggesting that the gum fraction or dietary fibre fraction (galactomannans) present in it. It was hypothesized that micelles formed from bile acids and saponins are not available for absorption due to their large size. A further insight in the lowering effect of cholesterol was given by Evans *et al*[11].

The galactomannan isolated from fenugreek exhibited a prominent selective inhibitory effect against intestinal lipase activity. It was found to significantly delay the absorption of LDL-cholesterol and triglycerides and helps to increase HDL-cholesterol.

Therefore, these investigations about fenugreek seeds reveal it as a potent natural food source that has a capacity to prevent and improve the disease and also acts as therapeutic agent. Hence these data indicate that the management of type 2 diabetes would be easier with therapeutic approach of fenugreek seeds.

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