

## **Effect of *Trigonella foenum-graecum* (Fenugreek/ Methi) on Hemoglobin Levels in Females of Child Bearing Age**

**Megha Doshi\*, Anissa Mirza\*\*, Balkrishna Umarji\*, Rohini Karambelkar\***

\* Department of Anatomy, Krishna Institute of Medical Sciences University, Karad India

\*\*Department of Biochemistry, Krishna Institute of Medical Sciences University, Karad, India

### **Abstract**

**Spices in India have paramount importance which is widely used as medicines. In the present randomized clinical trial, the study group supplemented with an oral medicinal dosage of powdered fenugreek seeds daily, for three consecutive months showed a significant rise in the levels of blood hemoglobin, in comparison with the study group who were not supplemented with it. This clinical trial proved that, the fenugreek seeds rich in proteins with essential amino acids, Iron, Ascorbate and Folate content, have restorative and nutritive properties. The daily use of fenugreek seeds as dietary supplement is safe. It has good beneficial effects to raise blood hemoglobin by easy means. This might further help to prevent and cure anemia and maintain good healthy life for longer duration.**

**Key words:** Anemia; Fenugreek; Hemoglobin; *Trigonella foenum-graecum*

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### **Introduction**

From ancient periods spices are used to flavor and improve the taste of food recipes. Beside this they are used in cosmetics and medicinal preparations of Indian systems such as ayurveda and unani. *Trigonella foenum-graecum* (Fenugreek /Methi) have great medicinal value in Indian homes and proved to serve as good hypoglycemic, hypocholesterolemic, galactogogue, laxative, stimulant, carminative, stomachic, antiacidic, antilulcerative, antibacterial, antihypertensive, antithrombotic, anticarcinogenic, antioxidant and diuretic[1-6].

Fenugreek seeds are rich source of the polysaccharide Galactomannan. They are also a source of saponins such as gitogenin, tigogenin and neotigogens. Other bioactive constituents of fenugreek include mucilage, volatile oils and alkaloids such as choline and trigonelline, sotolone and pyrazines. Bitterness of fenugreek seeds is mainly due to the oil, steroidal saponins and alkaloids which are all non toxic on consumption [7].

Females from all over the world very commonly suffer from anemia due to undernourishment, monthly regular loss of blood during menstruation, injury and bleeding piles. Anemia could be diagnosed by measuring hemo-

globin levels which determine the oxygen carrying capacity to the body tissues.

Knowledge from our ancestors and few online cited references stated that fenugreek has role in rectifying anemia and certain hematological properties. Till date search could not evidence any such study carried out as clinical trial to prove this statement. Considering this fact, a phase-I randomized clinical trial was carried out, by giving a daily oral medicinal dosage of powdered fenugreek seeds for a defined duration to females of child bearing age, to observe its effect on the levels of hemoglobin.

### **Materials and Methods**

The present study was carried out in 2009 with the permission of a research ethical committee, of Krishna Institute of Medical Sciences University, Karad, India. The study design was randomized open label trial (Unblinded).

Thirty female students of 20-22 years of child bearing age, living in ladies hostel, exposed to common dietary and environmental conditions were selected as study subjects. The study subjects were grouped into two equal groups of fifteen students each.

**Table 1: Distribution of study subjects with dosage pattern**

Groups	Number	Trial
Group A	15	Control subjects- no dosage of fenugreek seeds given during study period.
Group B	15	Study subjects- daily medicinal oral dosage of 5 gm powdered fenugreek seeds given during study period.

A written consent was taken from the study subjects before initiating the clinical trial, on explaining the purpose of study and clarifying their queries about consumption of fenugreek seed powder. Details regarding age, height, weight, body mass index, waist hip ratio, and general health conditions were recorded in all the selected subjects. The study subjects of both groups were on normal diet with no hematinics or any other medication given during an entire study period.

The fenugreek seeds were cleaned, roasted, dried and grinded to a fine powder. One teaspoon full of fenugreek seed powder (measured to 5 gm) was packed in a sachet as a medicinal dosage pack.

On the first day of August 2009 intravenous blood samples were withdrawn from the subjects of both groups and analyzed for hemoglobin levels. There onwards subjects of group B, ingested orally, a medicinal dosage of powdered fenugreek seeds followed by drinking water, every day after their breakfast, consecutively for three months. After every month on 1st day the I.V bloods of study subjects from both the groups were withdrawn to measure hemoglobin percentage using Automated Hematology Analyzer.

Subjects who had an abnormal increase or decrease in hemoglobin levels were to be interrogated for any injury, leading to blood loss or blood transfusion for any other reasons; such subjects who may give false report were planned to exclude out from the study.

### Statistical Analysis

The blood reports were tabulated and statistically analyzed using S.P.S.S software of windows version 16. ANOVA was applied to assess the significance of monthly rising trend in hemoglobin levels and unpaired student "t" test was applied to assess significance of difference in both trial groups for every month.

### Results

The present clinical trial reported, at the end of third month there was a significant rise of 2.24 gm % hemoglobin, in group B subjects, supplemented with the medicinal dosage of powdered fenugreek seeds, while that in group A subjects there was an insignificant rise of 0.40 gm % hemoglobin, who were not supplemented with this dosage (Table I).

Comparison of hemoglobin levels between group A and group B subjects of present clinical trial showed that, after one month onwards there was a gradual significant rise in hemoglobin levels in group B subjects supplemented with medicinal dosage of fenugreek seeds ( $F=8.68$ ;  $P < 0.001$ ). However, there was no month wise improvement noted in hemoglobin levels of group A control subjects who were not supplemented with medicinal dosage of fenugreek seeds ( $F=1.432$ ;  $P = 0.243$ ). (Table II).

**Table 2 .Hemoglobin levels in study groups**

Groups	Hb in gm% Mean $\pm$ S.D 1 <sup>st</sup> August 2009	Hb in gm % Mean $\pm$ S.D 1 <sup>st</sup> September 2009	Hb in gm% Mean $\pm$ S.D 1 <sup>st</sup> October 2009	Hb in gm % Mean $\pm$ S.D 1 <sup>st</sup> November 2009	Mean Difference Hb in gm %
Group A	11.35 $\pm$ 0.94	11.46 $\pm$ 0.39	11.72 $\pm$ 0.5	11.75 $\pm$ 0.51	0.40
Group B	11.21 $\pm$ 0.87	12.34 $\pm$ 1.06	12.69 $\pm$ 1.04	13.45 $\pm$ 1.02	2.24

\* : In Group B the Hemoglobin Values of 1<sup>st</sup> August are before giving the medicinal dose of powdered fenugreek seeds.  
\*: Mean difference of Hemoglobin Values is, difference between the Hemoglobin Values of before dosage (August) and after dosage (November).

**Table 3. Statistical Comparison of Hemoglobin Values between group A and group B study subjects.**

	Hb levels 1 <sup>st</sup> August 2009	Hb levels 1 <sup>st</sup> September 2009	Hb levels 1 <sup>st</sup> October 2009	Hb levels 1 <sup>st</sup> November 2009
Unpaired t test F 4.70	0.443	1.806	2.001	2.905
P value	0.777	0.099	0.057	0.008

**Table 4. Chemical Composition of Fenugreek seed powder**

Sr.No	Chemical Constituents of Fenugreek Seed powder	Quantity per 100 gram
1	Carbohydrates	58 gm
2	Proteins	23 gm
3	Fat	5.4 gm
4	Iron	33.5 mg
5	Calcium	175.6 mg
6	Phosphorous	296 mg
7	Vitamin C	43 mg
8	Vitamin B12	0
9	Folate	84 µg
10	Dietary fiber	40 gm
11	Calories	323 Cal

## Discussion

Spices and herbs have great medicinal value in Indian homes and proved to arrest, reduce, and terminate most of the diseases by the use of medicines prepared out of them. Various ethnobotanical surveys observed fenugreek seeds can be used in simple remedies for treating a variety of ailments [8, 9]. A reference cited wrote, one teaspoon of fenugreek seeds or leaves cooked with rice and eaten regularly for 10 to 15 days shows remarkable rise in hemoglobin [10].

Several human intervention trials and animal experiments demonstrated that the antidiabetic effect of fenugreek seeds ameliorate most metabolic symptoms associated with type I and type II diabetes. [11,12,13].Xue W L et al in their study concluded that Trigonella foenum graecum extract can lower kidney or body weight ratio, blood glucose, blood lipids and improve hematological properties in experimental diabetes rats [14]. Supplements of fenugreek seeds were shown to lower serum cholesterol, triacylglycerol, and low density lipoprotein in human patients and experimental models of hypercholesterolemia and hypertriglyceridemia. [15]

In recent research fenugreek seeds were shown to protect against experimental cancers of breast [16] and colon [17].The hepatoprotective properties of fenugreek seeds have also been reported in experimental models. [18]. Fenugreek seeds used as medicine in the present clinical trial are rich sources of Proteins, containing essential amino acids-Lysine and Threonine, Minerals- Iron and

Copper, Vitamins- Folate and Ascorbate [19, 20, 21] (table III), which are essential constituents of hemoglobin, these may be an important factor to increase the biosynthesis of hemoglobin and raise their blood levels in the study subjects supplemented with it.

The fenugreek seeds are helpful in maintaining a healthy digestive system, thus the continuous and daily use of this spice may improve the digestibility of eaten food, which may further promote good absorbing capacity of food constituents in blood for best metabolic use in the body cells. No side effects were noted in subjects given with medicinal dosage of powdered fenugreek seeds during entire study period.

Thus the present study concludes that, the fenugreek seeds have restorative and nutritive properties. The daily use of fenugreek seeds as dietary supplement is safe. It has good beneficial effects to raise blood hemoglobin by easy means. This might further help to prevent and cure anemia and maintain good healthy life for longer duration in females of child bearing age.

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## Correspondence to:

Megha Doshi  
 Department of Anatomy  
 Krishna Institute of Medical Sciences University  
 Karad, India



