

# INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES

[ISSN: 0975-4725; CODEN(USA):IJPS00] Journal Homepage: https://www.ijpsjournal.com



**Review Article** 

# A Review Article On Extraction Of Fenugreek Seed

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#### ARTICLE INFO

Received: 28 May 2024 Accepted: 01 June 2024 Published: 07 June 2024 Keywords: Trigonella foenum graecum L., Fenugreek extraction, Soxhlet, Maceration, Yield of Fenugreek extract DOI: 10.5281/zenodo.11521023

### **INTRODUCTION**

#### ABSTRACT

This review article is about the Extraction of Trigonella foenum graecum L. seeds which is also called as Fenugreek, Its seed is the most common part of plant to treat Hyperglycemia. The specific phytoconstituent 'Trigonelline' present in the fenugreek seeds possess Hypoglycemic properties which acts to optimize the blood glucose level. The chemical extraction of the seeds of herbal plant using different extraction methods of Maceration and Soxhlet apparatus with solvents like PET ether and Ethanol results in varying % yield of extract. The percentage yield of extracts by different solvents are compared , thus higher % yield is observed.

One of the first known therapeutic plants is fenugreek (Trigonella foenum -graecum L.), an aromatic annual leguminous crop of the Fabaceae family that exhibits diploid state without any aneuploidy.[1] Long pods and delicate leaves of fenugreek are used as a spice in Indian cuisine and in a variety of medical treatments.[2] The petioles of fenugreek leaves are cartilaginous and thicker at the top, with a dark green hue.[3] Fenugreek pods are bent, measuring 10–18 cm in length and 3.5–5 mm in width, and have short hair. When they ripen, the greenish-red pods turn brown[4] In fenugreek seeds, a broad, corneous covering of white, semi-transparent endosperm surrounds a vellow embryo.[5] Due to its nutritional advantages, fenugreek can be used as a food supplement for humans. It has several therapeutic properties and is a good source of proteins, carbs, lipids, and amino acids. The bioactive chemicals found in fenugreek seeds are responsible for its pharmacological activity. These compounds are used as raw materials to make several hormonal and therapeutic medications.[6] Fenugreek seeds are utilised in Chinese, Arabic, and Indian medicine as treatments for hypercholesterolemia and diabetes. One of the oldest forms of medicine currently in use in Iran and other western and central Asian nations is traditional Persian medicine (TPM), which offers prescriptions for

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**Relevant conflicts of interest/financial disclosures**: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



treating a variety of illnesses, including asthma.[7] It have long been utilised for their many health advantages, including better digestion, lowering blood sugar levels in diabetics, and preserving plasma cholesterol levels. These health advantages were linked to the fenugreek's abundant supply of bioactive chemicals[8]

## MATERIALS AND METHODS¬

#### Sample collection:

Seeds of Trigonella foenum graecum L. used for this study which were available locally and purchased from the market in Coiimbatore, Tamilnadu. The purchased samples were properly identified and got authenticated from the The Tamilnadu Agricultural University, Coimbatore by Dr. S. S. Hameed, Scientist 'F' & Officer-in-Charge, Botanical Survey of India, Tamilnadu Agricultural University (TNAU), Coimbatore, Tamilnadu. After the procurement, Dried Fenugreek seeds are ground into coarse powder using lab-scale grinder and stored in the air tight container before extraction.

## **EXTRACTION OF FENUGREEK SEEDS Extraction by soxhlet apparatus method:**

Approximately 500g of fenugreek seed powder was used in this method of extraction for defatting and oil extraction. PET ether (bp 30- 60 o C) of 800ml was used as solvent in the soxhlet extractor in which solvent flows back and forth into the extraction thimble for 14hrs at 30o C. After that, the mixture of solvent-oil was filtered via NO.1 Whatman filter paper. (Fig 1) Furtherly, The extract was transferred into the rotary evaporator and the solvent in the round flask was evaporated at 30oC. Atlast the extract was stored in the refrigerator at 5oC for further studies.



Fig 1: Extraction using Soxhlet apparatus Extraction by maceration method:

# Fenugreek seeds extraction using Chloroform water:

A 100g of coarsely ground dried fenugreek seeds were weighed using digital weighing balance. Then powdered seeds were transferred into transparent container and completely soaked into chloroform water of 1000ml i.e., water to seed ratio (10:1) and left for 3 days with stirring at regular interval. The soaked contents were transformed into mucilage was filtered using muslin cloth. After releasing mucilage in water and the filtrate was precipitated.

Fenugreek seeds extraction using Ethanol: Stored seeds of Fenugreek (150g) weighed approximately and ground into coarse powder was transferred into Transparent Container. Then it was filled with PET ether (bp 30- 60 o C) until the content in the container soaked completely and is left for 3 days with occasional stirring at regular interval. After the time period the solvent is removed by filtering with muslin cloth and slurry was dissolve into water and washed until clear upper layer was obtained. Further transferred into the container and soaked with ethanol (750ml) in the sample to solvent ratio of (1:5) for 5days with occasional stirring. After that, Marc was filtered using Muslin cloth and the filtrate was evaporated by

temperature controlled water bath at 300 C. Finally extract of fenugreek seed is obtained. (Fig 2)



Fig 2: Extraction using Maceration method RESULTS AND DISCUSSIONS

Due to their physiologically active components antibacterial, anti-inflammatory, antihypertensive, and antioxidant qualities, drugs, flavors, and insecticides are all manufactured using these compounds for commercial purposes.[9] However, these bioactive substances are rare to find in plants [13-18]. Consequently, in order to maximize the extraction efficiency of a given molecule, it is essential to choose the suitable extraction solvent and extraction technique. The chemical constituents of the compound, the extraction process, and the solvents employed all have an impact on the amount of bioactive chemicals extract.[10] In addition, temperature, pH, Solvent polarity, and extraction time all affect the extract yield.[11] The present study was carried out to the effect of solvents and extraction methods on Fenugreek seeds results in varying percentage yield of extract.

# Percentage yield % Yield = Practical Yield \* 100 / Theoretical Yield

It is concluded that, Extracts derived from the herbal plant Trigonella foenum graecum L. using Soxhlet apparatus and Maceration method using solvents like PET ether and ethanol. Among these methods, Ethanolic extract of Fenugreek seeds by defatting using solvent PET ether by Maceration method was studied on their fatty acid profile [12] and which results in higher % yield when compared with other methods.

METHODS / SOLVENTS	% EXTRACTION YIELD		
Soxhlet extraction method			
PET ether	6.42		
Maceration method			
Chloroform water	5.32		
Ethanol	9.71		

Table 1: Extraction yield of Fenugreek seeds





Fig 3: Comparision of fatty acid profile of Ethanol and PET ether Table 2 : Some chemical components of fenugreek [13-18]

Main group	Sub-group	Main group	Sub-group
Pyridine alkaloid	Trimethylamine	Minerals	Iron
	Neurin		Zinc
	Choline		Phosphorus
	Gentianine		Magnesium
	Capaine		Manganese
	Betaine		Selenium
	Trigonelline		Calcium
Flavonoids	Vitexin	Vitamins	Vitamin A
	Tricin		Vitamin C
	Naringenin		Niacin
	Quercetin		Pyridoxine
	Luteolin		Thiamine
Saponins	Graecunins		Riboflavin
	Fenugrin B		Nicotinic acid
	Fenugreekine		Folate
	Trigofoenosides A-G	Protein and amino acids	Globulin
Steroidal sapogenins	Diosgenin		Albumin
	Yamogenin		Lecithin
	Sarsasapogenin		Histidine
	Smilagenin		lysine
	Gitogenin		4-hydroxyisoleucine
	Yaccagenin	Volatile oils	n-hexanol
	Saponaretin		Heptanoic acid
	Tigogenin		Dihydroactiniolide
	Neotigogenin		Dihydrobenzofuran

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HOW TO CITE: S. Divakar, K. Shanthin, P. Kanaga, A Review Article On Extraction Of Fenugreek Seed, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 6, 461-466. https://doi.org/10.5281/zenodo.11521023

