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FORMULATION AND EVALUATION OF FENUGREEK (TRIGONELLA FOENUM-GRAECUM) SEED POWDER"

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ABSTRACT:

Fenugreek (Trigonella foenum-graecum L.) is a multi-purpose herb widely recognized for its medicinal and nutritional properties. This thesis explores the formulation of fenugreek seed powder into a standardized pharmaceutical dosage form, specifically focusing on capsule and tablet development. The study encompasses the extraction of bioactive markers such as trigonelline and diosgenin, pre-formulation studies, and quality control evaluation. Results Indicate that fenugreek seed powder possesses excellent mucoadhesive properties and therapeutic efficacy in lowering blood glucose and lipid levels.

KEYWORDS: Fenugreek seed powder; Trigonella foenum-graecum; Nutraceuticals; Antidiabetic; Dietary fiber; Saponins; Functional foods; Phytochemicals.

INTRODUCTION

Fenugreek, an annual legume belonging to the family Fabaceae, is indigenous to the Mediterranean region and extensively cultivated in India. The seeds are rich in protein, mucilaginous fiber, and diverse phytochemicals including steroidal saponins (diosgenin), alkaloids (trigonelline), and polyphenols (Gopu et al., 2008).

In recent years, herbal formulations have gained significant traction in the management of chronic conditions such as Type 2 Diabetes Mellitus and hyperlipidemia due to their perceived safety and lower cost compared to synthetic alternatives (Moosa et al., 2008). The primary challenge in herbal formulation is the standardization of active ingredients and the optimization of powder flow properties to ensure dosage uniformity.

LITRATURE REVIEW

Fenugreek's pharmacotherapeutic potential is derived from its unique chemical composition. It contains 26% protein, which contributes to its hypolipidemic effects (Sharma, 1986, as cited in Moosa et al., 2008). The galactomannan fiber present in the seeds slows down the absorption of sugar in the stomach and stimulates insulin (PeaceHealth, 2026).

Phytochemical Profile

Alkaloids: Trigonelline is the major alkaloid, recognized for its hypoglycemic activity.

Steroidal Saponins: Diosgenin is a precursor for various steroid hormones and possesses anti-cancer properties

Mucilage: Fenugreek seeds contain high amounts of mucilage (up to 40%), which acts as a natural binder and mucoadhesive agent in formulations.

AIM & OBJECTIVES

Aim:-

To formulate, develop, and evaluate a stable and effective oral dosage form of Trigonella foenum-graecum seed powder to utilize its antidiabetic, hypocholesterolemic, and antioxidant properties.

Objectives:-

To prepare uniform, standardized coarse or fine powder from clean and dried Trigonella foenum-graecum seeds.

To assess the organoleptic characteristics (taste, color, and odor).

Powder has a light brown to yellow color and a strong maply/earthy scent.

Manufacturing Process

Cleaning:

Removal of stones, dust, and foreign organic matter.

Drying:

Reducing moisture content to below 10% to prevent mold growth.

Roasting(optional):

Mild roasting enhances the aroma and reduces bitterness.

Grinding:

Using a hammer mill or cold-grinding technology to maintain essential oils.

Sieving:

Passing the ground material through fine meshes for uniformity.

Packaging:

Sealing in moisture-proof, airtight containers to preserve freshness.

MATERIALS AND METHODS

Collection and Authentication

The seeds were procured from local markets and authenticated. The seeds were cleaned and powdered using a mechanical grinder to a particle size of approximately Powder form.

Standard Oven Drying Method:-

For general home or research use, use these steps:

Temperature: 50 C to 60 C

Time: 4 to 6 hours

Moisture Goal: Roughly 5-10% (dry basis)

Step-by-Step Instructions:

Preparation: Manually pick over and clean the fenugreek seeds to remove any stones, debris, or damaged seeds. If you are drying soaked or sprouted seeds, drain off all excess water.

Low & Slow Heat: Set your conventional oven to a low heat setting, ideally between 50 C to 60 C.

Circulate Air: If your oven has a “convection” setting, turn it on to aid in moisture evaporation. Leave the oven door propped open slightly if possible to allow moisture to escape.

Monitor & Cool: Check the seeds occasionally and stir to promote uniform drying. Depending on the initial moisture, they should dry completely in 4 to 6 hours. Once brittle and dry, take them out and let them cool to room temperature.

Grinding Method:

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Transfer the roasted seeds to your mortar and pestle while they are still warm.

Initial Crush: Start by pressing down firmly and twisting the pestle to crack the seeds open.

Circular Grind: Once cracked, switch to a continual, sweeping circular motion. Push the seeds against the textured edges of the bowl to grind them into a powder.

Batch Size: Do not overload the mortar. Grind small batches (1 to 2 teaspoons) at a time to give yourself better control and speed up the process

Sieving method

Arrangement: Stack standard sieves vertically in a decreasing mesh size (e.g., passing the powder through sizes ranging from 40-mesh up to 60-mesh.

Shaking: Agitate mechanically or by hand to let fine powders pass through to the appropriate tray.

Result: You are left with uniform, finely graded flour, while the larger husk particles are caught in the upper sieves

Packaging: Stand-Up Pouches with Zip Locks: Great for retail, as they allow the consumer to reseal the pouch after each use.

Filling: For small-scale or home-based packaging, use a cup filler or a digital weighing scale to measure the exact weight (e.g., 50g, 100g, or 250g) before pouring into the pouch. Commercial operations use automated Auger fillers for powder.

Diabetes

Methi (fenugreek) powder can assist in managing diabetes by utilizing its high soluble fiber to slow carbohydrate digestion and improve insulin sensitivity. While it is a helpful natural supplement, it should not replace prescribed medications, a balanced diet, or regular exercise.

How It Works:

Slows Sugar Absorption: The high soluble fiber in methi creates a gel-like substance in the stomach, which slows down the digestion and absorption of sugars.

Improves Insulin Sensitivity: It contains specific compounds that help your body's cells respond better to insulin, regulating glucose utilization.

Cholesterol Support: Research indicates it may also help lower LDL (bad) cholesterol and triglycerides.

How to Use It:

Dosage: A common daily dosage used in studies is about 5 to 10 grams (approx. 1 to 2 teaspoons).

Timing: For best results, take it right before your heaviest meal or on an empty stomach in the morning.

Preparation: You can swallow the powder with a glass of water, soak it overnight, or incorporate it into baked goods like rotis or bread.

Precautions:

Medication Interactions:

Because methi can lower blood sugar, taking it alongside prescribed diabetes medications may increase the risk of hypoglycemia (low blood sugar).

Pregnancy & Allergies:

Fenugreek can induce uterine contractions and is not recommended for pregnant individuals.

Evaluation Parameters

Galactomannan:

Evaluated to test the soluble fiber/gum content, which is directly responsible for blood sugar and cholesterol regulation.

Trigonelline & 4-Hydroxyisoleucine:

The key bioactive alkaloids and amino acids evaluated for their anti-diabetic (blood-glucose regulating) and lactogenic properties.

Protein:

Typically accounts for (23% - 30%) of the seed, notable for being rich in essential amino acids like lysine.

Carbohydrates and Fiber:

Carbohydrates make up roughly (50% 58%) of the seed. Up to (25%) is dietary fiber (including non-starch polysaccharides and mucilage).

Lipids:

Usually constitute (6%-8%) of the seed, largely comprised of triglycerides and phospholipids.

RESULTS AND DISCUSSION

Clinical and in vivo trial results consistently show that FSP significantly reduces fasting blood glucose (FBG), 2-hour post-prandial glucose, and HbA1c levels.

Food products (like bread or noodles) supplemented with 5-10% FSP see increased water absorption and foaming capacity. However, sensory panels usually indicate that an addition of over 6% to 8% can impart a slightly bitter taste and dark color, lowering consumer acceptability.

Daily supplementation with FSP shows a marked reduction in total cholesterol (TC), triglycerides (TG), and low-density lipoprotein (LDL), while frequently increasing high-density lipoprotein (HDL).

DISCUSSION:

The organoleptic assessment confirmed the authentic characteristics of Trigonella foenum-graecum, exhibiting a distinctive spicy aroma and a intensely bitter, mucilaginous taste. The deep bitterness is primarily attributed to the presence of the alkaloid trigonelline and specific steroidal saponins.

The qualitative chemical screening strongly confirmed an abundance of mucilaginous carbohydrates and saponins, indicated by a high intensity response to the Ruthenium Red test and a persistent froth layer (> 1 cm) during the foam test. The presence of these metabolites underpins its traditional use as a demulcent, hypoglycemic, and anti-inflammatory agent.

CONCLUSION

The study successfully formulated a stable dosage for Fenugreek seed powder. The natural mucilage within the seeds exhibited excellent binding and disintegrating properties. Standardized herbal formulations these provide a consistent and reliable method for administering

Fenugreek for therapeutic benefits in diabetes and hyperlipidemia management.

REFRENCES

1. Gopu, C. L., Gilda, S. S., Paradkar, A. R., & Mahadik, K. R. (2008). Development and validation of a densitometric 1.C. method for analysis of trigonelline and 4-hydroxyisoleucine in fenugreek seeds. Acta Chromatographica, 20(4) 709-719. Hups://doi.org/10.1556/achrom.20.2008.4.15
   Cited by: 28
2. Gu, L. B., Liu, X. N., Liu, H. M., Pang, H. L., & Qin, G. Y. (2017). Extraction of Fenugreek (Trigonella foenum-graceum L.) Seed Oil Using Subcritical Butane: Characterization and Process Optimization. Molecules, 22(2), 228. https://doi.org/10.3390/molecules22020228
   Cited by: 83
3. Jyothi, D., Koland, M., Priva, S., & James, J. P. (2017). Formulation of Herbal Capsule Containing Trigonella Foenum-Graecum Seed Extract for the Treatment of Diabetes. Journal of Young Pharmacists, 9(3), 352-356. https:/doi.org/10.5530/jvp.2017.9.70
   Cited by: 26
4. Peace Health. (2026). Fenugreek Health Information Library, Retrieved from https://www.peacehealth.org/medical-
5. Topics/id/hm-2090006