iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** VI **Month of publication:** June 2022

DOI: https://doi.org/10.22214/ijraset.2022.44934

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue VI June 2022- Available at www.ijraset.com

Characterization of Fenugreek Seeds Mucilage and its Evaluation as SuspendingAgent

Mr. Ghodke Shubham Gorakhnath[1], Dr. Hingane L. D.[2]
Dr Babasaheb Ambedkar Marathwada University,Aurangabad
Aditya Pharmacy College Beed, 431122

Abstract: ***The present study was undertaken to extract mucilage from fenugreek seeds and evaluate it as suspending agent for pharmaceutical dosage forms. ThePercentage yield of Fenugreek seed mucilage was foundto be 18-20 %. Zinc oxide suspension (20% w/v) was prepared using the mucilage of fenugreek seed as a suspending agent, and it was evaluated for its stability parameters like, sedimentation volume, degree of flocculation, and redispersibility. The effect of the mucilage as the suspending agent was compared with commonly used suspending agents such as, tragacanth and acacia at the concentration of 0.5, 1.0 and 2.0% w/vrespectively. The results of the study indicated that, themucilage of fenugreek seed showed good stability parameters comparable to gum acacia and it did not show comparable stability parameters to that of tragacanth as suspending agent. Thus, Fenugreek seed mucilage (2%) has the potential for being used as a suspending agent.***

I. INTRODUCTION

A. *Suspension*

Suspension is a heterogeneous system in which solute particles do not dissolve but remain suspended throughout the bulk of solvent, left floating around freelyin the medium.

B. *Suspending Agent*

Suspending agents are also known as thickening agentsare used to stabilize suspensions are hydrophilic colloid i.e. substances that spontaneously form colloidal dispersions with water because of an affinity between the dispersed particles and the dispersion medium.

C. *Mucilage*

A polysaccharide substance extracted as a viscous or gelatinous solution from plant seeds, roots etc. and used in medicines and adhesives.

Nowadays, the whole world is turning towards natural drugs and excipients "". Natural materials have advantages over synthetic material as they are nontoxic, less expensive and freely available. The natural material can be modified to obtain tailor-made material for drug delivery system and they are able to compete with synthetic agents present in the market. Among them plant mucilage is used since ancient time for medicinal use such as burn wound healing properties of Cucurbita moschata Duchesne (pumpkin). Plant mucilage have diverse application in pharmacy for both solid and liquid dosage forms such as Hibiscus leaves mucilage as a suspending agent!". Plant mucilages have diverse applications such a binding agents, thickeners, water retention agents, emulsion stabilizers, suspending agents, disintegrants, gelling agents and film formers Pharmaceutical suspension thermodynamically unstable,use of suspending agent reduce the rate of settling and allow easy redispersion of any settled particulate matter.Suspending agent act by increasing consistency of the suspending medium and by protective colloidal action. The purpose of study is to search for expensive and effective natural excipients that can be used as new alternative suspending agents for formulation of suspension It is necessary to explore new resources to meet increasing demand 12. India, due to its geographical and environmental positioning has traditionally been a good source of such plant products2!

D. *Biological Source*

It consist of dried seeds of Trigonella foenum-graecum belonging to family Fabaceae. In fenugreek seeds high proportion of mucilage is present. The majority of the uses can beattributed to the mucilage content only. The fenugreek mucilage contain is polysaccharide galactomannan.

©IJRASET: All Rights are Reserved

The galactomannan is a gelatinous type of fiber, it remains unabsorbed in gastrointestinal tract, when it is consumed and passes through the system undigested. The fenugreek seeds can be used topically as an emollient or demulcent. The seeds are reported to be nonirritating, non-sensitizing and nontoxic to human skin. In the present study, it was planned to formulate zinc oxide suspension using fenugreekseed mucilage as a suspending agent.



II. LITERATURE REVIEW

1) *Hamman H et al 2015* reviewed on "Use of Natural Gums and Mucilages as Pharmaceutical Excipients." They studied the polysaccharide rich gums and mucilages produced by different sources and due to their diverse composition have wide applications in pharmacy. The aim of the study was to search for natural excipients and the use of gums and mucilages in novel drug delivery system.
2) *Prajapati VD et al 2014* reviewed on "Pharmaceutical applications of various natural gums, mucilages and their modified forms." Authorsstudied that large number of plant based pharmaceutical excipients are available today. Natural materials have advantage over synthetic ones that they are chemically inert, nontoxic, less expensive, biodegradable and widely available. In this review pharmaceutical applications of various gums, mucilages and their modified forms arementioned.
3) *Choudhary PD et al 2014* reviewed on "RecentlyInvestigated Natural Gums and Mucilages as Pharmaceutical Excipients: An Overview." And studied that the excipients used in novel drug delivery system can be of natural origin. The natural materials have advantage over synthetic material that they are nontoxic, chemically inert, less expensive, biodegradable and widely available. The review includes plant derived polymeric compounds and some recent investigations as excipients in noveldrug delivery systems.
4) *Deshmukh SS et al 2013* worked on "Isolation and Evaluation of Adansonia digitata Linn as a Suspending Agent" and studied natural excipient over synthetic products. The mucilage of leaves of Adansonia digitata plant is nontoxic, edible. Various physicochemical as well as suspending agent properties were studied. Mucilage obtained from leaves has shown comparable results with sodiumcarboxy methyl cellulose.
5) *ROFEL et al 2011* worked on "Evaluation of Hibiscus sabdariffa leaf mucilage as a suspending agent". They also worked on isolation of leaves mucilage and evaluation as suspending agent at different concentrations. The mucilage shown good suspending action at 2% concentration.

6) *Amit Kumar Nayak et al 2010* worked on "Evaluation of Spinacia oleracea L. leaves mucilage as innovative suspending agent" and the authors isolated mucilage and evaluated it for parameters such as sedimentation Volume, degree of flocculation and redispersalibity with respect to other binding agents such as acacia and tragacanth,bentonite, sodium carboxy methyl cellulose. The performance was found to be superior to both tragacanth and bentonite.
7) *Vidya Sable et al 2009* worked on the isolation and evaluation of fenugreek seed mucilage. Mucilage was evaluated for its granulating and binding properties in tablets. The tablets were prepared and evaluated. The tablets had good physicochemical and drug release properties. The tablets prepared using 8%, 9% mucilage as binder could be consideredas ideal tablet.
8) *Gowthamarajan K et al 2002* worked on the isolation, physicochemical and microbiological evaluation of mucilage, preparation of gel and evaluation of prepared gel. The gel prepared with3.25% mucilage and 10% glycerin as plasticizer showed better drug release when compared withmarketed formulations.

III. NEED OF RESEARCH

To search for an inexpensive and effective naturalexcipient that can be used as a alternative in pharmaceutical suspensions. To meet increasing demands it is necessary to explore new sources.
There are reports about the successful use of variousplant mucilage, as a innovative suspending agents, like mucilage isolated from Hibiscus rosasinensis L. leaves Ocimum gratissimum seeds, Cassia tora Seeds, Cassia roxburghii Seeds, Hibiscus cannabinus seeds, Chlorophytum borivilianum tuber, Ablemoschus esculentus fruits, Malava sylvestris, Pedalium murex fruits, and so on. No significant work has been reported on fenugreek seed mucilageas a suspending agent hence in the present study attempt was made to probe the potential utility of fenugreek seed mucilage as a suspending agent.

IV. AIM AND OBJECTIVES

A. *Aim*

Present study aimed at characterization of fenugreekseed mucilage and its Evaluation as suspending agent.

B. *Objectives*

The study was undertaken with following objectives To isolate and characterize fenugreek seed mucilage.To formulate and evaluate suspension using fenugreek seed mucilage probing Its potential utility as a suspending agent.

V. EXPERIMENTAL WORK

1) Procurement of Mucilage from fenugreek seeds
2) Characterization of mucilage for itsphysicochemical properties.
3) Preparation of suspension (mucilage) andstandard suspension (gum tragacanth and gum acacia)
4) Comparative evaluation of suspensions.

VI. MATERIALS AND METHODS

The materials used include zinc oxide; tragacanth and acacia; potassium dihydrogen phosphate, benzoic acid, glycerin and acetone. All the solventsand chemicals used were of analytical grade.

A. *Isolation of Mucilage*

Fenugreek seeds (100g) were soaked for 12 h in distilled water (1500 ml), crushed in a blender, warmed for 30 min with stirring and passed through several folds of muslin cloth. To the filtrate, acetonewas added in 1:1 proportion to precipitate the mucilage. The precipitated mucilage was then filtered and washed several times with acetone anddried at 45-50 C, passed through sieve no.80 and stored in desiccator until used for further studies (yield 18%).

B. *Preparation of zinc oxide suspension*

Zinc oxide, which was sieved through sieve number 100 and retained on sieve number 200 was used to yield a 20% w/v suspension in water using fenugreekseed mucilage and various conventional suspending agents at concentration of 0.5, 1.0 and 2.0% w/v.
Zinc oxide was first levigated with glycerin (1:1) and the weighed amount of these suspending agents were added and triturated. The volume was made up with distilled water. The suspension contained 0.1% benzoic acid as a preservative. All the suspensions were deflocculated. To determine the degree of flocculation, flocculated suspensions weremade, using potassium dihydrogen phosphate

(0.004M) as the flocculating agent.

Preparation of Zinc Oxide suspension using differentconcentrations of suspending agents such as Acacia,Tragacanth, Fenugreek seed mucilage as suspendingagent.

	A 0.5%	A1%	A2%	T 0.5%	T1%	T2%	F 0.5%	F1%	F2%
ZINCOXIDE	16 g	16 g	16 g	16 g	16 g	16 g	16 g	16 g	16 g
SUSPENDING AGENT	0.5g	1g	2g	0.5g	1g	2g	0.5g	1 g	2g
POT. DIHYDROGEN PHOSPHATE	2ml	2ml	2ml	2ml	2ml	2ml	2ml	2ml	2ml
GLYCERIN	16ml	16ml	16ml	16ml	16ml	16ml	16ml	16ml	16ml
BENZOICACID	2ml	2ml	2ml	2ml	2ml	2ml	2ml	2ml	2ml
WATER	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

C. Evaluation Of Zinc Oxide Suspension

1) *Sedimentation volume*: Sedimentation volume (F) was determined by keeping a measured volume of the suspension in a graduated cylinder at an undisturbed position for a definiteperiod of time and nothing the value of the ultimate height (Hu) of the sediment as the suspension settled and the initial height (Ho) of the total suspension (F= Hu/Ho).
2) *Degree of flocculation*: The degree of flocculation was determined from the followingequation: B = (Vu) floc / (VU) defloc, where (Vu)floc is the ultimate sedimentation volume in theflocculated suspension and (Vu) defloc is the ultimate sedimentation volume in the deflocculated suspension.
3) *Redispersibility*: Fifty milliliters of various suspensions were kept in calibrated measuring cylinders, which were then stored at room temperature at various time intervals (1, 5, 10, 15, 20, 30 and 45 days). At regular intervals, one measuring cylinder was removed and shaken vigorously to redistribute the sedimentation andthe presence of deposit was recorded, if any.
4) *Viscosity*: The viscosity of suspension was testedusing Brookfield viscometer.

VII. RESULTS AND DISCUSSION

The yield ofmucilage from Fenugreek seeds was obtained18-20% by using acetone as a mucilage precipitating solvent. The physicochemical characteristic of fenugreek seed mucilage aregiven in Table 1.

Table1: Physiochemical Characteristics ofFenugreek Seed Mucilage

Solubility	Swellsin cold water but quickly dissolvesin warm water Formingviscoussolution. Insoluble in methanol, ethanolandchloroform.
Swellingindex*(ml)	5.2
Lossondrying*(%)	7.8
pH	7.2
Total Ash	7.825

Mean of three determinations.

Viscosity of suspension is given in table2.

Table2 : Viscosity of suspension.

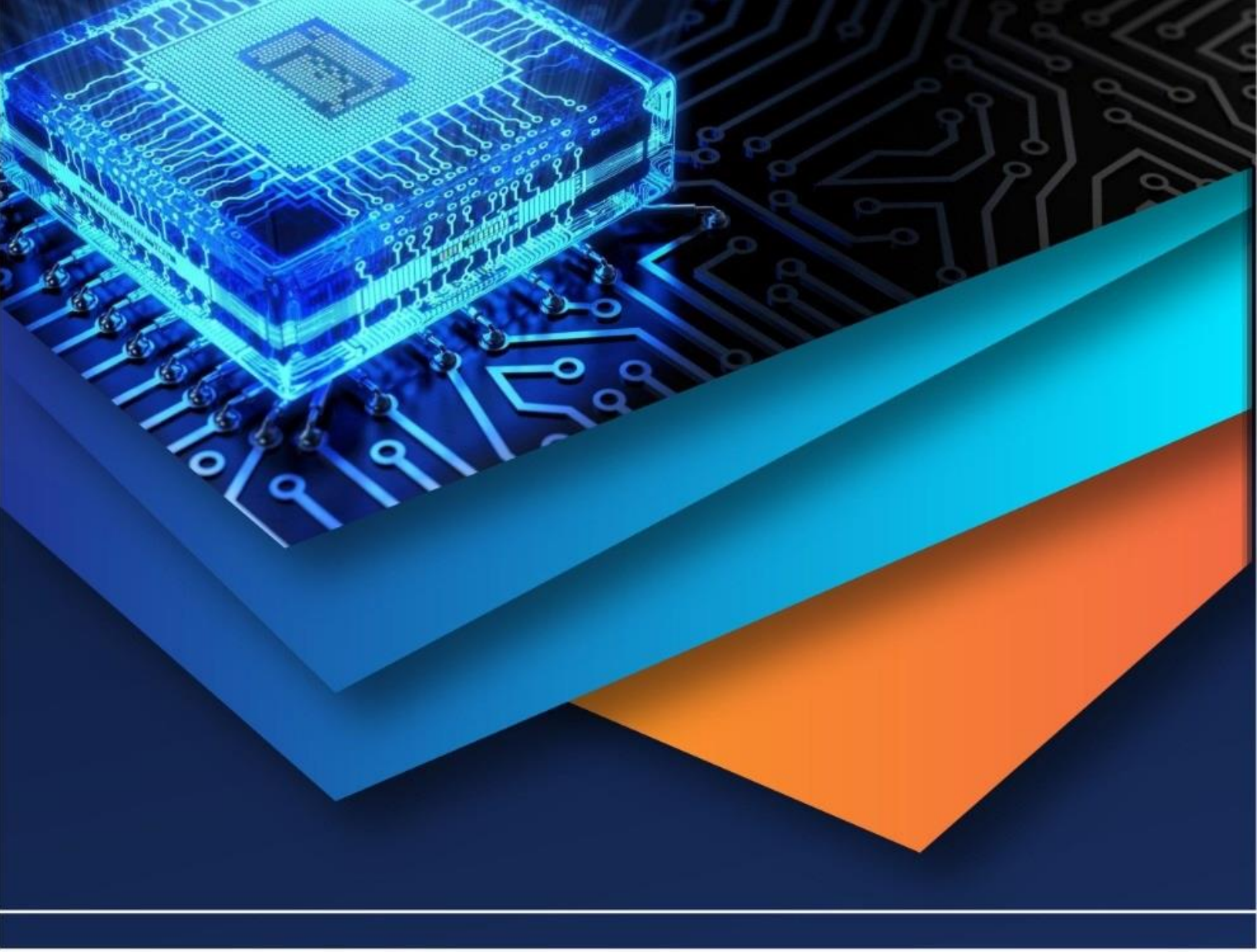
Suspension	A 0.5%	A1%	A2%	T 0.5%	T1%	T2%	F 0.5%	F1%	F2%
Viscosity (cp)	16400	73600	42600	25200	12200	3890	190	140	220

The suspensions were prepared using three different concentrations of fenugreek seed mucilage i.e. 0.5, 1.0, 2.0%. The prepared suspensions were evaluatedfor sedimentation volume, degree of flocculation and redispersibility and viscosity.
The suspensions were prepared using three different concentrations of fenugreek seed mucilage i.e. 0.5, 2.0%. The prepared suspensions were evaluatedfor sedimentation volume, degree of flocculation and redispersibility. The 2% concentration solution of gum acacia was found to be equivalent to the 2% concentration solution of fenugreek mucilage suspension.
The suspension prepared using Fenugreek seed mucilage showed comparable evaluation parametersas that of standard suspension. Hence, from the studies carried out, it is concluded that, fenugreek seed mucilage can be used as suspending agent and also it can be replaced with costlier suspending agents.

REFERENCES

Articles in Journals
[1] Nayak A, Pal D, Pany D, Mohanty B "Evaluationof Spinacia oleracea L. leaves mucilage as an innovative suspending agent. J Adv Pharma Technol Res, 1(3); 338-341, 2005.
[2] Kuppusamy G, Kulkarni G, Nanjain M, Suresh "Evaluation of fenugreek seed mucilage as gelling agent". Int J pharmal Excip, 16-19, 2002.
[3] Anroop B, Ghosh B, Parcha V, "Ocimum gratissimum seed mucilage: Evaluation of suspending properties". Int. J Pharma Sci, 67;206-9, 2005.
[4] Edwin J, Edwin S, Dosi S, Raj A, Gupta S, "Application of Hibiscus leaves mucilage as suspending agent". Indian J of Pharm Edu Res, 41; 373-5, 2007. 5. Sable V, Patel V, Paranjape A,Sabale P, "Isolation of Fenugreek Seed
[5] Mucilage and Its Comparative Evaluation as aBinding Agent with Standard Binder". Int J pharm, vol1 (4); 56-52, 2009.
[6] Rao GC, Prasad PG, Srinivas K, Rao MF. "Application of Moringa oleifera as a suspendingagent in the formulation of sulphamethoxazole".Indian Pharma, 5; 75-7, 2005.
[7] Yeole NB, Sandhya P, Chaudhari PS, Bhujbal PS."Evaluation of Malva sylvestris and Pedalium murex mucilage as suspending agent. Int J Pharm Tech Res, 2:385-9, 2010. 8. Kumaran KS,Vimalson CD, Palanisamy S, Jagadeesan M. "Evaluation of suspending properties of Cassia roxburghii mucilage on sulphamethoxazole suspension". Int J Pharm Bio Sci, 1:1-10, 2010,
[8] Palshikar GS, Jain BB, Pande VV, Katare YS. Studyof Hibiscus cannabinus seed mucilage: Extraction and evaluation as suspending w. J Pharm Res, 3; 462-4, 2010.
[9] Bramsoltani R, Farzaei MH, Afdolghaffarri AH, Rahimi R, Samadi N, Heidari M, Esfandyri M, Baeeri M, Hassanzadeh G, Abdollahi M, SoltaniS, Pourvaziri A, Amin G. "Evaluation of phytochemicals antioxidant and burn wound healing activities of Cucurbita moschata Duchesne fruit peels". Iran J Basic Med Sci. (7):798805, 2017.
[10] Leung A Y and Foster, Eds. "Encyclopedia of common Natural Ingredients Used in food, Drugs and Cosmetics, 2nd Edn., (1996), John Wiley and Sons Inc. New York, page no. 243-245.

Books and Monographs
[11] Indian Pharmacopoeia, 3rd Edn. Vol 2, (1985). Ministry of Health and Family Welfare Govt. ofIndia New Delhi, page no.A-73, A-88.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)