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A REVIEW ON: PHARMACEUTIAL APPLICATION OF FENUGREEK SEED MUCILAGE IN NOVEL DRUG DELIVERY SYSTEM

Simpi Sharma*, Vivek Kumar Patel[1], Prof. Rajeev Shukla[2], Dr. Abhishek Rai[3]

*Research Scholar SHEAT College of Pharmacy Varanasi.
[1]Assistant Professor of SHEAT College of Pharmacy Varanasi,
[2]Director of SHEAT College of Pharmacy Varanasi,
[3]Principal of SHEAT College of Pharmacy Varanasi,
Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India, 226301.

***Corresponding Author: Simpi Sharma**
Research Scholar SHEAT College of Pharmacy Varanasi, Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India, 226301.

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ABSTRACT
In the recent development in Pharmaceutical technology, the application of natural polymer increases the public interest and mostly patient compliance towards the natural occurring polymer that is used in the pharmaceutical formulation has become a subject of growing interest to discover, extraction / isolation and purity of such compound from the give an account of origin in pharma world. In this current review we have studied about mucilage (fenugreek seed mucilage) as a potent in used in pharmaceutical formulation. We also furthermore compiled the numerous sources that may lead the way to significant mucilage production and also procedure of extraction and its pharmaceutical application. The various properties of fenugreek seed mucilage have been give out in detail, that make a potent candidates to be used as pharmaceutical natural excipients / polymers in the Pharma world.

KEYWORLD: Fenugreek seed mucilage, mucilage, natural polymer, pharmaceutical application.

INTRODUCTION
In the recent development, naturally occurring or plant derived polymer has commemorated tremendous interest to their manifold pharmaceutical application (such as; binding agent, diluents, disintegrating agent in tablet formulation, as a thickeners in oral liquid preparation, gelling agent, bases in suppositories, and also used as protective colloids in suspension).[1] The may also used in cosmetic formulation, textiles, paints, and paper board (paper making).[2-3] Naturally occurring polymer (such as fenugreek seed mucilage or gum) are used in pharmaceutical formulation (like; tablet) because it have great compatibility with other such excipients, cheap, economical, easily available and are leaned to semi-synthetic or synthetic excipients due to its low casting, availability, lack in toxicity, non–irritant, soothing action.[3] Demand of application of natural polymer in pharmaceutical formulation are greatly increasing not also India but also in foreign country(like Asia and Europe).[4]

Trigonella Foenum-gracicum (belonging to family-Leguminoseae) also named as locally methika, chandrika in Ayurveda and used in the pharmaceutical application for the procurement of wounds, arthritis, diabetes, bronchitis, and also in digestive disorder[5-6]. *Trigonella Foenum-gracicum* is about 60 centimeter long, annual herb local to western Asia and southern Europe had long history used as medicinal herbs and gastronomic herbs subsequently earliest time.[6] The plant of *Trigonella Foenum-gracicum* mostly cultivated in northern Africa, Western Asia & northern India and recently cultivated in Canada. Fenugreek had been delineate as antiulcer, antihelmenthic and antibacterial and having anti fertility action, antinociceptive action and also antioxidants activity.[8] Generally, the production of fenugreek seed in India all over world. The pod of fenugreek plant is about 3 to 1 cm long and 1cm width and it contains 10-20 seeds along with 2 to 3mm. The fenugreek seed has a strong aromatic odor and having bitter in taste. The seed of *Trigonella Foenum-gracicum* constituents are like alkaloids, flavonoids, saponins, amino acid, steroidal glycosides, protein and also contain tannins etc.[8-9]

He natural material like gum and mucilage enormous used in field of novel drug delivery system for easily availability, eco-friendly, non-irritant, non- toxic and compatibility of these natural polymer with other formulation.[10]The ripe seed of *Trigonella Foenum-gracicum* have various application in traditional

medicine system of India, and also in cosmetic product for the pharmaceutical formulation. Fenugreek also delineate as treatment of colic flatulence, diarrhea, dyspepsia, dysentery with loss o appetite, dropsy, enlargement of liver and spleen, gout, diabetes and chronic cough etc.[11] It may also used for dandruff problem solution, diuretics, gastro protective and anti-inflammatory agent. It is also used to increase the lactation in mothers(nursing mother) and cure of post natal. *Trigonella Foenum-gracicum* mostly contain mucilage in higher percentage that is naturally gummy substance. Fenugrek sed mucilage does not dissolved in distilled water, mucilage forms a viscous mass when it is reveal to fluid.[12-13]

Macroscopical character of fenugreek seed:[1,3]

Color	**Yellow or light to dark yellow**
Odor	**Charateristicks**
Taste	**Bitter taste & Mucilaginous taste**
Shape	**Rhomboidal**
Size	**5to8mm long &1to2mm thick**

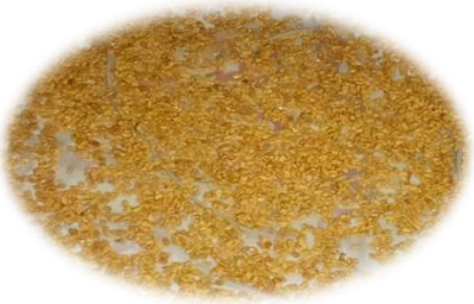

Fig. Fenugreek seed.

Analysis of fenugreek seed:[13,14,16]

Parameter	Yield value
Moisture content	0.22%
Total ash value	3.92
Acid insoluble ash value	0.44
Water soluble ash value	3.48
Alcohol soluble extractive value	14.50
water soluble extractive value	35.00
Protein content	2.74±0.35

Extraction of mucilage from fenugreek seed:[17,18]

- 100gm of fenugreek seed was taken.
- Washed it with water and dried at room temperature.(25°C).
- Seeds are taken in to 1000ml of beaker and boiled it on heating mental.
- Mucilage of fenugreek seed releases in water due to boiling.
- Squeezed it by using muslin cloth.
- Then filtrate was kept in refrigerator for cooling.
- In filtrate ethyl alcohol was added (1:1)
- Precipitation of mucilage.
- Precipitated mucilage was separated by using muslin cloth.
- Obtained mucilage was dried in hot air oven.
- Obtained mucilage powder.

Evaluation parameter of fenugreek seed mucilage:[8,13,20]

Parameters	Result
Solubility	Slightly soluble in cold water but rapidly dissolve in warm water, insoluble in acetone, chloroform, ether, methanol etc.
Gelatinization temperature	200-300°C
pH(1%)	7.4
Viscosity(1%)	500cp
Swelling index(%)	50
Water absorption content(%)	50
Ash value	0.85

Pharmaceutical application of fenugreek seed mucilage:[21,22]

There widely used fenugreek seed mucilage or gum used in pharmaceutical preparation/formulation, such as:

Used as super-disintegrant:

The extracted mucilage from fenugreek seed have great disintegration properties, various studies have been reported that fenugreek seed mucilage is a good natural occurring polymers in pharmaceutical field. Fenugreek seed mucilage showed favorable additive anti-inflammatory action with diclofenac sodium M. fenugreek seed mucilage that is used in formulation of amlodipine fast dissolving tablet had been show good polymer (reported that good disintegrating property) with other superdisinterants.

Used as binding agent or suspending agent:[21]

Fenugreek seed mucilage greatly used as binding agent or suspending agent in the formulations of numerous dosage form. It was reported that fenugreek seed mucilage or gum compared to other mucilage or gum like acacia, bentonite and tragacanth in the staging.[20] From the *Trigonella foenum- gracecum* (fenugreek seed) extraction of mucilage to be performed, has a prospective as a suspending agent(in lower concentration of fenugreek seed mucilage)[13] Like other gum or mucilage containing substance, fenugreek seed mucilage are also swell when it come in contact with aqueous solution or any other fluids.

Emulsifying properties of fenugreek seed mucilage:

The fenugreek seed mucilage / gum may also act as emulsifiers/ emulsifying agent.fenugreek seed mucilage that is highly purified and free from protein content, showed the good emulsifying agent / emulsifiers. Although it have been suggested that galactose grafted mannan backbone in the fenugreek seed mucilage that allow the fenugreek galactomanan that has a completely extended adaptation in solution.[14,21] The emulsifying properties of Trigonella foenum -gracecum mucilage

coupled with powerful moisture holding capacity unlocked the interesting possibilities of application of fenugreek seed mucilage in formulation of cosmetics products.

Mucoadhesive properties:
Numerous study had been reported that the mucilage of fenugreek seed(*Trigonella foenum- gracicum*) could be used in the formulation of mucoadhesive formulation as a carriers for controlled delivery of metformine HCl.[24]

In nasal drug delivery system:
A nasal drug delivery system of Diazepam, had been formulated with fenugreek seed mucilage, that is used as natural mucoadhesive agent in the formulation of nasal products.

CONCLUSION

Naturally occurring excipient have been incorporated in drug formulation as an inert compound/ substance, they may have increasingly included in dosage form to succeed in specialized function that is used for improving drug delivery. Fenugreek seed mucilage in mostly used in biopharmaceutical application along with particular distinct function as a tablet disintegrant function as a tablet disintegrant and controlled release excipient. A remarkable amount of research remains too supervise to unveil the real prospective the polysaccharides might take over. The fenugreek seed mucilage have potential perfection polysaccharides for novel drug delivery system may be act as alternative of synthetic polymer in active medicament delivery in future. Whereas detail investigation has to be required for pharmaceutical formulation.

REFERENCE

1. Zattz, J.L. and G.P. Kushla, In : Pharmaceutical dosage form – Disperse system, M. M. Reiger and G.S. Banker, Ed; Marcel Dekker Inc., New York, 1989; 2: 508.
2. Patel, D.M., Prajapati and N.M. Patel, Seed mucilage from *Occimum americanum Linn.*. As disintegrant in tablet: Separation and evaluation. Indian Journal of Pharmaceutical Science, 2007; 69(3): 431-35.
3. Jania, G.K., D.P. Shahb, V.D. Prajapati and V.C. Jainb, Gums and mucilages: versatile excipients for Pharmaceutical formulations, Asian J. Pharmaceutical science, 2009; 4(5): 309-323.
4. Kulkarni, G.T., K. Gowthaamrajan, R.R. Dhobe, F. Yohanan and B. suresh, Development of controlled release spheroids using natural polysaccharides as release modifier. Drug Delivery, 2005; 12: 201-206.
5. Bhunavara, N.S. and M.L. Khorana, Studied on suspending properties of *Hyprophila spinosa.* Indian Drugs, 1985; 22: 500-502.
6. Clarke, A.E., R.L. Andreson and B.A. ston, Form and function of arabinogalactans and arabinoglactan protein. Phytochemistry, 1979; 18: 521-540.
7. Kale, R.H., U.M. Joshi, D.P. Ambhore and G.R. sitaphale, Evaluation of *Delonix regia* Raf. endospermic mucilage as tablet binder. International J. Chem. Tech Res., 2009; 1: 11-15.
8. Yadav, I.K., D. Jaiswal, H.P. Singh, D. Chandra and D.A. Jain, Evaluation of seed mucilage of *vigna mungo(l.)* as binder in tablet formulations, J. Pharmacy Res., 2009; 2: 1281-1283.
9. Whistler, R.L., IN: Industrial gums, 2nd Edition, Academic Press, Landon, 1996.
10. Gowthamarajan K., G.T. Kulkarni, A. M uthukumar, N. Mahadevan, M.K. Samanta and b. suresh, Evaluation of fenugreek seed mucilage as gelling agent. International J. Pharmaceutical Excipient, 2002; 4(1): 16-19.
11. Hanawa, T., A W atanabe, R. Ikoma, M. Hidaka and M. Sughira, New oral dosage form for elderly patients: Preparation and characterization of silk fibroin gel. Chem. Pharm. Bull, 1995; 43: 284-288.
12. Seager, H., Drug delivery products and the Zydis Fast dissolving dosage form. J. Pharm. Pharmacol., 1998; 50: 375-382.
13. Dattarami, Bandyopadhyay A.K., Development of a new nasal drg delivery system of Diazepam using natural mucoadhesive agent from Trigonella foenum gracecum. J sci. Ind Res, 2005; 64: 973-977.
14. Lala, P.K., Practical Pharmacognosy. Culcutta, linna Guha, 1981; 135.
15. Malvia, R., Extraction and characterization of selected mucilage as a Pharmaceutical Excipient. Polim Med., 2011; 41(3): 39-44.
16. Shubham verma, Nitin Kumar, Pramod K. Sharma, Extraction and evaluation of Trigonella foenum gracecum Linn. and Linum Usitatissiumum seed mucilage. Global Journal of pharmacology, 2014; 8(4): 510-514.
17. Indian Pharmacopoeia, 3rd edition, Ministry of health and Family welfare. Govt. of India. New Delhi, 1985; 2: pp. A-73, A -88.
18. Kokate, C.K., A.P. Purohit and S.B. Gokhale, Pharmacognosy. 24th edition. Pune: Nirali Prakashan, 2003.
19. Indian Pharmacopoeia 4th edition. Ministry of health and family welfare, govt. of India New Delhi; Controller of Publication, 1996; A- 54.
20. Al- Habori MA., Pharmacological properties. In G. A. Petropoulus (Ed), Fenugreek: The Genus Trigonella. Taylor and Francis, London, 2002; 162-163.
21. Analava M., Deba Prasad B., Dose dependent effect of fenugreek composite in diabetes with dilipidemia. InternetJ food, 2006; 8: 49-55.
22. Ansari H., Essential of Pharmacognosy, Birla Publication Pvt. Ltd., 2005; 1: 357-384.
23. Elnaz H hamshali R., Sayed F, Reza DL, Jalal Z., Review on fenugreek therapy and Phytochemical benefits. Medicinal Plant magaz, 2010; 2: 34.
24. Ethan B, Grace K, Michael S., Therapeutic Apllication of fenugreek. Altern Med Rev, 2003; 8(1): 20.