



REVIEW ON JELLY PREPARED BY USING MORINGA OLEIFERA LEAF EXTRACT FOR ANTI- DIABETIC PATIENT

Ms.Chine Vaishnavi Vijay¹ , Dr.Datir Mahendra Baban²,Ms Bedekar Mansi Raju³, Ms
.Mahajan Mayuri Anil⁴

^{1*,2*,3*,4}. M.A.B.D Institute Of Pharmaceutical Education and Research ,Yeola,Nashik

ABSTRACT

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels due to insulin deficiency or resistance, leading to serious complications that impact global health. The increasing prevalence of diabetes worldwide emphasizes the need for affordable, safe, and patient-friendly therapeutic options. *Moringa oleifera* (Drumstick tree), belonging to the family Moringaceae, possesses potent antioxidant, antihyperglycemic, and immunomodulatory properties, making it a promising natural candidate for diabetes management. The present study focuses on the formulation and evaluation of oral medicated jellies incorporating *Moringa oleifera* leaf extract as an active nutraceutical ingredient. Oral medicated jellies represent a novel and convenient drug delivery system designed to enhance patient compliance, particularly among pediatric and geriatric populations with swallowing difficulties.

The jellies were prepared using gelling agents such as gelatin and pectin, sweeteners, flavoring agents, stabilizers, and preservatives through a controlled heating and molding process. The extract of *Moringa oleifera* was obtained via Soxhlet extraction and incorporated into the jelly matrix. The prepared formulations were evaluated for physical appearance, pH, stickiness, grittiness, and stability. The study aims to optimize the formulation parameters to achieve a palatable, stable, and effective oral medicated jelly that can deliver *Moringa oleifera* extract efficiently while maintaining its therapeutic properties. This formulation has the potential to serve as a cost-effective, patient-compliant, and nutritionally beneficial dosage form for diabetic individuals.

Keywords: Diabetes mellitus, *Moringa oleifera*, Jelly

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterised by a high blood glucose concentration (hyperglycaemia) caused by insulin deficiency, often combined with insulin resistance and eventual glycosuria. Accordingly, the prevalence of diabetes mellitus patients worldwide has increased annually. The Diabetes Atlas says that in 2013, 382 million individuals around the world had DM. By 2035, that number is anticipated to rise to 592 million, with 80% of them residing in low- to middle-income nations.^[1] Diabetes mellitus is among the leading causes of morbidity and mortality globally according to the World Health Organization (World Health Organization, 2022). Diabetes and its resultant complications are fast becoming an epidemic in all corners of the globe. While globalization cannot be avoided, similarly unavoidable is the legacy of the risk of non communicable diseases that are suffocating developed nations. This serious diabetic complication not only impacts the life of the patient, but their families and the nation, which ultimately results in outrageous treatment expenses and hinder the nation's growth.^[2]

The "Drumstick Tree," or "*Moringa Oleifera* (MO)", is member of the family of Moringaceae. It is the most famous and commonly utilized of the thirteen species of the *Moringa* genus. Its native origin was in the northeastern parts of India, Bangladesh, Afghanistan, and Pakistan, in the southern part of the Himalayas. Due to its numerous utilization, MO is considered to be a multipurpose plant. In most tropical and subtropical countries, the leaves, green pods, and seeds are eaten as part of the local food. It is a perennial tree with rapid growth that can grow up to 12 meters tall and showing immense ecological plasticity because it can adapt to the most disparate conditions of soil, temperature, and rainfall, being highly tolerant of the drought. Its leaves are compound, and they are found in bunches of leaflets measuring 30–70 cm, the flowers consist of five white petals which are unequal, and yellow stamens, the fruits appearing as pods have 12 to 15 winged seeds per fruit and its cultivation is done through sowing or cuttings^[3]

Due to its low cost and ease of administration, oral administration is the most popular and practical way for a variety of medications to obtain improved pharmacotherapeutic advantages, which in turn improves patient compliance. Oral medicated jellies are the result of recent developments in innovative drug delivery systems (NDDS), which seek to increase patient compliance and convenience while also enhancing the safety and effectiveness of dosage forms for administration. This formulation reduces dosage waste and dumping, improves stability and flavor masking, increases bioavailability, and avoids substantial hepatic first-pass metabolism. Since they like the taste and chewing qualities of the jellies—which are frequently sweet and flavored with fruit juices and extracts—children with complete dentition now eat jelly sweets with ease.^[4]

Types Of Jellies: ^[5]

There are three varieties of jellies.

Medicated Jelly:

Utilized mostly as an initial anesthetic, spermicidal, and antibacterial agent on skin and mucous membranes. There is enough water in these jellies. As the water evaporates and a protective layer is left behind, they provide a cooling sensation.

Lubricating Jelly:

Like surgical gloves, cytosopes, cutlet booths, catheters, and rectal thermometers, it is used to lubricate medical equipment.

Miscellaneous Jellies :

These are thin, translucent, and water-responsive. Because these jellies are utilized to slide particulars into sterile body locations such as the urine bladder, they must be sterilized.

1. Patch testing: These jellies act as carriers for allergens used in perceptivity tests. As the patches dry, a residual layer forms, which helps to preserve differentiation and reduces misunderstanding.

2. Electrocardiogram: Electrodes are coated with jelly to minimize the electrical impedance between the case's skin and the electrode. The jelly contains sodium chloride, pumice powder, and glycerin. Sodium chloride conducts electricity well, and glycerine works as a humectant.

Advantages

- 1.Can be taken without the need for water.
2. Provides for design inflexibility.
3. Improves bioavailability or targets first-pass metabolism.
4. Excellent for acute medications.
5. Easy to manufacture and cost-effective

Disadvantages

- 1.Inadequately formulated jellies may have a disagreeable flavor.
- 2 .A high risk of microbiological contamination.
3. Oral jellies are hygroscopic, meaning they store moisture in dry environments.^[4]

Objectives of Oral Medicated Jellies:

1. To promote patient compliance.
2. Use a poorly soluble medication in medicated jelly.
3. Chipper dose form is formulated differently from usual formulations.

MATERIAL AND METHODS**Plant Profile**

Fig No.1. Moringa oleifera

SYNONYMS- Drumstick tree, Horseradish tree, or Saguna

FAMILY- Belongs to the Moringaceae

BIOLOGICAL SOURCE- The leaves of the Moringa oleifera tree

CHEMICAL CONSTITUENT- such as flavonoids (apigenin, quercetin, luteolin, myricetin, kaempferol), lignans (secoisolariciresinol, isolariciresinol, medioresinol, epipinoresinol, feruloylquinic acids) predominantly found in moringa leaves.

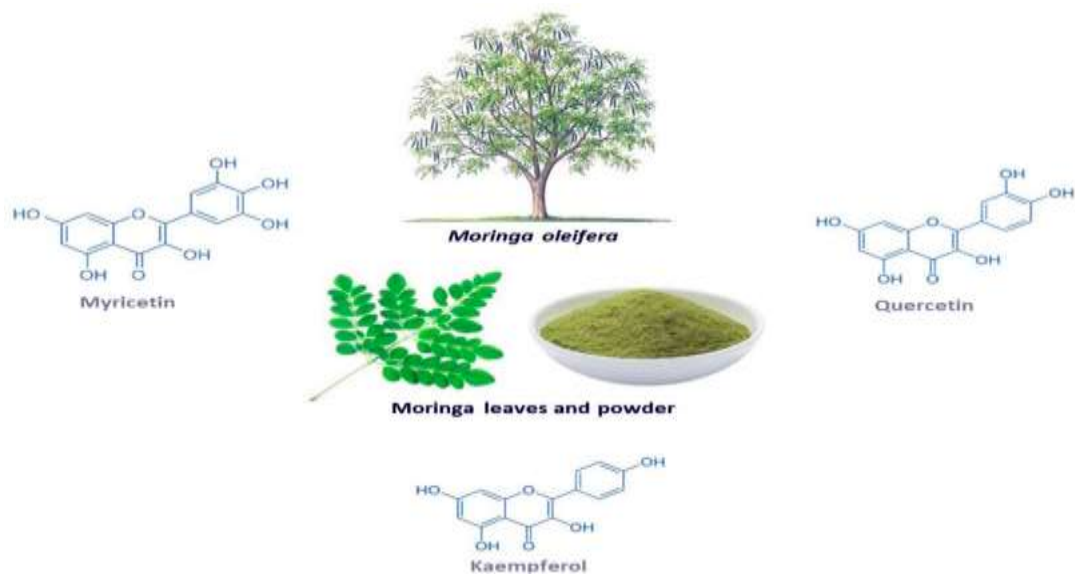


Fig.No.2. Moringa oleifera

Uses

- 1. Moringa is renowned for its significant ability to enhance immunity.
- 2. Its high antioxidant content further strengthens the immune system, offering protection against infections.
- 3. Additionally, moringa is abundant in iron and vitamin A, both of which are crucial for optimal immune system performance.

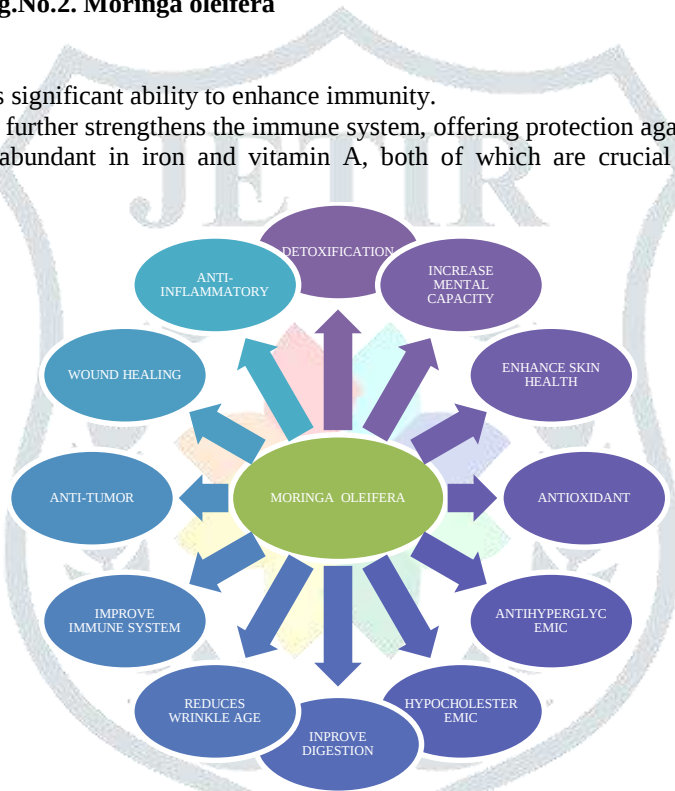


Fig.No.3 USES OF MORINGA OLEIFERA

EXCIPIENTS

Gelling Agents	Pectin, Gelatin, Tragacanth, Agar-Agar
PH Modifier	Citric Acid
Stabilizer	Propylene glycol, Sorbitol
Preservatives	Methyl Paraben, Propyl paraben
Flavoring Agents	Orange, Lemon
Colouring Agent	Betanin

Table 1: Various Components of Medicated Jelly Formulations

Gelling Agent:

Gelatin: It is used as a biodegradable matrix material in an implantable delivery system. Gelatin is also widely used in food products and photographic emulsions. Gelatin, a hydrocolloid or water soluble polymer, is used in the food business for gelling, thickening, and stabilizing purposes. Unlike other hydrocolloids like carrageenan and pectins, gelatin is a completely digestible protein with all essential amino acids except tryptophan.



PH modifiers: Citric acid



Stabilizers:

There are some stabilizers which are added prevent jellies from drying. Examples include the following:
Eg: Propylene glycol



Preservative:

Jellies liquid nature may allow bacteria to thrive, as previously believed. Preservation must be to prevent incompatibilities with gelling agents, which could shorten the product's shelf life, specific ingredients were chosen. Cellulose derivatives and clay are mostly resistant to microbial attack. Some examples are literally.^[11]

Methyl Paraben

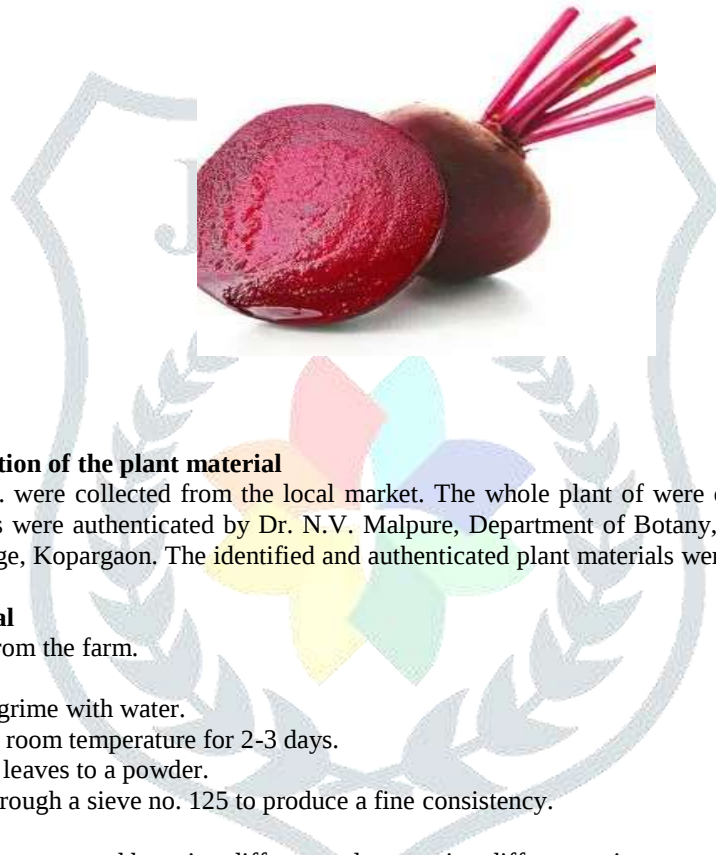


Flavoring Agent:

Orange and citrus concentrates: Sugar-free orange juice concentrate or orange rind can give your jelly a zesty, citrusy flavor.^[15]

**Colouring Agent:**

Beetroot: A natural source of betalain, beetroot powder or juice can produce red and pink shades.

**METHOD****Collection and authentication of the plant material**

The *Moringa oleifera* Lam. were collected from the local market. The whole plant of were collected from the botanical garden. The plant materials were authenticated by Dr. N.V. Malpure, Department of Botany, S.S.G.M.Gautam Arts And Sanjivani Commerce College, Kopargaon. The identified and authenticated plant materials were used for further extraction process.

Collection of Raw Material

1. Collect moringa leaves from the farm.
2. Cut the leaves by hand.
3. Wash away any dust and grime with water.
4. Dry the cleaned leaves at room temperature for 2-3 days.
5. Grind the dried moringa leaves to a powder.
6. Sift the crushed leaves through a sieve no. 125 to produce a fine consistency.

Preparation of jelly

1. Oral medicated jellies were prepared by using different polymer using different ratio.
2. Initially an sugar syrup is prepared by using sucrose and water at the required ratio.
3. To this syrup gelling agent of the required quantity and heating until it gets dissolved.
4. To this solution stabilize and solubilizer are added and stirred to dissolved.
5. To the above mixture preservative is added.
6. Once completely dissolved it is brought to an room temperature then, drug along with colour and flavours is added.
7. This solution is paired into the required shape and size mold and is allow to settled down to form an jelly.^[12]

CONCLUSION

For all practical purposes, pharmaceutical jellies have a particular visual appeal and delicious flavor compared to any alternative methods for delivering drugs orally. It has comparatively superior organoleptic characteristics as well as patient adherence. As a whole , the results of this systematic review study showed that this jelly may helpful in DM. Due to the gaps in our knowledge, and the future direction in this area, more studies are required to determine the exact mechanisms by which this *Moringa Oleifera* Medicated Jelly will used in the treatment of DM.

REFERENCES

1. El-Seedi, H. R., Salama, S., El-Wahed, A. A. A., Guo, Z., Di Minno, A., Daglia, M., ... & Wang, K. (2024). Exploring the therapeutic potential of royal jelly in metabolic disorders and gastrointestinal diseases. *Nutrients*, 16(3), 393.
2. Natarajan, S. B., Das, S. K., Chandran, S. P., Oo, A. M., Kanneppady, S. S., Entezarian, M., & Lwin, O. M. (2018). *Moringa oleifera* leaf extract loaded hydrogel for diabetic wound healing. *Malaysian Journal of Medical Research (MJMR)*, 2(2), 35-41.

3. Nova, E., Redondo-Useros, N., Martínez-García, R. M., Gómez-Martínez, S., Díaz-Prieto, L. E., & Marcos, A. (2020). Potential of Moringa oleifera to improve glucose control for the prevention of diabetes and related metabolic alterations: a systematic review of animal and human studies. *Nutrients*, 12(7), 2050.
4. Mahajan, P. S., Barhate, S. D., Naik, R. R., Naik, V. V., & Nanote, S. A. (2025). FORMULATION AND EVALUATION OF MORINGA OLEIFERA NUTRITIVE AND IMMUNE BOOSTING JELLY.
5. International Journal of Pharmaceutical Research and Applications Volume 7, Issue 4 July-Aug 2022, pp: 174-179
www.ijprajournal.com ISSN: 2456-4494
6. Sarkar, Marzan, Sujan Bhowmick, Jakir Hussain, Mahmudul Hasan, and Shahdat Hossain. "Hot water extract of Moringa oleifera leaves protects erythrocytes from hemolysis and major organs from oxidative stress in vitro." *Journal of Basic and Applied Research in Biomedicine* 3, no. 3 (2025): 120-126
7. Krishna, Ambati Vamsi, Vedavathi Sai Gandodi, Apoorva Dev, Adusumalli Chakravarthy, Suryadevara Vidyadhara, and Shaik Shafiya Begum. "Intermittent Fasting: A Promising Tool for Controlling Diabetes." *Indian Journal of Pharmacy Practice* 17, no. 2 (2024)
8. Godhwani, Tanu, Mahavir Chhajer, Atika Chhajer, and Deepshikha Tiwari. "Formulation development and evaluation of unit moulded semisolid jelly for oral administration as a calcium supplement." *World journal of pharmaceutical research* 1, no. 3 (2012): 629.
9. 1)Stohs, Sidney J., and Michael J. Hartman. "Review of the safety and efficacy of Moringa oleifera." *Phytotherapy Research* 29.6 (2015): 796-804.
10. Bodmeier R. Darreichungsform zur Applikation in Korperoffnungen. German Patent Application DE; c1999. p. 19922537.
11. Bradoo, R., Shahani, S., Poojary, S., Deewan, B., & Sudarshan, S. (2001). Fast dissolving drug delivery systems. *Jama India*, 4(10), 27-31.
12. Vijetha, J., Daniel, T., Jayasri, R., Pavithra, R., Prema, S., & Vidhya Devi, M. (2024). FORMULATION AND EVALUATION OF ORAL MEDICATED JELLY-AN REVIEW.
13. López-Bascón, M. A., & De Castro, M. L. (2020). Soxhlet extraction. In *Liquid-phase extraction* (pp. 327-354). Elsevier.
14. López-Bascón, M. A., & De Castro, M. L. (2020). Soxhlet extraction. In *Liquid-phase extraction* (pp. 327- 354). Elsevier.
15. Robayo, S., Kucab, M., Walker, S. E., Suitor, K., Morello, O., & Bellissimo, N. (2024). Effect of 100% orange juice and a volume-matched sugar-sweetened drink on subjective appetite, food intake, and glycemic response in adults. *Nutrients*, 16(2), 242

