International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

A Review on Medicated Jellies

Ms. Pratiksha Kurawade, Dr. G. V. Taware

Date of Submission: 10-02-2026 Date of Acceptance: 20-02-2026

ABSTRACT
Oral drug delivery remains the most preferred route of administration due to its convenience, safety, and patient acceptance. However, conventional solid dosage forms such as tablets and capsules pose swallowing difficulties for pediatric, geriatric, and dysphagic patients, leading to poor compliance. In recent years, chewable jelly formulations have emerged as a promising alternative oral dosage form that combines the advantages of solid and semi-solid systems. These formulations provide better patient adherence, dosage accuracy, palatability, and convenience of administration. Chewable jellies are particularly useful for pediatric medications, nutraceuticals, vitamins, and minerals such as iron supplements. This review focuses on the formulation aspects, excipients used, manufacturing methods, evaluation parameters, advantages, limitations, and future prospects of chewable jelly drug delivery systems.

Keywords: Chewable jelly dosage form, oral drug delivery systems, patient adherence, pediatric drug formulation, medicated jelly preparations.

I. INTRODUCTION

Oral drug delivery systems account for a significant proportion of pharmaceutical formulations due to their ease of administration and cost-effectiveness. Despite these advantages, conventional oral dosage forms are associated with limitations such as difficulty in swallowing, poor taste, and delayed onset of action. These issues are more prominent in special patient populations, including children, elderly individuals, and patients suffering from dysphagia.[1]

Chewable jelly dosage forms have gained attention as an innovative solution to overcome these limitations. These dosage forms are characterized by a soft and elastic texture, enhanced with flavoring and sweetening agents to improve palatability making them more acceptable to patients. Unlike tablets, chewable jellies do not require water for administration and disintegrate easily in the oral cavity upon chewing. Their pleasant mouthfeel and aesthetic appeal enhance patient compliance, especially in pediatric therapy.

Chewable jellies are semi-solid oral dosage forms formulated with suitable gelling agents that create a stable and flexible three-dimensional matrix for incorporating the active pharmaceutical ingredient (API). When chewed, the structure disintegrates into smaller fragments, promoting faster drug release, dissolution, and subsequent absorption in the gastrointestinal tract. [2],[3],[4]

These formulations lie between solid and liquid dosage forms, offering the structural integrity of solids and the ease of administration of liquids. Chewable jellies are commonly employed for the delivery of vitamins, mineral supplements, probiotics, and low-dose therapeutic agents, particularly in cases where effective taste-masking is required to enhance patient acceptability.[1]

Anatomical and Physiological Considerations of the Oral Cavity in Relation to Oral Drug Delivery:

A comprehensive understanding of the structural and functional characteristics of the oral cavity is fundamental for the rational development and optimization of oral drug delivery systems. particularly patient-friendly dosage forms such as **oral chewable jellies**. The oral cavity serves not only as the initial site of drug administration but also as a potential site for drug absorption, taste perception, and patient acceptance.[2]

1. Anatomical Structure of the Oral Cavity:
Anatomically, the mouth cavity is separated into two primary areas:

1.1 Oral Vestibule

The area between the lips, cheeks, and teeth is known as the oral vestibule. It plays a limited role in drug absorption but contributes to **mechanical processing** during chewing of dosage forms such as jellies.

1.2 Oral Cavity Proper

The oral cavity proper is bounded by the teeth and gums anteriorly and laterally, the hard

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

and soft palate superiorly, and the tongue and floor of the mouth inferiorly. This region is of **primary importance for oral DDS**.

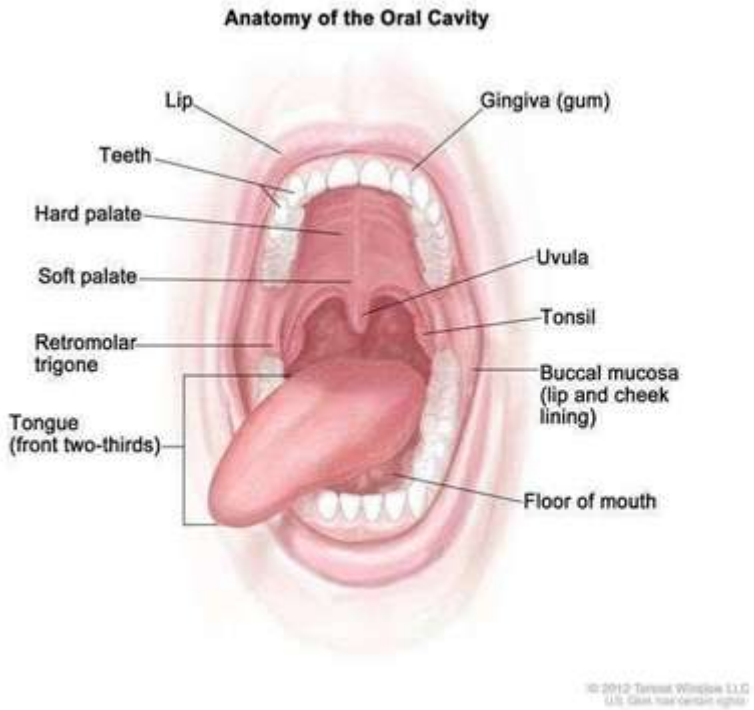

Fig: Anterior view of the oral cavity showing major structures

II. ORAL MUCOSA

The oral mucosa acts as a protective barrier and potential absorption site for drugs.[5]

2.1 Types of Oral Mucosa

The oral mucosa can be categorized into distinct types according to its structural characteristics and functional roles:

- **Masticatory mucosa (gingiva and hard palate):** Characterized by a relatively thick, keratinized epithelial layer, providing mechanical protection and exhibiting lower permeability to drug molecules.
- **Lining mucosa (buccal and labial mucosa, soft palate, and floor of the mouth):** Composed of non-keratinized epithelium, offering greater flexibility and comparatively higher permeability, making it more suitable for drug absorption.
- **Specialized mucosa** (dorsal surface of tongue): Contains taste buds involved in taste perception.

For oral chewable jellies, the **buccal mucosa and floor of the mouth** are particularly important due to their **higher permeability and rich blood supply**.

III. BUCCAL MUCOSA AS A SITE FOR DRUG ABSORPTION

The buccal mucosa is composed of the following structural components:

- Stratified squamous epithelium
- Basement membrane
- Connective tissue (lamina propria)

Key features influencing drug delivery include:

- **High vascularization**, enabling rapid systemic absorption
- **Relatively low enzymatic activity**, reducing drug degradation
- **Avoidance of first-pass hepatic metabolism**, which can enhance bioavailability Chewable jellies remain in contact with the buccal mucosa during mastication, allowing partial

buccal or sublingual absorption, especially for drugs with suitable molecular weight and lipophilicity.[5],[6]

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

IV. TONGUE AND ITS ROLE IN ORAL DDS

The tongue is a muscular organ responsible for:

- Manipulation and positioning of dosage forms
- Mechanical breakdown during chewing
- Taste perception

The dorsal surface of the tongue contains **papillae and taste buds**, which play a critical role in evaluating palatability. Unpleasant taste can lead to rejection of dosage forms; Effective taste-masking strategies are essential in the development of oral chewable jelly formulations to ensure patient acceptability and adherence to therapy.

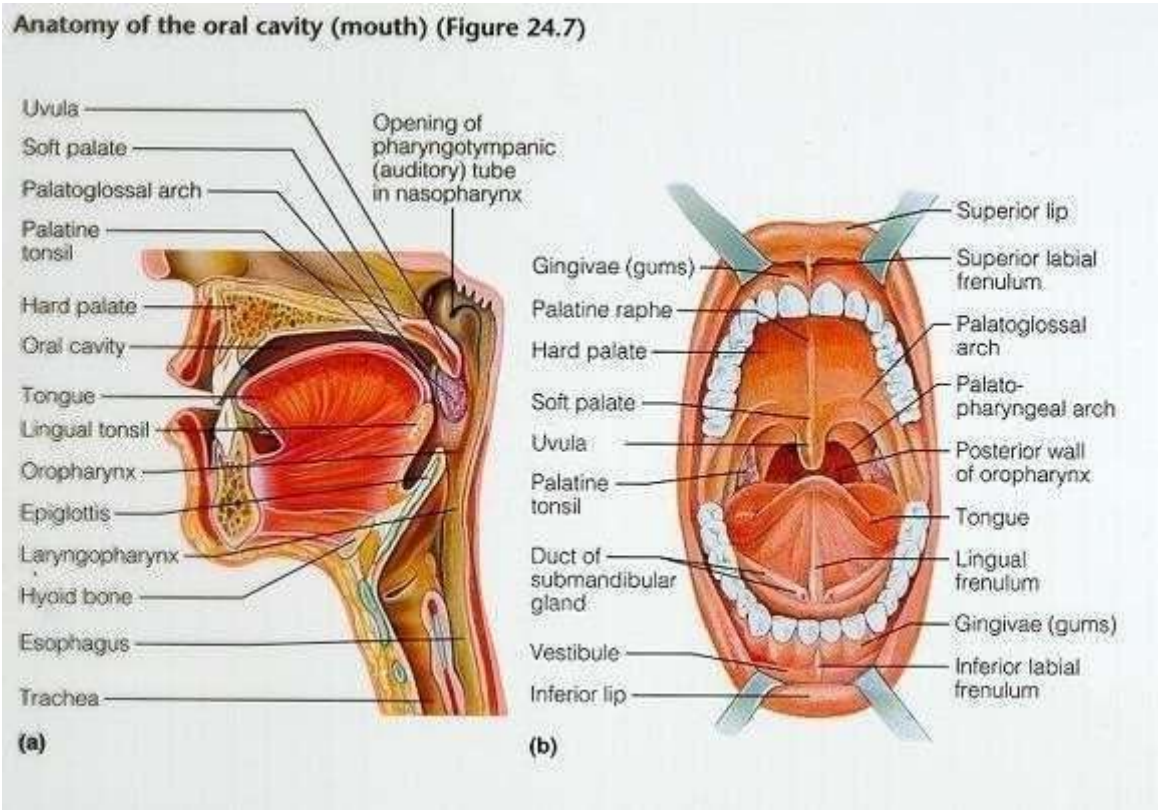

Fig: **Figure:** Schematic representation of the oral cavity illustrating the dental arches, palate, tongue, and associated anatomical landmarks.

V. SALIVA AND ITS INFLUENCE ON DRUG DELIVERY

Saliva is produced by the major salivary glands, namely the parotid, submandibular, and sublingual glands, as well as by numerous minor salivary glands distributed throughout the oral mucosa.

5.1 Composition of Saliva

Saliva consists of:

- Water (≈99%)
- Electrolytes
- Enzymes (e.g., amylase)
- Mucins

5.2 Role of Saliva in Oral Chewable Jellies

Saliva influences oral DDS by:

- Facilitating **hydration and dissolution** of the jelly matrix
- Affecting **drug release and dispersion**
- Modulating **taste perception**
- Facilitating lubrication of the oral cavity to aid in mastication and swallowing.

An increased salivary flow rate may accelerate the clearance of the drug from the oral cavity, potentially reducing residence time, whereas decreased salivary secretion (xerostomia) can impair drug dissolution and delay its release.[5],[6],[7]

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

VI. ORAL PH AND ENZYMATIC ENVIRONMENT

The normal pH of saliva ranges from **6.2 to 7.4**, which is favourable for the stability of many drugs. Unlike the gastrointestinal tract, the oral cavity has **limited enzymatic activity**, reducing the risk of drug degradation before absorption. [8],[9]

This environment is particularly advantageous for **acid-labile drugs** and for formulations designed to release drug prior to swallowing.

VII. VASCULARIZATION AND LYMPHATIC DRAINAGE OF THE ORAL CAVITY

The oral cavity possesses an extensive vascular network, with particularly dense blood supply in the buccal and sublingual regions, which supports efficient drug absorption and rapid entry into the systemic circulation. Drugs absorbed across the oral mucosa enter systemic circulation directly, bypassing hepatic first-pass metabolism. This can result in:

- Faster onset of action
- Reduced dose requirement
- Improved therapeutic efficacy

VIII. IMPLICATIONS OF ORAL ANATOMY FOR CHEWABLE JELLY FORMULATION

The anatomical and physiological characteristics of the oral cavity directly influence formulation design:

- **Gel strength and texture** must allow easy chewing without sticking to oral tissues.
- **Taste masking strategies** are essential due to taste bud sensitivity.
- **Residence time** should be optimized to allow drug release without discomfort.
- **Non-irritating excipients** must be used to prevent mucosal damage.

Oral chewable jellies leverage these anatomical advantages to deliver drugs efficiently while maximizing patient comfort and compliance.

Rationale for Oral Chewable Jellies

1 Patient Compliance and Acceptability

Chewable jellies improve compliance through **taste masking**, pleasant texture, and ease of administration without water. For populations with dysphagia (difficulty swallowing), Semi-Solid dosage forms are generally associated with a lower risk of choking and may contribute to improved therapeutic adherence. [10]

2 Rapid Onset of Therapeutic Action

Due to their **large surface area** and potential for transmucosal absorption, orally disintegrating jellies may facilitate faster drug release and absorption compared to conventional tablets. [9]

3 Flexible Dosing Potential

Oral jellies allow for dose customization, which is particularly beneficial in pediatric and geriatric practice where **dose titration** is often necessary. [8],[10]

Chewable Jelly–Based Oral Drug Delivery System

1. Overview of Oral Drug Delivery Systems

The oral route remains the most extensively used pathway for drug administration due to its convenience, cost-effectiveness, and high patient acceptance. Despite these advantages, conventional oral dosage forms such as tablets and capsules often present challenges including swallowing difficulty, poor palatability, and delayed onset of action. These limitations necessitate the development of alternative oral dosage forms that are patient-friendly and therapeutically effective.

Chewable jelly formulations have emerged as an innovative oral drug delivery platform designed to overcome these challenges. These semi-solid dosage forms are soft, elastic, and palatable, making them particularly suitable for patients who experience difficulty swallowing solid dosage forms.

2. Concept and Design of Chewable Jelly Drug Delivery System

Chewable jellies are structured, gel-based oral dosage forms prepared using gelling agents that create a three-dimensional polymeric network capable of entrapping the active pharmaceutical ingredient. The formulation is designed to maintain physical integrity during handling while readily disintegrating upon mastication.

The chewable nature of these jellies allows mechanical breakdown in the oral cavity, promoting early drug release and enhanced dissolution prior to swallowing. This unique behavior positions chewable jellies between solid and liquid dosage forms, combining the advantages of both. [13],[11]

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

3. Drug Release Mechanism in Chewable Jellies

Drug release from chewable jelly formulations occurs through a combination of mechanical, diffusional, and dissolution-based processes. During chewing, the jelly matrix is fragmented, increasing surface area and allowing saliva to penetrate the gel structure. This initiates partial drug dissolution within the oral cavity.

Following swallowing, the remaining drug continues to release in the gastrointestinal tract. The release rate is influenced by factors such as polymer concentration, gel strength, drug solubility, and the degree of cross-linking within the jelly matrix. This controlled breakdown contributes to predictable drug release behaviour. [12]

4. Formulation Components and Their Functional Roles

4.1 Gelling Agents

Gelling agents form the backbone of chewable jelly formulations. Frequently utilized gelling agents include gelatin, pectin, agar, carrageenan, and sodium alginate. These polymers play a critical role in defining the mechanical strength, elasticity, texture, and overall stability of the jelly formulation. [14],[15]

4.2 Sweeteners

Sweeteners are incorporated to improve palatability and patient acceptance. Both natural and synthetic sweetening agents, including sucrose, glucose syrup, sorbitol, xylitol, and sucralose, are widely incorporated into formulations to enhance palatability and improve patient acceptance. [16]

4.3 Flavouring Agents

Flavouring agents enhance sensory appeal and mask unpleasant drug tastes. Fruit-based and natural flavours are widely preferred for chewable formulations. [16]

4.4 Plasticizers

Plasticizing agents, including glycerin and propylene glycol, are incorporated to enhance the flexibility of the polymeric network and to minimize brittleness within the jelly matrix. [14]

4.5 Preservatives

Owing to their relatively high moisture content, chewable jelly formulations are prone to microbial contamination. Therefore, suitable antimicrobial preservatives are incorporated to maintain product safety, stability, and shelf life. [16]

5. Biopharmaceutical Considerations

Chewable jellies may offer improved biopharmaceutical performance compared to traditional oral dosage forms. The pre-disintegration and partial dissolution during mastication can enhance dissolution rates, potentially leading to faster onset of action. Uniform dispersion of the drug within the gel matrix also minimizes localized gastrointestinal irritation.

Furthermore, chewable jellies reduce variability associated with gastric disintegration, resulting in more consistent drug absorption profiles.

6. Taste Masking and Sensory Optimization

Taste masking represents a key formulation challenge in chewable jelly dosage forms, as the drug remains in direct contact with the taste receptors for an extended period during mastication. To address this issue, various technological approaches are implemented, including:

Incorporation of high-intensity sweetening agents

- Incorporation of flavour blends
- Encapsulation or coating of drug particles
- Use of polymer–drug complexes

Optimizing the sensory attributes of the formulation is essential for promoting treatment adherence, especially among pediatric and geriatric patient populations.

7. Patient Compliance and Acceptability

Patient-centric design is a major advantage of chewable jelly dosage forms. The soft consistency, palatable taste, and visually appealing characteristics of chewable jellies contribute substantially to patient acceptability. In contrast to conventional tablets, these formulations can be administered without the need for water and are associated with a lower risk of choking. Owing to these advantages, chewable jellies are particularly well suited for long-term therapeutic regimens, where sustained adherence is critical to achieving optimal clinical outcomes.

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

8. Stability and Storage Considerations

Parameter	Tablets	Liquid Syrups	Chewable Jellies
Swallowing ease	Low	High	Very high
Dose accuracy	High	Moderate	High
Palatability	Low	Moderate	Excellent
Patient compliance	Moderate	High	Very high
Risk of choking	Present	Low	Minimal

Chewable jelly formulations face unique stability challenges due to their semi-solid nature. Major stability challenges associated with chewable jelly formulations include moisture transfer, alterations in texture, and susceptibility to microbial proliferation. Therefore, careful formulation design and selection of suitable packaging systems are critical to preserving product integrity and quality throughout storage.

Packaging solutions that provide effective barriers against moisture and oxygen, such as blister packs or hermetically sealed containers, are frequently utilized to enhance stability and prolong shelf life.

Advantages of Chewable Jelly Formulations

Chewable jellies offer several benefits over conventional oral dosage forms:

- Improved patient compliance due to pleasant taste and texture
- Suitable for pediatric and geriatric patients [27]
- No need for water during administration
- Enhanced palatability and taste masking
- Accurate dosing compared to liquid formulations
- Reduced risk of choking
- Better acceptance for long-term therapy

Limitations

Despite their advantages, chewable jelly formulations also present certain challenges:

- Limited drug loading capacity
- Stability issues related to moisture and microbial growth [29]
- Requirement of preservatives
- Sensitivity to temperature and humidity
- Not suitable for high-dose or bitter drugs without effective taste masking

Applications of Chewable Jelly Dosage Forms

Chewable jellies are widely used in:

- Pediatric medications [29],[28],[27]
- Nutraceuticals and dietary supplements
- Vitamin and mineral supplementation (e.g., iron, calcium)
- Herbal formulations
- Over-the-counter products

Types of Jelly Dosage Forms

Jelly formulations can be classified based on their route of administration, composition, drug release behavior, and functional application. In pharmaceutical sciences, jellies are primarily designed to improve drug acceptability, local or systemic delivery, and patient compliance.

1. Oral Jellies

Oral jellies are intended for administration through the mouth and are either swallowed or chewed before swallowing. These jellies are commonly used in pediatric and geriatric therapy due to their ease of administration and pleasant taste. [17],[18]

1.1 Chewable Jellies

Chewable jellies are soft, elastic formulations that require mastication before swallowing. They offer accurate dosing, enhanced palatability, and improved patient adherence. These jellies are widely used for vitamins, minerals (such as iron and calcium), and nutraceutical products. [19],[17]

1.2 Swallowable (Non-Chewable) Jellies

These jellies dissolve or disintegrate in the oral cavity without the need for chewing. They are suitable for patients with severe dysphagia and are formulated to rapidly dissolve upon contact with saliva.

2. Medicated Jellies

Medicated jellies contain active pharmaceutical ingredients and are designed for **local or systemic therapeutic action**.

2.1 Oral Medicated Jellies

Used for systemic drug delivery, these jellies improve bioavailability and compliance.
Examples include antipyretics, iron supplements, and vitamin formulations.

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

2.2 Topical Medicated Jellies

These jellies are applied to the skin or mucosal surfaces for localized action. They are commonly used in dermatology, gynecology, and dentistry for delivering antiseptics, anesthetics, or antifungal agents.

3. Nutraceutical and Functional Jellies

These jellies contain dietary supplements such as vitamins, minerals, probiotics, and herbal extracts. They are often marketed as functional foods and are designed to support general health and wellness rather than treat specific diseases.

4. Sugar-Based and Sugar-Free Jellies

4.1 Sugar-Based Jellies

Prepared using sucrose or glucose syrup, these jellies offer better texture and taste but may not be suitable for diabetic patients.

4.2 Sugar-Free Jellies

Formulated using artificial or natural sweeteners such as sorbitol, xylitol, or sucralose, sugar- free jellies are suitable for diabetic and calorie-conscious patients.

5. Immediate-Release and Modified-Release Jellies

5.1 Immediate-Release Jellies

These jellies release the drug rapidly after administration, making them suitable for conditions requiring quick onset of action.

5.2 Modified-Release Jellies

Modified-release jellies are designed to control the drug release profile by using specialized polymers or matrix systems. They provide prolonged therapeutic effects and reduce dosing frequency.

6. Pediatric and Geriatric Jellies

These jellies are specifically formulated to meet the needs of pediatric and geriatric populations. Emphasis is placed on taste masking, soft texture, safe excipients, and ease of swallowing. [17],[18],[19]

7. Herbal and Ayurvedic Jellies

Herbal jellies contain plant-based active ingredients and are increasingly popular due to patient preference for natural products. These formulations combine traditional medicine with modern drug delivery approaches.

8. Specialty Jellies

Specialty jellies include:

- **Fast-melting jellies**
- **Medicated oral cavity jellies**
- **Mucoadhesive jellies**

These jellies are designed for targeted delivery, enhanced residence time, or rapid therapeutic action.

The classification of jelly dosage forms highlights their versatility and adaptability in pharmaceutical applications. Among these, **chewable jellies** stand out as a patient-friendly dosage form with significant potential in pediatric and nutraceutical markets.

Excipients Used in Chewable Jelly Formulations

1. Gelling Agents

Gelling agents are the backbone of chewable jelly formulations. Commonly used gelling agents include:

- Gelatine
- Pectin
- Agar
- Carrageenan
- Sodium alginate

The choice of gelling agent affects texture, elasticity, and drug release behavior. [14],[15]

2. Sweeteners

Sweeteners improve palatability and mask unpleasant drug taste. [15],[16]

- Sucrose
- Glucose syrup
- Sorbitol
- Aspartame
- Sucralose

3. Flavouring Agents

Flavouring agents enhance consumer acceptability. Examples include fruit flavours such as orange, strawberry, and mango.[16]

4. Preservatives

Preservatives are added to prevent microbial growth. [15],[14],[16]

- Methyl paraben
- Propyl paraben
- Sodium benzoate

5 Colouring Agents

Approved food-grade colorants are used to improve visual appeal.

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

Methods of Preparation of Chewable Jelly Dosage Forms

The method of preparation of chewable jelly formulations plays a crucial role in determining their texture, uniformity, drug content, stability, and sensory characteristics. The selection of an appropriate method depends on the nature of the gelling agent, thermal stability of the drug, desired mechanical properties, and scale of production. Several preparation techniques have been developed to ensure reproducibility and quality of chewable jelly dosage forms.

1. Conventional Heating and Cooling Method

This is the most widely used method for preparing chewable jellies and is suitable for thermally stable drugs.

Procedure:

- The gelling agent is dispersed in purified water and allowed to hydrate.
- The dispersion is heated with continuous stirring until complete dissolution occurs.
- Sweeteners, plasticizers, and stabilizers are added to the molten gel.
- The active pharmaceutical ingredient is incorporated at a controlled temperature.
- Flavouring and colouring agents are added just before moulding.
- The molten mass is poured into moulds and allowed to cool until gelation occurs.

Advantages: Simple, economical, and easy to scale up. Limitations: Not suitable for heat-sensitive drugs. [20]

2. Cold-Setting Method

This method is preferred for drugs and excipients that are sensitive to elevated temperatures. Procedure:

- The gelling agent is dissolved using minimal heating or mechanical agitation.
- Drug and other excipients are dissolved separately in suitable solvents.
- Both phases are mixed under controlled conditions at low temperature.
- The mixture is poured into molds and allowed to set at room temperature or under refrigeration.

Advantages: Preserves drug stability. Limitations: Limited choice of gelling agents.

3. Solvent Casting Method

The solvent casting technique is used to obtain uniform chewable jelly formulations with controlled thickness and texture.

Procedure:

- Gelling agents and excipients are dissolved in a suitable solvent system.
- The drug is uniformly dispersed or dissolved in the solution.
- The solution is cast onto molds or trays.
- Solvent evaporation occurs under controlled conditions.
- The formed jelly is cut into uniform units.

Advantages: Good content uniformity.
Limitations: Requires solvent removal and control. [20],[22]

4. Melt Fusion Technique

This method involves melting gelling agents and plasticizers without the use of solvents. Procedure:

- Gelling agents are melted at a specific temperature.
- Plasticizers and sweeteners are incorporated into the molten mass.
- The drug is added with continuous mixing.
- The mixture is poured into moulds and cooled.

Advantages: Solvent-free process.
Limitations: Limited applicability for thermolabile drugs.

5. Polymer Hydration and Gelation Method

This method relies on controlled hydration and cross-linking of polymeric gelling agents. Procedure:

- Polymers are slowly added to water with constant stirring to prevent lump formation.
- The drug is incorporated after complete hydration.
- Gelation occurs naturally upon cooling or pH adjustment.
- The jelly mass is moulded and set.

Advantages: Produces uniform gel matrix.
Limitations: Longer processing time.

6. Ionotropic Gelation Method

This technique is particularly suitable for alginate- and pectin-based jellies. Procedure:

- The gelling polymer and drug are dissolved in aqueous solution.
- The solution is exposed to multivalent ions such as calcium.
- Ionic cross-linking leads to gel formation.
- The gel is moulded and stabilized.

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

Advantages: Mild processing conditions.
Limitations: Requires precise control of ion concentration. [20],[21],[22]

7. Vacuum-Assisted Preparation Method

This method is employed to eliminate air entrapment and improve texture consistency.
Procedure:

- Jelly mass is prepared using conventional techniques.
- The mixture is subjected to vacuum to remove entrapped air.
- The deaerated mass is poured into moulds and allowed to set.

Advantages: Improved appearance and uniformity. Limitations: Requires specialized equipment.

8. Continuous Manufacturing Method

This method is used for large-scale industrial production. Procedure:

- Raw materials are fed into a continuous mixer-heater.
- The molten jelly mass flows through moulding and cooling zones.
- Final units are demoulded and packaged automatically.

Advantages: High production efficiency and reproducibility. Limitations: High initial setup cost.[22]

9. Microwave-Assisted Method

Microwave energy is used to heat and dissolve gelling agents rapidly. Procedure:

- Ingredients are mixed and subjected to microwave heating.
- Rapid gel dissolution occurs.
- The drug is added and mixed thoroughly.
- The mixture is moulded and cooled.

Advantages: Reduced processing time and energy efficiency. Limitations: Risk of uneven heating if not controlled.

10. Layered Jelly Preparation Method

This method is used to produce multi-layered chewable jellies for aesthetic or functional purposes.
Procedure:

- Individual jelly layers are prepared separately.
- Each layer is poured sequentially and allowed to partially set.
- The final composite jelly is allowed to cool completely.

Advantages: Allows design flexibility. Limitations: Complex processing steps.

Evaluation Parameters of Jelly Dosage Forms

Evaluation of jelly dosage forms is essential to ensure their quality, safety, efficacy, stability, and patient acceptability. Due to their semi-solid nature, jellies require both conventional pharmaceutical evaluation tests and specialized texture-related assessments. The following parameters are commonly employed for the evaluation of chewable jelly formulations.

1. Organoleptic Properties

Organoleptic evaluation provides preliminary information regarding patient acceptability.

1.1 Appearance

Jellies are visually inspected for:

- Colour uniformity
- Transparency or opacity
- Presence of air bubbles
- Surface smoothness

1.2 Taste and Odor

Taste and odour are assessed using sensory evaluation techniques to ensure palatability and absence of unpleasant smell.

2. Weight Variation

Uniformity of weight ensures dose consistency. Method:

- Individual jelly units are weighed.
- Mean weight is calculated.
- Percentage deviation from the average weight is determined.

3. Content Uniformity

This test confirms uniform distribution of the active ingredient throughout the jelly matrix. Method:

- Individual jelly units are dissolved in a suitable solvent.
- Drug content is analyzed using validated analytical methods.
- Results are expressed as percentage of labeled claim.

4. pH Determination

pH influences drug stability, taste, and microbial growth. Method:

- Jelly is dispersed in purified water.

International Journal of Pharmaceutical Research and Applications
Volume 11, Issue 1 Jan - Feb 2026, pp: 1043-1054 www.ijprajournal.com ISSN: 2456-4494

- pH is measured using a calibrated digital pH meter.

5. Texture Analysis
Texture analysis evaluates mechanical properties that affect chewability and mouthfeel. [23]

5.1 Hardness
Measures the force required to deform the jelly.

5.2 Elasticity
Determines the jelly's ability to regain its shape after compression.

5.3 Cohesiveness
Assesses internal bonding strength within the jelly matrix.

6. Gel Strength
Gel strength reflects the firmness and structural integrity of the jelly. [23]

Method:
- Measured using texture analyzers or Bloom strength testing.
- Higher gel strength indicates better shape retention.

7. Friability (Modified Test)
Although friability is primarily used for tablets, a modified approach may be used for jellies to assess physical robustness during handling and packaging.

8. Moisture Content
Moisture content affects texture, stability, and microbial growth. Method:
- Determined using loss-on-drying or moisture analyzers.
- Expressed as percentage moisture content.

9. Syneresis Study
Syneresis refers to the expulsion of liquid from the jelly matrix over time. Method:
- Jelly samples are stored under controlled conditions.
- Presence of liquid separation is visually observed and quantified.

10. In-Vitro Dissolution Studies [24]
Dissolution studies evaluate drug release characteristics. Method:
- Conducted using USP dissolution apparatus.
- Suitable dissolution medium is selected.
- Samples are withdrawn at predetermined intervals and analyzed.

11. Disintegration (Modified Test)
Although not mandatory, a modified disintegration test can be used to study jelly breakdown behavior. [26],[25]
Method:
- Jelly is subjected to simulated oral or gastric conditions.
- Time required for breakdown is recorded.

12. Spreadability
Spreadability indicates ease of deformation under applied force. Method:
- Measured by applying a known weight between glass plates.
- Diameter or spread area is measured.

13. Microbial Limit Test
Due to high moisture content, jellies are prone to microbial contamination. Tests include:
- Total viable count
- Yeast and mould count
- Absence of pathogenic microorganisms [25]

14. Stability Studies
Stability studies assess the effect of storage conditions on jelly quality. Parameters evaluated include:
- Appearance
- Texture
- pH
- Drug content
- Microbial load

Samples are stored under accelerated and long-term conditions as per regulatory guidelines. [26]

15. Packaging Compatibility Studies
Packaging materials are evaluated for their ability to protect jellies from moisture, oxygen, and contamination.

16. Sensory Evaluation Studies
Consumer acceptability studies are conducted using trained or untrained panels to evaluate:

- Mouthfeel
- Chewability
- Taste persistence

- **Regulatory and Stability Considerations**
Chewable jellies must comply with

pharmaceutical and food-grade regulatory standards. Stability concerns include moisture absorption, microbial contamination, and changes in texture over time. Proper packaging, such as blister packs or airtight containers, is essential to maintain product stability. [30],[31],[32]

- **Future Prospects**

With increasing focus on patient-centric drug delivery, chewable jelly formulations are expected to gain wider acceptance. Advances in polymer science and taste-masking technologies will further enhance their applicability for a broader range of drugs. Personalized medicine and pediatric formulations represent promising areas for future research. [30],[31],[32]

IX. CONCLUSION

Chewable jelly drug delivery systems represent an innovative and patient-friendly approach to oral drug administration. Their ease of use, palatability, and suitability for special populations make them an attractive alternative to conventional dosage forms. Although formulation and stability challenges exist, continued research and technological advancements are likely to expand their pharmaceutical applications in the future.

REFERENCES

[1]. Sastry SV, Nyshadham JR, Fix JA. Recent technological advances in oral drug delivery. Pharm Sci Technol Today. 2000;3(4):138–145.
[2]. Allen LV Jr. Dosage form design and development. Int J Pharm Compd. 2003;7(3):183–188.
[3]. Dixit RP, Puthli SP. Oral strip technology: Overview and future potential. J Control Release. 2009;139(2):94–107.
[4]. Deshmukh VN. Mouth dissolving drug delivery system: A review. Int J PharmTech Res. 2012;4(1):412–421.
[5]. Shojaei AH. Buccal mucosa as a route for systemic drug delivery. J Pharm Pharm Sci. 1998;1(1):15–30.
[6]. Patel VF, Liu F, Brown MB. Advances in oral transmucosal drug delivery. J Control Release. 2011;153(2):106–116.
[7]. Rathbone MJ, Drummond BK, Tucker IG. Oral cavity as a site for systemic drug delivery. Adv Drug Deliv Rev. 1994;13(1–2):1–22.
[8]. Preis M, Knop K, Breitkreutz J. Chitosan-alginate microparticles for oral delivery. Eur J Pharm Biopharm. 2012;81(3):491–498.
[9]. Mahajan HS, Gundare SA. Formulation and evaluation of mouth dissolving tablets. Res J Pharm Biol Chem Sci. 2010;1(3):280–287.
[10]. Sohi H, Sultana Y, Khar RK. Taste masking technologies in oral pharmaceuticals. Drug Dev Ind Pharm. 2004;30(5):429–448.
[11]. Pather SI, Rathbone MJ. Design of oral gel and jelly drug delivery systems. Drug Dev Ind Pharm. 2008;34(8):879–892.
[12]. Costa P, Lobo JMS. Modeling and comparison of dissolution profiles. Eur J Pharm Sci. 2001;13(2):123–133.
[13]. Banker GS. Drug release from polymeric matrices. J Pharm Sci. 1966;55(1):81–89.
[14]. Rowe RC, Sheskey PJ, Quinn ME. Excipients in oral formulations. Int J Pharm. 2009;370(1–2):1–12.
[15]. Kumari A, Sharma PK, Garg VK. Gelling agents in pharmaceutical formulations. Pharm Rev. 2010;8(2):1–6.
[16]. Allen LV Jr. Role of sweeteners and flavors in oral formulations. Pharm Compounding. 2004;8(4):262–266.
[17]. Bhusnure OG, Gholve SB, Giram PS. Oral jelly drug delivery system: A review. World J Pharm Res. 2015;4(10):1250–1262.
[18]. Mahajan A, Chhabra N, Aggarwal G. Formulation strategies for oral jellies. Asian J Pharm. 2011;5(1):1–7.
[19]. Bala R, Pawar P, Khanna S, Arora S. Orally dissolving strips: A review. Int J Pharm Investig. 2013;3(2):67–76.
[20]. Kulkarni AS, Deokule HA. Development of oral jelly formulations. Int J Pharm Sci Rev Res. 2013;22(2):61–66.
[21]. Gattani SG, Savaliya PJ. Solvent casting technique in oral dosage forms. J Pharm Sci Res. 2010;2(10):616–621.
[22]. Thakur RR, McMillan HL, Jones DS. Solvent casting and gelation methods. Int J Pharm. 2012;423(2):210–218.
[23]. Guhmann M, Thommes M. Mechanical testing of soft oral dosage forms. Int J Pharm. 2020;589:119844.
[24]. United States Pharmacopeia. Tests for non-solid oral dosage forms. USP–NF. Rockville: USP Convention; 2023.
[25]. Costa P. An alternative method to evaluate

dissolution characteristics. Eur J Pharm Sci. 2001;13(2):123–133.

[26]. ICH Q1A(R2). Stability testing of new drug products. ICH Guidelines. 2003.

[27]. Preis M, Breitkreutz J. Pediatric oral drug delivery systems. J Pharm Pharmacol. 2017;69(3):299–315.

[28]. Batchelor HK, Marriott JF. Formulations for children. Adv Drug Deliv Rev. 2015;73:102–126.

[29]. Stegemann S, Ternik RL, Onder G. Geriatric drug delivery. Eur J Pharm Sci. 2010;41(3–4):284–295.

[30]. ICH Q1A(R2). Stability testing of new drug substances and products. ICH Harmonised Guideline. 2003.

[31]. EMA. Reflection paper on formulations for pediatric use. Eur Med Agency. 2006.

[32]. Salunke S, Liu F, Batchelor H. Formulation challenges in pediatric medicines. Adv Drug Deliv Rev. 2017;122:20–35.