

“NATURAL POLYMERS AND THEIR APPLICATIONS IN FAST DISSOLVING TABLETS: A COMPREHENSIVE REVIEW”

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Introduction of FDT

Fast dissolving tablets (FDTs) offer rapid drug disintegration and absorption without water, addressing challenges for patients with swallowing difficulties, like pediatric and geriatric populations. FDTs improve patient compliance and provide faster therapeutic action. Traditional tablets often fail to meet these needs, making natural polymers a promising alternative. Natural polymers enhance safety, ensure faster disintegration, and improve drug release, offering significant advantages in pharmaceutical formulations.

Mechanism Of Action

- **Disintegration:** FDTs rapidly break apart in saliva without water.
- **Dissolution:** The drug is released and dissolves in saliva.
- **Absorption:** The drug is absorbed through the oral mucosa or GI tract.
- **Therapeutic Effect:** The drug enters the bloodstream quickly, by passing first-pass metabolism for faster action.



Introduction Of Natural Polymer

Natural polymers are increasingly utilized in Fast Dissolving Tablets (FDTs) for their biocompatibility, safety, and ability to enhance disintegration. Polymers like Xanthan gum, Guar gum, and Plantago ovata promote rapid tablet breakdown in saliva, leading to faster drug release and absorption. Their incorporation not only boosts FDT performance but also meets the demand for safer, sustainable excipients, aiding the development of innovative drug delivery systems that improve patient compliance and therapeutic outcomes.

Why Natural Polymers in FDTs

1. **Biocompatibility:** Safe, non-toxic for drug delivery.
2. **Biodegradability:** Eco-friendly, easily eliminated from the body.
3. **Low Cost:** Affordable, derived from abundant resources.
4. **Non-allergenic:** Lower risk of allergic reactions.
5. **Patient Compliance:** Suitable for all age groups due to safety.
6. **Sustained Release:** Allows for controlled and extended drug release.
7. **Gel-forming:** Quick disintegration in saliva.

Introduction to Superdisintegrants

Superdisintegrants are key excipients in the formulation of Fast Dissolving Tablets (FDTs). They facilitate the rapid breakdown of tablets upon contact with saliva by promoting water uptake and swelling, which accelerates disintegration. Unlike conventional disintegrants, superdisintegrants work more efficiently at lower concentrations, ensuring quick disintegration without compromising tablet integrity. Their use is essential in improving drug release and absorption, making them vital for enhancing the performance and patient acceptability of FDTs.

Types of Superdisintegrants

Synthetic Superdisintegrants

- **Example:** Croscarmellose sodium, Crospovidone, Sodium starch glycolate
- These are widely used due to their high efficiency and rapid swelling properties.

Natural Superdisintegrants

- **Example:** Plantago ovata, Guar gum, Xanthan gum
- Derived from natural sources, these are biodegradable, non-toxic, and preferred for their safety profile.

Methods For The Preparation Of Fast Dissolving Tablets

Direct Compression

Lyophilization (Freeze-Drying)

Molding

Sublimation

Cotton Candy Process (Flash Heat Process)

Spray Drying

Natural Polymer Utilized In Commercial Pharmaceuticals



Chitin and chitosan:

- **Marketed drug:** Cinnarizine
- **Disintegration time:** 60 sec
- **Concentration used:** 3% w/w



Agar and treated agar:

- **Marketed drug:** Theophylline
- **Disintegration time:** 20 sec
- **Concentration used:** 1-2% w/w



Gum Karaya:

- **Marketed drug:** Amlodipine
- **Disintegration time:** 17.10 sec
- **Concentration used:** 4% w/w



Fenugreek seed mucilage:

- **Marketed drug:** Metformin HCl
- **Disintegration time:** 15.6 sec
- **Concentration used:** 4% w/w

Evaluation Parameters Used For Fast Dissolving Tablets

- Hardness
- Friability
- Weight Variation
- Thickness
- Disintegration Time

- Wetting Time
- Water Absorption Ratio
- In-Vitro Dissolution Study
- Content Uniformity
- Moisture Uptake

- Taste Evaluation
- Mechanical Strength
- Porosity
- Stability Testing (under different temperature and humidity conditions)

Conclusion

Natural polymers in fast dissolving tablets (FDTs) offer a promising advancement in drug delivery, enhancing disintegration, drug release, and patient compliance. Their renewable nature provides a sustainable alternative to synthetic excipients while maintaining drug efficacy and bioavailability, making them a valuable option for future pharmaceutical formulations.

References

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