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Journal of Pharmacological Reports

Perspective

The Materials used and Benefits of Tablet Coating

Rehaban Rinah*

Department of Pharmaceutics, Kuwait University, Kuwait, Kuwait

ABOUT THE STUDY

Tablet coating is a critical pharmaceutical process that plays a significant role in enhancing medication delivery and improving the overall patient experience. It involves applying a thin layer of a coating material onto a tablet or pill to achieve various objectives, including taste masking, protection of the Active Pharmaceutical Ingredient (API), and controlled release of the drug. This process has evolved over the years, offering numerous advantages to both pharmaceutical manufacturers and patients.

Importance of tablet coating

Taste masking: Many medications have an unpleasant taste or odour that can be off-putting for patients. Coating the tablets can mask these undesirable attributes, making the medication more palatable and increasing patient compliance, especially in the case of pediatric and geriatric patients.

Protecting the API: Some active pharmaceutical ingredients are sensitive to environmental factors such as moisture, light, or oxygen. Coating acts as a protective barrier, shielding the API from these elements and ensuring its stability throughout its shelf life.

Modified release: Tablet coating can be tailored to control the release rate of the drug, allowing for sustained, extended, or delayed release formulations. This is particularly important for drugs that require a specific dosing regimen or exhibit dose-dependent effects.

Improved aesthetics: Coated tablets often have a more attractive appearance, with smooth and glossy surfaces. This can enhance the overall perception of the medication and promote patient trust.

Types of tablet coating

There are several methods of tablet coating, each with its own set of advantages and applications. The most common types include:

Sugar coating: This traditional method involves layering tablets with multiple coats of sugar-based solutions, such as sucrose or gum arabic. Sugar coating provides a glossy appearance and excellent taste masking. However, it is time-consuming and has largely been replaced by other coating techniques.

Film coating: Film coating is the most widely used method in modern pharmaceutical manufacturing. It involves applying a thin polymer film to the tablet's surface using a coating solution that contains polymers, plasticizers, and colorants. Film-coated tablets are easier to swallow, have improved stability, and allow for precise control of drug release.

Enteric coating: It is designed to protect the tablet from gastric acid and release the drug in the intestine. It is commonly used for medications that are irritating to the stomach or require a delayed release profile. Enteric-coated tablets are resistant to dissolution in acidic conditions but disintegrate in the alkaline environment of the small intestine.

Compression coating: It involves pressing a layer of granulated material onto the tablet core. This method is particularly useful for preparing multi-layer tablets with different release profiles. It is often employed in the development of controlled-release formulations.

Materials used in tablet coating

The choice of coating materials is crucial and depends on the specific requirements of the drug formulation. Some common coating materials include:

Cellulose derivatives: Hydroxypropyl Methylcellulose (HPMC) and ethyl cellulose are widely used in film coating due to their excellent film-forming properties, stability, and compatibility with various drugs.

Acrylic polymers: Eudragit are often used for enteric coating because they provide pH-dependent solubility, ensuring drug release in the intestinal environment.

PEG (Polyethylene Glycol): PEG is used as a plasticizer in film coating formulations. It enhances film flexibility and helps in achieving a uniform coating layer.

Colorants and opacifiers: These additives are used to give tablets their desired color, appearance, and opacity.

Correspondence to: Rehaban Rinah, Department of Pharmaceutics, Kuwait University, Kuwait, Kuwait, E-mail: rinahrehba@gmail.com

Received: 17-Nov-2023, Manuscript No. JPR-23-26920; **Editor assigned:** 20-Nov-2023, PreQC No. JPR-23-26920 (PQ); **Reviewed:** 05-Dec-2023, QC No. JPR-23-26920; **Revised:** 12-Dec-2023, Manuscript No. JPR-23-26920 (R); **Published:** 19-Dec-2023, DOI: 10.35248/jpr.23.7.191

Citation: Rinah R (2023) The Materials used and Benefits of Tablet Coating. J Pharma Reports. 7:191.

Benefits of tablet coating

Tablet coating offers several advantages to pharmaceutical manufacturers and patients:

Improved patient compliance: Taste masking and ease of swallowing contribute to better patient adherence to medication regimens.

Enhanced stability: Coating protects the drug from degradation caused by environmental factors, ensuring product efficacy and shelf life.

Precise drug release: Controlled-release formulations enable consistent drug delivery, reducing the need for frequent dosing.

Diverse formulation options: Tablet coating allows for the development of various dosage forms, including immediate-release, extended-release, and delayed-release tablets.

Enhanced aesthetics: Coated tablets are visually appealing, which can positively influence patient perception.

Reduced side effects: Enteric coating can prevent gastric irritation associated with some medications.

Tablet coating is a vital pharmaceutical process that enhances medication delivery and patient experience. It serves multiple purposes, including taste masking, protection of the active pharmaceutical ingredient, and controlled drug release. Various coating methods and materials are available to suit the specific requirements of different drug formulations. Overall, tablet coating plays a crucial role in improving the effectiveness, stability, and acceptability of pharmaceutical products, ultimately benefiting both manufacturers and patients. As pharmaceutical technology continues to advance, tablet coating will likely remain a cornerstone of drug formulation and delivery.