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AN OVERVIEW OF THE MEDICATION RELEASE MECHANISM AND FORMULATION TECHNIQUES USED IN IMMEDIATE RELEASE TABLETS

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ABSTRACT

The oral route of administration remains the most favored among various administration methods due to its numerous advantages, such as easy consumption, pain avoidance, versatility, and, most significantly, patient compliance. Tablets are the most prevalent type of medication nowadays due to their convenience for self-administration, compact size, and ease of production. Immediate start of action is sometimes deemed necessary, making immediate release pills the ultimate choice. In recent times, quick release tablets have become increasingly popular and widely accepted as a method of delivering drugs. This is mostly due to their convenience of administration and ability to improve patient compliance. This work focuses on the formulation, development, and assessment of instant release tablets. The utilization of quick release dosage forms enables a producer to prolong their exclusive rights in the market. Additionally, they serve as a means to broaden markets, prolong the lifespan of products, and create new prospects.

KEYWORDS: Immediate release tablets, Onset of Action and Super-Disintegrants, Granulation, Disintegration.

1. INTRODUCTION

The oral route is widely utilized for medication delivery due to its systemic efficacy, patient adherence, and cost-effectiveness in manufacturing. Solid oral delivery devices are cost-effective to produce as they do not necessitate sterile conditions.[1] In recent years, there has been a growing emphasis and interest in the field of controlled release and targeted drug delivery systems. Specifically, tablet dosage forms have been developed to be ingested whole, rapidly disintegrate, and promptly release their medications in the gastrointestinal tract.[2] An optimal dose regimen of pharmacological therapy is the one that rapidly achieves the required therapeutic concentration of the medication in plasma or at the site of action, and consistently maintains it throughout the full course of treatment.[3] The experts have directed their attention towards the formulation of an immediately released tablet. The development of a fast-disintegrating tablet is achieved through the utilization of appropriate diluents and highly effective super disintegrants.[4]

1.1 Tablet

A tablet is a solid dosage form that consists of crushed medicaments, sometimes with additional substances called excipients. As per the Indian pharmacopoeia, pharmaceutical tablets are solid, flat or biconvex plates that serve as a single dose of medication. They are made by compressing a drug or a combination of medications, with or without additional substances. They exhibit a range of shapes and exhibit significant variations in size and weight, contingent upon the quantity of medicinal ingredients and the planned method of delivery.

1.2 Properties of tablets

1. The tablet must possess adequate strength and durability to survive impact, friction, and handling throughout the processes of production, packaging, shipping, and usage. The characteristic in question is measured by conducting hardness and friability tests.
2. The tablet should have consistent weight and pharmacological content for each individual tablet. These tests assess the weight fluctuation and content uniformity.
3. The substance should possess both chemical and physical stability in order to preserve its physical characteristics over a prolonged period.
4. The tablet must have the ability to consistently and reliably release the therapeutic ingredients.

1.3 Advantages

2. They are simple to manage.

3. The cost of oral dosage forms is the most affordable among all options.
4. Easily ingested with minimal risk of obstruction.

1.4 Disadvantages

1) Challenging to ingest for children and others who are unconscious.
2) Some medications have an amorphous nature and low-density character, which makes them resistant to compaction into dense compacts.

1.5 Types of tablets[5,6,7]

1. Tablets ingested orally

a. Standard compressed tablet
b. Multiple compressed tablet
1) Layered tablet
2) Compression coated tablet
c. Repeat action tablet
d. Delayed action and enteric coated tablet
e. Sugar and chocolate coated tablet
f. Film coated tablet
g. Chewable tablet
h. Targeted tablet
1) Floating tablet
2) Colon targeted tablet.

These tablets should be ingested whole, accompanied by an adequate amount of drinkable water. An exception refers to a type of medication that is in the form of a chewable tablet. More than 90% of the tablets produced nowadays are taken orally.

2. Tablets used in the oral cavity

a. Buckle tablet
b. Sublingual tablet
c. Troches and lozenges
d. Dental cones
e. Mouth dissolved tablet

The tablets in this category are designed to deliver API (Active Pharmaceutical Ingredient) directly to the oral cavity or to have a localized effect in this area. The pills in this category circumvent first-pass metabolism, degradation in the stomach environment, nausea, and provide a quick onset of action. The tablets produced for this location are specifically intended to fit precisely within the appropriate region of the mouth cavity.

I. Tablets administered by other routes

a. Implantation tablet
b. Vaginal tablets

These tablets are supplied via routes other than the oral cavity to prevent the medications from traveling through the gastrointestinal tract. These pills can be injected into different bodily cavities or placed directly under the skin for absorption into the bloodstream from the application site

II. Tablets used to prepare solution

a. Effervescent tablet
b. Dispensing tablet
c. Hypodermic tablet
d. Tablets triturates.

2. IMMEDIATE RELEASE TABLETS

Immediate release tablets are invented to disintegrate and release their dosage form with no special rate controlling features, such as special coatings and other techniques. Immediate release tablets are those which disintegrate rapidly and get dissolved to release the medicaments.[8] The oral bioavailability of drug dependent on disintegration, dissolution and various physiological factors.[9] An immediate release dosage form helps a manufacture to diversify market and simultaneously offering patients a convenient dosage form or dosage regimen.[10]

Immediate release tablets are those which disintegrate rapidly and get dissolved to release the medicaments. Immediate release may be provided for by way of an appropriate pharmaceutically acceptable diluents or carrier, which diluents or carrier does not prolong, to an appreciable extent, the rate of drug release and or absorption. This term excludes formulations which are adapted to provide for modified, controlled, sustained, prolonged, extended or delayed release of drug.

Release term includes the provisions of drug from the formulation to the gastrointestinal tract, to body tissues and or into systemic circulation. For gastrointestinal tract release, the release is under pH conditions such as pH=1 to 3, especially at, or about, pH=1. In one of the invention a formulation as described herein with a compound of formula, or an acid addition salt thereof, in crystalline form release drug under a range of PH conditions. Thus, formulations of the invention may release at least 70 % of active ingredients within 3-4 hours and more preferably 2hours [such as within 30 minutes], of administration, whether this be oral or parenteral.

2.1 Merits

- Improved stability, and bioavailability.
- Decreased disintegration and dissolution times for immediate release oral dosage forms
- Suitable for controlled, sustained release actives.
- High drug loading is possible.
- Ability to provide advantages of liquid medication in the form of solid preparations
- Cost-effective.
- Improved compliance added convenience.[11,12]
- Ease of swallowing is possible.[13]
- Bilayers tablet is possible for sequential release of two drugs in combination and separate two incompatible substances.[14]

2.2 Demerits

- Frequent dosing is necessary for a drug with a short half-life.

- Drug release at a time may produce high plasma concentration which may produce toxicity. Ng to toxicity.

3. IDEAL PROPERTIES OF DRUGS SUITABLE FOR IMMEDIATE RELEASE

1. Solid dose forms should undergo dissolution or disintegration in the stomach within a brief timeframe.
2. The initial process of adsorption and dissolution of the medication should be displayed.
3. Immediate release pills consistently exhibit rapid beginning of action.
4. Must exhibit compatibility with taste masking.
5. Be easily transportable without any concerns about fragility.
6. It should not leave a negligible or non-existent residue in the mouth following oral intake.
7. Offers a pleasant tactile sensation in the mouth.
8. Demonstrate minimal susceptibility to external factors such as humidity and temperature.
9. Produced using cost-effective conventional processing and packaging equipment.[15, 16]

4. UNSUITABLE DRUG CHARACTERISTIC FOR IMMEDIATE RELEASE TABLETS

Immediate release tablets are not appropriate for drugs with a short biological half-life. Pharmaceuticals with limited bioavailability are likewise unsuitable for immediate release tablets. Immediate release tablets are not suitable for drugs with higher clearance and longer elimination half-life. The user's text is empty.[17]

5. EXCIPIENTS

Excipients balance the properties of the actives in immediate release dosage forms. This demands a thorough understanding of the chemistry of these excipients to prevent interaction with the actives. Determining the cost of these ingredients is another issue that needs to be addressed by formulators. The role of excipients is important in the formulation of fast-melting tablets. These inactive food-grade ingredients, when incorporated in the formulation, impart the desired organoleptic properties and product efficacy. Excipients are general and can be used for a broad range of actives, except some actives that require masking agents.

5.1 Bulking materials

Bulking materials are significant in the formulation of fastmelting tablets. The material contributes functions of a diluent, filler and cost reducer. Bulking agents improve the textural characteristics that in turn enhance the disintegration in the mouth, besides; adding bulk also reduces the concentration of the active in the composition. The recommended bulking agents for this delivery system should be more sugar-based such as mannitol, polydextrose, lactitol, DCL (direct compressible lactose) and starch hydrolystate for higher aqueous solubility and good sensory perception. Mannitol in particular has high aqueous solubility and good sensory perception. Bulking agents are added in the range of 10 percent to about 90 percent by weight of the final composition.

5.2 Emulsifying agents

Emulsifying agents are important excipients for formulating immediate release tablets they aid in rapid disintegration and drug release. In addition, incorporating emulsifying agents is useful in stabilizing the immiscible blends and enhancing bioavailability. A wide range of emulsifiers is recommended for fast-tablet formulation, including alkyl sulfates, propylene glycol esters, lecithin, sucrose esters and others. These agents can be incorporated in the range of 0.05 percent to about 15 percent by weight of the final composition.

5.3 pH Modifiers

Inclusion of pH modifiers such as acids, bases, or buffers may also be beneficial in an amount of from 0 to 10 % w/w. Acidic pH modifiers (e.g., acids such as citric acid or succinic acid) retard the dissolution of the pharmaceutical composition when the dispersion polymer is anionic. Alternatively, basic pH modifiers (e.g., sodium acetate or amines) enhance the rate of dissolution of the same types of pharmaceutical composition.

5.4 Lubricants

Lubricants, though not essential excipients, can further assist in making these tablets more palatable after they disintegrate in the mouth. Lubricants remove grittiness and assist in the drug transport mechanism from the mouth down into the stomach.

5.5 Flavours and Sweeteners

Flavours and taste-masking agents make the products more palatable and pleasing for patients. The addition of these ingredients assists in overcoming bitterness and undesirable tastes of some active ingredients. Both natural and synthetic flavours can be used to improve the organoleptic characteristic of fast-melting tablets. Formulators can choose from a wide range of sweeteners including sugar, dextrose and fructose, as well as nonnutritive sweeteners such as aspartame, sodium saccharin, sugar alcohols and sucralose. The addition of sweeteners contributes a pleasant taste as well as bulk to the composition.[18,19,20,21,22]

6. SUPER DISINTEGRANTS

A super disintegrant is an additive that is included in a tablet or capsule mixture to facilitate the disintegration of the compressed mass when it comes into contact with a liquid environment.

6.1 Advantages

- Exhibits efficacy at lower concentrations.
- Has a reduced impact on the compressibility and flowability of the substance.
- Demonstrates greater effectiveness within the granules.

- **Some super disintegrants are: Sodium Starch Glycolate (Explotab, primogel)** are utilized at concentrations ranging from 2-8%, with the optimal concentration being 4%. Mechanism of Action: The process involves a quick and significant increase in size with minimum formation of a gel-like substance. Microcrystalline cellulose, also known as Avicel or celex, is typically utilized in tablets with a concentration ranging from 2% to 15% of the tablet weight.

- **Cross-linked Povidone or cross povidone (Kollidone):** Into the tablet at a concentration of 2-5% of its weight. Totally non-soluble in water. Mechanism of Action: The process involves the absorption of water, expansion, and potentially some ability to regain its original shape after deformation. It quickly scatters and expands in water, but does not form a gel even after long-term contact. Highest rate of expansion in comparison to other substances that promote disintegration. This disintegrant has a higher surface area to volume ratio compared to other disintegrants.

- **Low-substituted hydroxyl propyl cellulose, which is insoluble in water:** Experiences rapid expansion when exposed to water. The grades LH-11 and LH-21 demonstrate the most significant level of edema. Specific grades may possess cohesive characteristics while maintaining the ability to disintegrate. Optimal dilution range: 1-5%

- **Cross linked carboxy methyl cellulose sodium (Ac-Di-sol) Croscarmellose sodium:** Mechanism of Action: The fibrous structure of the material facilitates wicking, while also exhibiting minimal gelling when it swells. Optimal Concentrations: The direct compression method typically requires a percentage range of 1-3%, while wet granulation typically requires a percentage range of 2-4%.[18]

7. CONVENTIONAL TECHNIQUES USED FOR PREPARATION OF IMMEDIATE RELEASE TABLETS

Various technologies exist for the production of quick release tablets. The predominant techniques for preparation include molding, lyophilization or freeze drying, direct compression, spray drying, and sublimation.[23]

7.1 Tablet molding technique

This approach involves the use of water-soluble components to expedite the disintegration and dissolution of the tablet. Hydroalcoholic solvents are utilized to dampen a mixture of powder and subsequently exert a compression force that is lower than that required for traditional tablet formation in order to shape the tablet. The solvent is subsequently eliminated by the process of air drying. The presence of a porous structure in molded tablets increases the rate of dissolution.[24]

7.2 Direct compression

Direct compression refers to a method of tablet formulation where tablets are made by compressing a powder blend of appropriate excipients and active pharmaceutical ingredient (API) without any additional steps. Pre-treatment of blended powder using either dry or wet granulation procedures is unnecessary. It offers advantages primarily in terms of fast manufacturing, since it involves fewer machines, a smaller workforce, fewer steps, and much less time for processing, while also improving product stability.[25]

7.3 Granulation techniques

Granulation procedures involve the process of increasing the size of microscopic particles by forming larger agglomerates, resulting in enhanced physical strength. Avoiding segregation of the constituent goods, improving powder flow and handling, and minimizing dustiness are advantageous. The particle is perfectly spherical, and the reduced size allows it to effectively occupy the empty spaces between the granules. This approach can also be categorized into two distinct categories.[26]

A) Wet granulation

The wet granulation procedure facilitates the efficient production of tiny particles for medication manufacture. Typically, the quick release formulation is granulated by adding a binding polymer to an aqueous solution, resulting in the formation of fine particles. A controlled release formulation was produced by including a binder polymer solution.[27]

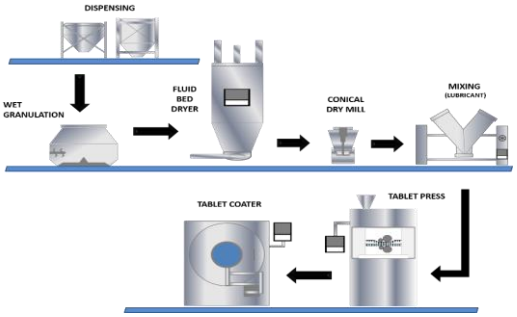

Fig. 1: Powder characterisation techniques for wet granulation.[28]

B) Dry granulation

Dry granulation involves compressing the powder mixture without the need for heat or solvent. The two fundamental methods involve compressing a material to form a compact and subsequently milling the compact to obtain granules. There are two ways often employed for dry granulation. The user's text is a reference to a specific source, indicated by the number.[29]

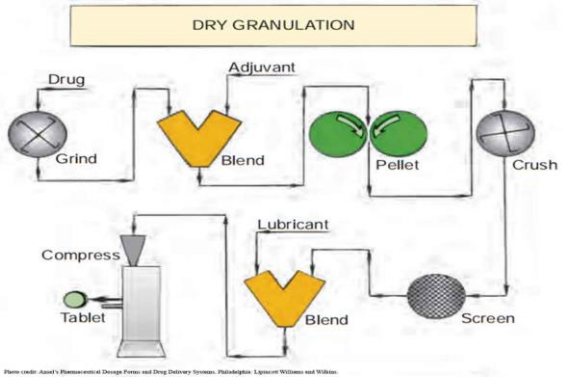

Fig. 2: Manufacture of tablets by dry granulation method.[30]

7.4 Mass extrusion

Mass extrusion involves the process of softening a mixture of the active medication with a water-soluble solvent such as methanol and polyethylene glycol. This softened mixture is then placed into an extruder to create a cylindrical shape for the final product. The extruded cylinder is then segmented using a heated blade to form tablets for dose administration.[31]

7.5 By Solid dispersions[32,33,34]

When preparing solid amorphous dispersions for quick release solid dosage forms intended for oral administration to the gastrointestinal system of an animal, such as a human, it is frequently advantageous to maximize the quantity of dispersion contained in the dosage form. This reduces the volume of the solid medication needed to reach the desired dosage. The solid amorphous dispersion should ideally contain a minimum of 30 wt % of the drug dose, preferably a higher percentage, and even more preferably at least 50 wt % or more of the solid dosage form. High drug loadings of dispersion in solid dosage forms reduce the size of the dosage forms, facilitating swallowing for the patient and potentially enhancing patient compliance.

The immediate release dosage forms contain a solid dispersion that improves the solubility of a drug with low solubility. This means that the drug may be either substantially insoluble in water, with a minimum solubility of less than 0.01 mg/ml at pH levels relevant to the body (pH 1-8), or sparingly soluble in water, with solubility ranging from about 1 mg/ml to as high as about 20-40 mg/ml.

The drug dispersion used in creating the high loading instant release dosage forms of this invention consist of solid dispersions of a medication and at least one concentration boosting polymer. The concentration increasing polymer is included in the dispersions used in this invention in a quantity that effectively increases the drug concentration in a given use environment compared to a control composition. The dispersions utilized in this invention offer a minimum concentration enhancement compared to a control group that only contains the crystalline form of the medication. Therefore, the dispersion contains an adequate quantity of the concentration enhancing polymer. When this dispersion is introduced into a specific environment, it results in an enhanced drug concentration compared to a control sample that contains the same amount of crystalline drug but lacks the concentration enhancing polymer.

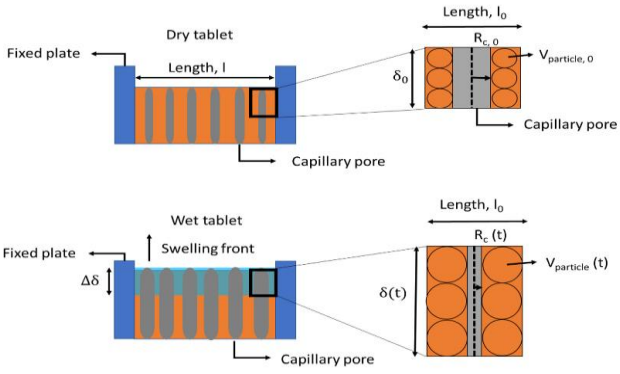

Fig. 3: The significance of tablets internal structure on disintegration and dissolution of immediate release.[35]

8. Mechanism of disintegration

Disintegrants are substances incorporated into tablets and encapsulated formulations to facilitate the fragmentation of the tablet and capsule "slugs" into smaller pieces when exposed to water. This process increases the surface area available for drug release and promotes a faster release of the drug substances. [36] They induce the infiltration of moisture and the scattering of the tablet matrix. The process of tablet disintegration has garnered significant interest as a crucial step in obtaining rapid medication release. The user's text is a reference to a specific source or citation. There are four primary methods by which tablets disintegrate.

8.1 Swelling

Swelling is the most widely acknowledged general mode of action for tablet disintegration. Tablets that have a high porosity exhibit weak disintegration because they lack sufficient swelling force. Conversely, the tablet with poor porosity experiences a significant amount of swelling force. It is important to mention that when the packing percentage is extremely high, the tablet becomes impermeable to fluid and the process of disintegration slows down.[37]

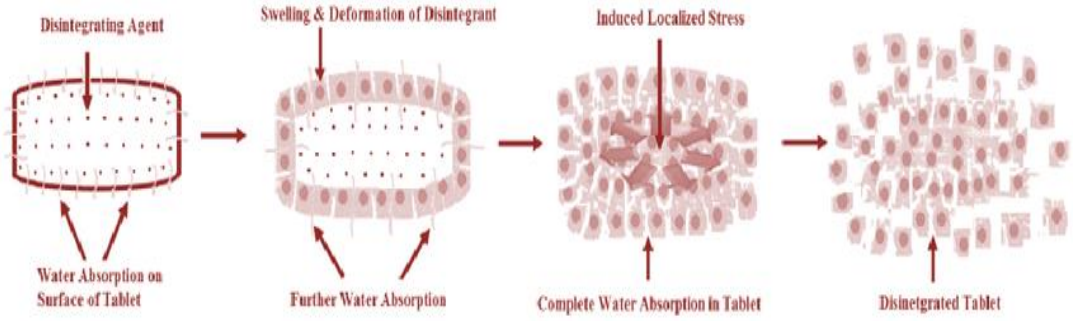

Fig. 4: Swelling tablet disintegration mechanism.[37]

8.2 Capillary Action/ Wicking

The disintegrating agents do not undergo swelling; thus, they function through the process of capillary action and porosity. The porosity of tablets allows for the fluid to enter the dose form. The disintegrating particles, characterized by low compressibility and cohesiveness, promote high porosity and create a pathway for liquid absorption in the tablet through capillary action. This process disrupts the inter-particle bonding, resulting in the tablet breaking apart.[38]

8.3 Chemical reaction [Acid-base reaction]

The tablet undergoes rapid disintegration caused by the internal liberation of CO2 in water as a result of the interaction between tartaric acid and citric acid (acids) with alkali metal carbonates or bicarbonates (bases) in the presence of water. The tablet disintegrates as a result of pressure generation. The solubility of API in water and the masking of its flavor are influenced by the release of CO2 gas. Strict control of the environment is necessary during tablet manufacturing, as disintegrates are highly sensitive to even little fluctuations in humidity and temperature. The effervescent mixture can be added either immediately before compression or in two separate portions of the formulations.[39]

8.4 Deformation

The starch granules exhibit an elastic property, allowing them to be easily distorted by pressure and thereafter regain their original location and shape once the pressure is released. However, when compressive forces are exerted during the tableting process, the grains undergo permanent deformation and are referred to as "energy rich". This energy is subsequently released upon contact with water.[40]

9. EVALUATION OF IMMEDIATE RELEASE DOSAGE FORMS

Evaluation of powder blend

The prepared blend is evaluated by following tests.

1. Angle of repose
2. Bulk density
3. Tapped density
4. Hauser’s ratio
5. Carr’s index

1. Angle of repose

The angle of repose refers to the three-dimensional inclination (in relation to the horizontal base) taken by a conical heap of material created by various means. The method employed is the fixed height method. The fixed funnel method involves securing a funnel at a specific height (2 cm) above a graph paper put on a flat horizontal surface. The granules or tablet blend were meticulously poured down the funnel until the highest point of the conical pile precisely contacts the tip of the funnel. Therefore, let r represent the radius of the base of the conical pile. The angle of repose is determined using a mathematical formula.

The equation is written as

$\tan \theta = h/r$.

The angle of repose (θ) is calculated using the formula $\theta = \tan^{-1}(h/r)$.

Let h represent the height of the powder pile.

The variable r represents the radius of the circular pile.

2. Bulk Density (Pb)

The determination of bulk density is accomplished by the utilization of a constant mass method employing a measuring cylinder. Bulk density refers to the proportion of the mass of an untapped quantity of powder to its volume, taking into account the empty volume between particles. The unit of measurement is grams per milliliter (gm/ml) and is determined by The formula for bulk density (ρB) is calculated by dividing the mass (M) of a substance by its volume (Vo). Let M represent the mass of the powder, measured in grams. Vo refers to the void volume, which represents the untapped volume in milliliters.

3. Tapped Density (Pt)

The volume is determined by using a measuring cylinder and tape it until there is no more change in the measurement. The tapped density (ρT) is measured in grams per milliliter (gm/ml) and is calculated using the formula:

Tapped density (ρT) = M/Vf

Let M represent the mass of the powder, measured in grams.

Vf represents the final bulk volume of a substance after it has been tapped, measured in milliliters.

4. Hausner ratio

The Hausner ratio is a surrogate measure used to forecast the flowability of powdered substances. The calculation is determined using the following formula. The Hausner ratio is calculated by dividing the tapped density (ρT) by the bulk density (ρB).

The Hausner ratio is calculated using the following formula: V_0/V_F

The Hausner ratio is defined as the ratio of the bulk volume (Vo) to the tapped volume (Vf).

3. Compressibility Index (Carr's Index)

The compressibility index, also known as Carr's index, is an indirect metric used to estimate the flow characteristics of a powder. The compressibility index is calculated by measuring the starting volume (Vo) and final volume (Vf) of a powder sample after it has been completely tapped in a measuring cylinder. The compressibility index (CI) is calculated using the formula CI = (Vo - Vf) / Vo X 100. Alternatively, the compressibility index can be determined by utilizing the measured values of bulk density (ρB) and tapped density (ρT) in the following manner.

The compressibility index is calculated as 100 multiplied by the difference between the bulk density (ρB) and the tapped density (ρT), divided by the tapped density (ρT).

Compressibility index = 100 x {(ρT-ρB)/ρT.[41]

Post compression tests

5. Weight variation

The weight variation test involves randomly selecting 20 tablets from the entire batch and measuring their individual weights. The individual weights are then compared to the average weight to assess the weight variations.

The formula to calculate the percentage difference (PD) is given by PD

$PD = [(W_{avg}–W_{initial})/ (W_{avg})] \times 100$

Were,

PD = Percentage deviation,

W_{avg} = Average weight of tablet,

$W_{initial}$ = Individual weight of tablet.

2. Friability test

10 tablets were precisely weighed and placed in the drum. Rotate the drum precisely 100 times, equivalent to a speed of 25±1 revolutions per minute, for a duration of 4 minutes. Afterward, remove the tablets. Eliminate any loose dust from the tablets and weigh them with precision. For most items, a maximum mean mass loss of 1.0% or less from the three samples is regarded acceptable.

% friability = (Initial weight-final weight)/Initial weight x 100.

3. Hardness

Hardness is determined by measuring the amount of force needed to fracture the tablet using a Monsanto hardness tester. The hardness of three pills from a batch is measured. Hardness is quantified in units of kg/cm2.

4. Disintegration Test

The disintegration test is conducted using the disintegration apparatus provided by Rolex India. Each tube in the basket contained one dosage unit, for a total of six units. The immersion fluid employed was a 1N HCl solution, and the temperature was maintained at 37 °±2 °C. The equipment was operated until each of the unit dosages emerged from the basket.

5. Drug content

Five pills were pulverized and the resulting powder, equivalent to 100 mg of the medication, was mixed in a buffer solution with a pH of 7.5. The solution's volume is increased to 100 ml using that media. The solution underwent filtration and was subsequently diluted by a factor of 100. It was then analyzed using spectrophotometry, specifically the Shimadju UV 1800240V model. Further calculations were performed to determine the drug amount in a single tablet.

6. In vitro drug release study

The experiments were conducted using a dissolution test device with a predetermined volume of 900 ml of phosphate buffer 7.5. The temperature was maintained at 37±0.5°C. The tablets are inserted straight into a medium and the paddles are immediately activated at the specified rate of 50 RPM. During the set time intervals (15, 30, 45, and 60 minutes), a volume of 10 ml of the sample is extracted. The samples underwent filtration, and 1 ml of the resulting filtrate was diluted with 10 ml. The samples undergo analysis, followed by subsequent calculations to determine medication release. The drug's

released data were graphed and analyzed using a zero-order model, specifically plotting the cumulative percentage of drug released against time.[42]

7. Wetting time

A folded piece of filter paper was inserted into a Petri dish containing 6 ml of phosphate buffer with a pH of 7.5. A tablet was placed on the paper and the duration of complete wetting was recorded. Each batch underwent three trials.

8. Water absorption ratio

A folded piece of filter paper was inserted into a tiny Petri dish holding 6 ml of water. A tablet is placed onto the paper and let to fully saturate. The moist tablet was subsequently measured for its weight. The water absorption ratio is subsequently measured in the following manner.

Water absorption ration (R) = 100(Wa-Wb)/Wb

Were,

W_b= weight of the tablet before absorption

W_a= weight of the tablet after absorption. [43]

CONCLUSION

The majority of patients require prompt therapeutic intervention from the medication, leading to inadequate adherence to traditional drug therapy and subsequently diminishing the overall efficacy of the treatment. Immediate release tablets are specifically formulated to rapidly release the medications at an accelerated rate. As previously said, there is a need for enhanced manufacturing processes for instant release pharmaceutical forms that are both mechanically robust and easy to handle and package. Additionally, these processes should be cost-effective, comparable to those used for regular tablets. The provision of market exclusivity, facilitated by the use of quick release dosage form, results in higher profits and enables the targeting of patient populations who have been neglected or inadequately treated. A contemporary dose structure, known as the quick release pharmaceutical form, has been created to offer the combined benefits of simple and convenient dosing. These tablets are designed to release potent drugs from the dose form. In order to meet these medical requirements, researchers have dedicated significant resources to creating a new variety of tablet dosage form that rapidly disintegrates and dissolves, resulting in improved dissolving.

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