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DISCUSSION AND INGREDIENTS OF DIFFERENT TYPES OF TABLETS: A COMPREHENSIVE REVIEW

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***Abstract*—**Not only is medicine a science, but it is also an art. Instead of mixing pills and plasters, It addresses the basic functions of life that must be understood in order to be guided. Oral solid pharmaceutical dosage forms have been widely used for a long time, primarily due to their ease of use and effectiveness in delivering systemic medications. The tablets can be made from powders straight out of the container, from pellets or granules, or from several film-coated units.Tablets are classified as solid pharmaceutical dosage forms made by moulding or compression that contain medication ingredients with or without appropriate diluents. As a result, two general categories for tablets exist: compressed tablets and moulded tablets. Additional categories for compressed tablets include tablet triturates, chewable tablets, and directly compressible tablets.

Keywords—Binders, Coated Tablets, Compression, Granulation, Ingredients

I. INTRODUCTION

Solid medication can be taken orally as pills, powders, tablets, capsules, cachets, or capsules. These dosage forms contain a quantity of drug that is given as a single Unit, several standard doses of medication. The numerous advantages of tablets and capsules, The prescription of powders and pills has been steadily decreasing.

Tablets are the traditional solid dosage form and offer numerous benefits over alternative dosage forms. The most commonly used dosage form is a tablet.Approximately 70% of all medications are administered as tablets. Various weights, sizes, and forms of tablets were associated with different medicinal substances and intended modes of administration. This paper reviews some of the benefits and drawbacks of tablets, as well as the basic components that are frequently found in them, preparation techniques, and different tablet types.

Solid medication can be taken orally, Justification Pharmaceutical tablets are made by compressing a drug or drug mixture, with or without diluents, into solid, flat, or biconvex dishes. The Indian Pharmacopoeia concurs with this. A tablet is a compressed solid dosage form that can include excipients or not and contains medication. Their size, weight, and shape vary greatly depending on the quantity of medicinal ingredients and the intended mode of administration.

Properties

These are several properties of unit dosage.

1) The product should be refined and unique, devoid of flaws like contamination, discoloration, chips, and cracks.
2) Need to be robust enough to endure the rough treatment of shocks during manufacturing, packing, transportation, and dispensing.
3) Its physical stability should allow it to hold onto its physical characteristics over time.
4) The medication agent(s) must be able to enter the body in a consistent and repeatable manner.
5) Needs to maintain an appropriate level of chemical stability over time to prevent the medicinal agent(s) from changing.
6) Fit for production on a big scale.
7) Easy to take in and least likely to cause hang-ups.
8) Coating techniques can mask unpleasant smells and bitter tastes.
9) Enteric coating makes products with sustained release feasible.

Advantages

Solid medication can be taken orally has several advantages

1)One of the best oral dosage forms for the most precise dose and least amount of content variability is the tablet, which is a unit dosage form.

2) It is less expensive and easier to package and strip them.

3) Affordable.

4) Compact and lighter.

5.) Being the most microbially and chemically stable oral dosage form.

Disadvantages

Solid medication can be taken orally has several Disadvantages

1) Tough to swallow when a patient is unconscious or a child.

2) Because of their low density and amorphous nature, certain drugs are resistant to compression into dense compacts.

3) To formulate tablet and will still provide sufficient drug bioavailability for medications with poor wetting, slow dissolving qualities, and optimal absorption high in the gastrointestinal tract.

4) Encapsulation or coating are important for drug which are sensitive to oxygen, have an unpleasant odour, or are bitter testing drugs. In these circumstances, capsule might be the most cost-effective option.

5) The GI mucosa is irritated by certain solids (like aspirin).

II. INGREDIENTS

The tablet includes a variety of inert substances referred to as excipients or additives in addition to its active ingredients. Different excipients are:

S.no.	Ingredients	Examples
1.	**Diluents**	Calcium Phosphate; Carboxymethylcellulose Calcium; Cellulose; Dextrin; Sorbitol; Starch
2.	**Binders**	Acacia; Alginic Acid; Carboxymethylcellulose; Cellulose; Dextrin; Gelatin; Liquid Glucose; Magnesium Aluminum Silicate
3.	**Lubricants**	Calcium Stearate; Poloxamer; Sodium Benzoate; Sodium Lauryl Sulfate; Sodium Stearyl Sulfate; Stearic Acid; Talc; Zinc Stearate
4.	**Glidants**	Magnesium Trisilicate; Cellulose; Starch; Talc;
5.	**Anti – adherents**	Corn Starch; Metallic Stearate; Talc
6.	**Disintegrants**	Alginic Acid; Carboxymethylcellulose; Cellulose; Colloidal Silicon Dioxide; Croscarmellose Sodium; Crospovidone; Povidone
7.	**Coloring agents**	FD&C or D&C Dyes or Lake Pigments
8.	**Flavoring agents**	Ethyl Maltol; Ethyl Vanillin; Menthol; Vanillin
9.	**Absorbents**	Kaolin; Magnesium Aluminum Silicate; Tricalcium Phosphate

1) **Diluents**:

1) Solid medication can be taken orally and diluents used because they are fillers that are used in tablets when the drug dosage is insufficient to produce the necessary bulk.

2) Binders: to create unified capsules for tablets that are compressed directly.

3) Lubricants: The purpose of lubricants is to lessen interparticle friction, stop tablet materials from sticking to die and punch surfaces, and possibly increase the rate at which tablet granulation flows.

2) Glidants: By reducing the friction between the particles and encourage the flow of granules or powder material.

3) Anti-adherents: These are substances added to tablet formulations that stop the substance from adhering to the tablet press walls.

4) Disintegrates: When added to a tablet formulation, it helps the tablet break or dissolve the dosage forms in the body.

5) Colouring Agents: There are three reasons why colouring and dyes are used in tablets:

(A) Disguising off-color medications; (B) Identifying the product; and (C) Creating a more sophisticated product.

8) Flavouring Agents: Chewable tablets require flavoring oils.

9) Absorbents: If a product contains a material that has a high affinity to absorb then we can use this in the formulation.

III. METHODS

Tablets are prepared by three methods

1) Wet granulation method
2) Dry granulation method
3) Direct compression

1) Wet Granulation Method - It's the most popular and extensively applied technique. A number of procedures are involved in this method, including weighing the ingredients, mixing, granulating, and screening the damp pass, as well as drying, lubricating, and compressing the tablets. After blending the primary active ingredient, diluent, and disintegrant, the mixture is let to pass through a sieve (sifting). Stirring constantly, solutions of the binding agent are added to the starting mixture. To prevent overwetting of the tablet, an adequate amount of binding agent should be added. Inadequate wetting of the powder can result in excessively soft granules that are prone to breaking down during lubrication, making tablet compression challenging. The most popular technique for drying tablet granules is tray drying. However, fluid-bed dryers, a cutting-edge method, may eventually replace tray drying as the most popular method. The granules are allowed to flow through the screen after drying; typically, nylon cloth with a mesh size of 60 to 100 is used. Lubricant is added as fine powder after dry granulation, which is necessary for the die cavity to be properly filled.

2.) Dry Granulation Method: This process is used to prepare tablets; slugging may be necessary to form the granules if the ingredients are extremely sensitive to moisture or cannot withstand high temperatures during the drying process. Dry granulation, also known as double compression, typically removes a number of steps that require slugging the mass of powder.The slug is created by blending the lubricant, diluent, and active ingredient. In order to create the tablets, the compressed slug is fed through a mesh screen or a mill, and any leftover lubricant is then added to the granulation, properly blended, and compressed.

3.) Direct Compression: The powdered material is directly compressed into tablets using a process known as direct compression. Direct compression is used when the drug makes up the majority of the tablet's weight. It is possible to formulate tablets with a drug substance content of no more than 25% and a suitable diluent that serves as the drug's carrier or vehicle. The tablets made using the aforementioned method are fed through a compression machine, which may have one or more stations.

IV. TYPES OF ORAL TABLETS FOR INGESTION

1) Standard Compressed Tablets

2) Multiple Compressed Tablets Compression Coated Tablets –

a) Sugar coated,

b) Film coated tablets,

c) gelatin coated tablets,

d) enteric coated tablets Layered tablet Inlay tablet

3) Targeted Tablets –

a) Floating Tablet,

b) Colon Targeting Tablet

4) Chewable tablets

5) Dispersible tablets

Tablets used in the Oral Cavity

1) Lozenges and troches

2) Sublingual tables

3) Buccal tablet

4) Dental cones

5) Mouth dissolved / rapidly dissolving tablets

Tablets Administered by other Routes

1. Vaginal tablet

2. Rectal tablet

3. Implants Tablets used to prepare Solution

1) Effervescent tablets

2) Molded tablets Hypodermic tablet Dispensing /soluble tablet

3) Tablet Triturate.

Structure Wise

1) Divisible Tablets

2) Aperture Tablet

3) Concave Convex Tablets

4) Core Tablet Action Wise

1) Modified Release Tablet

A) ORAL TABLET FOR INGESTION

These are designed to swallow intact, with exception of chewable tablets.

1) Standard Compressed Tablets: These are regular uncoated tablets that are compressed using double, direct, or wet granulation techniques. It offers quick drug release and disintegration. Their primary goal is to have a localised impact on GIT. Typically, it contains adsorbents and antacids, which are drugs that are insoluble in water. Compressed tables typically include a variety of adjuvants, such as diluents, binders, disintegrants, etc., in addition to the medicinal agents.

2) Multiple Compressed Tablets: Several compression cycles are used to prepare multiple compressed tablets. When separation of the active ingredient is required for stability or when mixing is insufficient to ensure even dispersion of two or more active ingredients, this procedure works best.This class comprises three categories: Inlay tablets, Layered tablets, and Compression coated tablets.

3.) Compression Coated tablets: This tablet is easily made into a repetitive task. The first dose is supplied by the outer layer, and the drug is subsequently released by the inner core. As a result, it can be used to release two active pharmaceutical ingredients (APIs): one formulation for immediate release that is trapped in the coat, and another formulation for sustained release that is trapped in the core. ManestyDrycota 900, Stock 538, and Colton 232 are the pieces of equipment used to make compression coated tablets.

4.) Sugar Coated Tablets: The sugar coating shields the enclosed medication from the elements and acts as a barrier against unpleasant tastes or odours. It also results in a sophisticated, glossy look. The sweet taste of the tablet contributes to an increase in patient acceptability.widely used in the preparation of mineral and multivitamin combinations.

5.) Film Coated Tablets: It's the kind of coated tablet where coating of the drug is not necessary. Instead of using sugar coating, film coating is applied to tablets to increase their strength. This method makes use of polymers like ethylene glycol (EC), hydroxypropyl cellulose (HPC), and hydroxypropylmethyl cellulose (HPMC). In comparison to the sugar coating method, it is also a quicker process. Although it is less elegant and beautiful to look at, it has some advantages over sugar coating, such as being more robust, less bulky, and easier to apply. The coating is intended to burst, exposing the core tablet at the desired gastrointestinal tract location.

6.) Enteric Coated Tablets: The ground-breaking gel cap is a compressed tablet in the shape of a capsule that makes the coated product roughly one-third smaller than a capsule containing an equivalent amount of powder. Compared to unsealed capsules, gelatin-coated tablets are more tamper evident and the gelatin coating facilitates swallowing.

7.) Dispersible Tablets: According to the European Pharmacopoeia, dispersible tablets are uncoated or film-coated tablets that are meant to be uniformly dispersed in water prior to administration. A dispersible tablet is usually dissolved in 5 to 15 millilitres of water (for example, in a tablespoon or glass), and the patient is then given the resulting dispersion. Dispersible tablets must dissolve in three minutes in water at a pH of fifteen to twenty-five. A sieve screen with a nominal mesh aperture of 710 µm should also be passed through by the dispersion created by a dispersible tablet.

B) TABLETS USED IN ORAL CAVITY

1) Lozenges and Torches: Lozenges are medicated dosage forms are the two types of lozenges. Lozenges can be used for systemic drug uptake as well as local medications applied to the mouth or throat. A pastille is a soft lozenge that contains medication in a base of water, sucrose, and acacia, or in a gelatin or glycero-gelatin. The composition of compressed lozenges contains no disintegrate. When dissolving, the other additives (binder and filler) need to taste or feel good. Gelatin is a common binder in compressed lozenges, and sorbitol, mannitol, and glucose are common fillers.

2) Sublingual Tablets: They are to be positioned beneath the tongue to allow the drug to be directly absorbed through the mucosal lining of the mouth beneath the tongue, resulting in an instantaneous systemic effect. Typically, the tablets are flat, tiny, and only slightly compressed to maintain their softness. For the medications to be quickly absorbed, the tablet needs to dissolve quickly. Its purpose is to dissolve in a small amount of saliva. Sublingual, which translates literally to "under the tongue," describes a technique for giving drugs orally so that they are quickly absorbed through the blood vessels beneath the tongue as opposed to the digestive system.

3) Buccal Tablets: These medications are meant to dissolve in the buccal pouch. Tablets aren't meant to break apart. It is positioned close to the parotid duct opening in order to supply the dissolving medium for the tablet. The most common use case for buccal tablets is replacement hormonal therapy.

4) Dental Cones: The purpose of these tables is to be arranged loosely in the empty socket that remains after a tooth extraction. The main goals of using this tablet are either to stop bacteria from growing in the socket by using a slow-releasing antibacterial compound, or to stop bleeding by using a tablet that contains an astringent or coagulant. It is designed to gradually dissolve or erode over a 20–40 minute period when a small amount of serum or fluid is present. Amino acids, sodium bicarbonate, and sodium chloride are frequently utilised vehicles.

5) Mouth Dissolved or Rapid Dissolving Tablets: The Mouth Dissolving Tablet is easy to swallow and has a pleasant mouth feel. In saliva, MDT was quickly dissolved or disintegrated (15 s to 3 min).Some MDT tablets are referred to as "true fast-dissolving tablets" because of their exceptional ability to dissolve in saliva in a matter of seconds. Some are better referred to as fast-disintegrating tablets because they contain ingredients that speed up the rate at which tablets dissolve in the mouth; they may take up to a minute to dissolve fully. It is the dosage form of choice for paediatric, geriatric, and travelling patients due to its good hardness, dose uniformity, and ease of administration.

C) TABLETS ADMINISTERED BY OTHER ROUTES

1) Vaginal Tablets: Applicator assistance may be required for the insertion of a medication intended for vaginal administration in the treatment of localised vaginal infections, The management of Haemophilus vaginalis, yeast, and Candida albicanslocalised vaginal infections. These are ovoid or bullet-shaped tablets without a coating.intended to undergo gradual dissolution and release of medication in the vaginal cavity. pleased with the plastic tube inserter's upper vaginal tract location. It might have astringent, antibacterial, or antiseptic properties.

2) Rectal tables: It is a traditional and legitimate form of care. Variability in the volume and composition of rectal fluid, as well as its buffer capacity, pH, and surface tension, can greatly influence absorption through this route, even within a single subject. Refrigeration is not necessary for rectal tables. increased stability of the product even at room temperature.

3) Implants: These tablets are inserted into bodily cavities to have an effect that lasts for several days, weeks, months, or even a year. These tablets have a cylinder-like shape and are tiny in size. They are intended to be inserted subcutaneously through a surgical process and gradually absorbed over a month or a year. The tablet in the form of a rod is administered using a special injector that has a hollow needle and plunger. Surgery is used for other shapes. These are excipient-free, sterile formulations.

D) TABLETS USED TO PREAPER SOLUTION

1) Effervescent Tablets: Effervescent tablets are made to break when they come into contact with liquids like water or juice, frequently causing the tablet to dissolve into a solution. This results in a more effective way to absorb the ingredients as well as a better taste and a decreased risk of irritation. A soluble organic acid and an alkali metal carbonate salt—of which the API is frequently one—combine to produce effervescence. When this mixture comes into contact with water, carbon dioxide is produced. Their intestinal and stomach tolerance is good.

2) Molded Tablets a. Hypodermic Tablets: One kind of sterile preparations are these. Before injecting them into the hypodermic cavity, the tablets are dissolved in sterile water or WFI. They are meant to be mixed with WFI of sterile water to create a transparent solution

that parents are to inject. Because of their portability, rural physicians use them extensively. It can be applied to medications with extremely low water stability. It is not advisable to use them in this way as the solutions that are produced are not sterile.

3) Dispensing or Soluble Tablets: To create a solution with a fixed concentration of API, they must be added to water or other solvents. should be free of all insoluble substances (binders, glideants, etc.), as they will be transformed into a transparent solution. Mercury bichloride, quaternary ammonium compounds, and mild silver proteinate are among the ingredients found in dispensing tablets. If these tablets are accidentally swallowed, they are extremely toxic. These tablets offer a convenient dose of a powerful medication.

V. ACTION WISE

Modified Release Tablet: Once one tablet has been administered, the medication will be released gradually over an extended period of time. Used to target releases that are site-specific. An adjuvant that modifies swelling, gelling properties, or water uptake rate can also change the rate at which API is released. This can be seen in the blood concentration versus time comparison. By giving the tablet a suitable microenvironment pH, the drug release can be altered.When alkaline polymers are used, acidic drugs release in a way that is desired.

VI. CONCLUSION

Tablets are a solid dosage form that is well-liked by both patients and healthcare professionals because it allows for self-administration. A tablet's formulation includes a number of ingredients in addition to the API to ensure that the patient receives the API in the right amount. As technology progresses and awareness of the need to modify standard tablet formulations for improved bioavailability and acceptability grows, newer and more effective tablet dosage forms are being created. The primary motivation for developing various tablet formulations is to provide a delivery system that is reasonably easy and affordable to produce. Provide the patient with the dosage form that is most convenient for them, and take a method that won't complicate the regulatory approval process. Tablets are categorised here according to their route of administration and the kind of drug delivery system they represent within that route in order to help you understand each dosage form.

VII. REFERENCES

1) Leon Lachman, Herbert A. Lieberman, Joseph L. Kanig: The theory and Practice of Industrial Pharmacy, Varghese publication house, 3rd edition, 1990, 293-373.

2) Herbert A. Liberman, Martin M. Rieger and Gilbert S. Banker, pharmaceutical dosage forms: Tablets; volume-I.

3) Al-Achi A (2019) Tablets: A Brief Overview. Journal of Pharm Practice and Pharmaceutical Science. 2019(1): 49-52.

4) Nagashree K. Solid dosage forms: Tablets. Research and Reviews: Journal of Pharmaceutical Analysis. 2015.

5) Kaur Harbir. International Research Journal of Pharmacy. 2012, 3 (7).

6) G. Hymavathi, J. Adilakshmi, K. Dwarathi, M. Kavya, G. Pravallika. Review Article on In process Problems and Evaluation Tests of Tablet Manufacturing. International Journal of Research in Pharmaceutical and Nano Sciences. 2012, 3(7).

7) D. M. Jariwala, H. P. Patel, C. T. Desai, S. A. Shah and D. R. Shah. A Review on Multiple Compressed Tablets. Journal of pharmaceutical sciences and boiscientific research. 2016, 6(3). 371-379.

8) Purushottam R. Patil, Vaibhav D. Bobade, Pankaj L. Sawant and Rajendra P. Marathe. Emerging Trends In Compression Coated Tablet Dosage Forms: A Review. International journal of pharmaceutical sciences and research. 2016, 7(3). 930-938.

9) Bhavjit Kaur, Shivani Sharma, Geetika Sharma, Rupinder Saini, Sukhdev Singh, MeenuNagpal, Upendra K Jain, Mandeep Sharma. A Review of Floating Drug Delivery System. Asian journal of biomedical and Pharmaceutical Sciences. 2013. 3(24) , 1-6.

10) Anita , Anil Singh and Ankit Dabral. A Review On Colon Targeted Drug Delivery System. International journal of pharmaceutical sciences and research. 2019; Vol. 10(1): 47-56.