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A Short Assessment on Pharmaceutical Packaging

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ABSTRACT: Packaging is designed to contain a product so that it is unable to interact with the environment. Packaging must provide the protection, identification, information against the physical damage, loss of content or ingredients and intrusion of unwanted component of the environment such as water vapour, oxygen and light. An important role of pharmaceutical packaging is to transform the formulation into an attractive and marketable product. So many issues regarding the pharmaceutical product like stability, sale, patient compliance etc are related with the packaging and in regard to this; present review is done on the various advancements in the packaging techniques and selection of packaging material, machinery & labelling. The present article reviews the various packaging materials, types of packaging in pharmaceutical industry.

KEYWORDS: Packaging, packaging types, tablet, capsule

1. INTRODUCTION

Packaging can be defined as an economical means of providing presentation, protection, identification information, containment, convenience and compliance for a product during storage, carriage, display and until the product is consumed.

Packaging must provide protection against climatic conditions biological, physical and chemical hazards and must be economical. The package must ensure adequate stability of the product throughout the shelf life.

Package should provide adequate information related to the contents including legal requirements, route of administration, storage conditions, batch number, expiry date, manufactures name and address and product license number.

Package should assist in patient compliance.

Different type of pharmaceutical packaging

The medical field has been playing an important role in everyone's life not only in human life but also in the life of other living species. The most important part of the medical field is the "Medicine" and when it comes to medicine, the manufacturing process and the packaging play a very critical role.

Types of Pharmaceutical Packaging:

Containers Aluminium foil Injectibles/ Vials Bottles Cartons Paper Board Lamitubes Paper PVC Based Combinations

Packaging in the pharmaceutical industry varies from drug to drug and normally there are three levels of packaging commonly referred to as the primary, secondary, and tertiary packaging.

1. Primary packaging :-

system is the material that first envelops the product and holds it i.e., those package components and subcomponents that actually come in contact with the product, or those that may have a direct effect on the product shelf-life e.g., ampoules and vials, prefilled syringes, IV containers, blister packs, etc.

2. Secondary packaging

system is outside the primary packaging and used to group primary packages together e.g., cartons, boxes, shipping containers, injection trays, etc.

3. Tertiary packaging

system is used for bulk handling and shipping

Tertiary packaging is a type of wrapping which protects the manufactured products.

e.g., barrel, container,
edge protectors,
Brown cardboard boxes,

Wood pallets



Tablet.

A tablet (also known as a pill) is a pharmaceutical oral dosage form (oral solid dosage, or OSD) or solid unit dosage form. Tablets may be defined as the solid unit dosage form of medicament or medicaments with suitable excipients. It comprises a mixture of active substances and excipients, usually in powder form, pressed or compacted from a powder into a solid dose.

Common disk-shaped tablets

Tablets are prepared either by molding or by compression. The excipients can include diluents, binders or granulating agents, glidants (flow aids) and lubricants to ensure efficient tableting; disintegrants to promote tablet break-up in the digestive tract; sweeteners or flavours to enhance taste; and pigments to make the tablets visually attractive or aid in visual identification of an unknown tablet. A polymer coating is often applied to make the tablet smoother and easier to swallow, to control the release rate of the active ingredient, to make it more resistant to the environment (extending its shelf life), or to enhance the tablet's appearance. Medicinal tablets were originally made in the shape of a disk of whatever color their components determined, but are now made in many shapes and colors to help distinguish different medicines.

Tablets are often stamped with symbols, letters, and numbers, which enable them to be identified. Sizes of tablets to be swallowed range from a few millimetres to about a centimetre.

The compressed tablet is the most popular dosage form in use today. About two-thirds of all prescriptions are dispensed as solid dosage forms, and half of these are compressed tablets. A tablet can be formulated to deliver an accurate dosage to a specific site; it is usually taken orally, but can be administered sublingually, buccally, rectally or intravaginally. The tablet is just one of the many forms that an oral drug can take such as syrups, elixirs, suspensions, and emulsions.

Tablet formulations



In the tablet-pressing process, it is important that all ingredients be fairly dry, powdered or granular, somewhat uniform in particle size, and freely flowing. Mixed particle sized powders segregate during manufacturing operations due to different densities, which can result in tablets with poor drug or active pharmaceutical ingredient (API) content uniformity, but granulation should prevent this. Content uniformity ensures that the same API dose is delivered with each tablet.

Some APIs may be tableted as pure substances, but this is rarely the case; most formulations include excipients. Normally, a pharmacologically inactive ingredient (excipient) termed a binder is added to help hold the tablet together and give it strength. A wide variety of binders may be used, some common ones including lactose, dibasic calcium phosphate, sucrose, corn (maize) starch, microcrystalline cellulose, povidone polyvinylpyrrolidone and modified cellulose (for example hydroxypropyl methylcellulose and hydroxyethylcellulose).

Often, an ingredient is also needed to act as a disintegrant to aid tablet dispersion once swallowed, releasing the API for absorption. Some binders, such as starch and cellulose, are also excellent disintegrants.

Manufacturing

Manufacture of the tableting blend

In the tablet pressing process, the appropriate amount of active ingredient must be in each tablet. Hence, all the ingredients should be well-mixed. If a sufficiently homogenous mix of the components cannot be obtained with simple blending processes, the ingredients must be granulated prior to compression to assure an even distribution of the active compound in the final tablet. Two basic techniques are used to granulate powders for compression into a tablet: wet granulation and dry granulation. Powders that can be mixed well do not require granulation and can be compressed into tablets through direct compression ("DC"). Direct Compression is desirable as it is quicker. There is less processing, equipment, labor, and energy consumption. However, DC is difficult when a formulation has a high content of poorly compressible active ingredient.

Granulation

Granulation is the process of forming grains or granules from a powdery or solid substance, producing a granular material. It is applied in several technological processes in the chemical and pharmaceutical industries. Typically, granulation involves agglomeration of fine particles into larger granules, typically of size range between 0.2 and 4.0 mm depending on their subsequent use. Less commonly, it involves shredding or grinding solid material into finer granules or pellets.



Capsule

DEFINITION:-

Capsule are solid dosage forms in which the active medicament are enclosed in either a hard or soft soluble container or shell of a suitable form of gelatin. OR. Capsules are solid dosage forms in which drug and/or inert substances are enclosed in a gelatin shell.

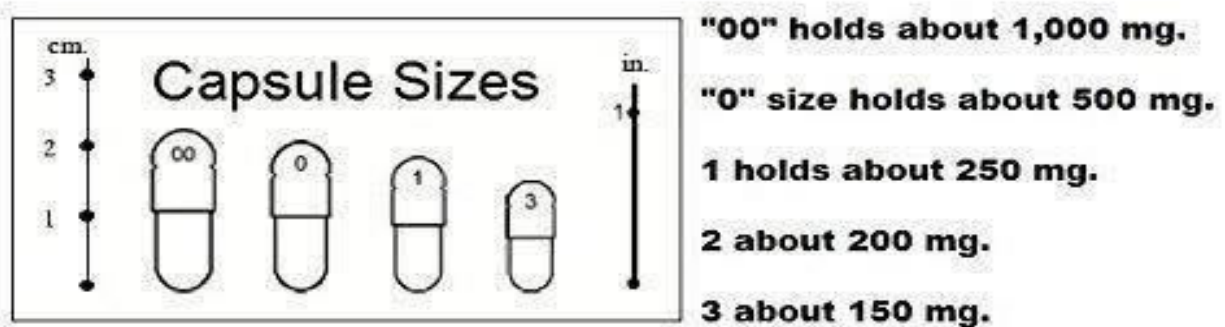
Type of capsule

1. Hard gelatine capsule

Size of capsule

2. Soft gelatine capsule

examples of capsules



Alfacalcidol. Ampicillin.

Amoxicillin. Doxycycline. Lansoprazole. Omeprazole.

Capsule filling machine



Capsule filling machine is the one which is used in the pharmaceutical industries for filling the empty capsules. Capsule filler machine is also known as encapsulation.

Operating principle of capsule filling machine

Rectification (orientation of the bad gelatin capsules). Separation of capsule caps from bodies. Dosing of fill material/formulation (filling the bodies). Rejoining of caps and bodies. Ejection of filled capsules.



Fig: Capsule filling machine



II. CONCLUSION

Level filling machines work by using vacuum, pressure or gravity. A level is pre-determined and set on the machine, and then the mechanism fills containers or bottles to this level. A vacuum might be used to initiate the flow of liquid or powdered products at low or medium speed, such as wine or milk powder.

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