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A REVIEW ARTICLE ON ORAL PHARMACEUTICAL DOSAGE FORMS AT DIFFERENT STATES

Sutha P.*, Sharma M. S., Sreethilak N. K., Sibiraj S., Sangameswaran B., Nithyapriya K.

SSM College of Pharmacy, Jambai, Erode. The Tamilnadu Dr. Mgr Medical University, Chennai.

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***Corresponding Author**
Sutha P.
SSM College of Pharmacy, Jambai, Erode. The Tamilnadu Dr. Mgr Medical University, Chennai.

ABSTRACT

Oral Liquid Dosage Forms in Pharmaceuticals include Syrup, Oral Suspension, Oral Solution, Oral Drop, Oral Emulsion, Mixture, Linctuse, and Elixir. Oral liquids are homogeneous liquid preparations, usually containing a solution, an emulsion, or a suspension of one or more active ingredients in a suitable liquid base. They are prepared for oral administration either as such or after dilution. They may contain other substances such as suitable dispersing, solubilizing, wetting, emulsifying, stabilizing, suspending, thickening agents and antimicrobial substances for preservation. When creating pharmaceutical dosage forms, the selection of excipients plays a significant role in the formulation and formulation research. Excipients physical, mechanical, and chemical characteristics have a big impact on the final product and other formulation parameters like disintegration, dissolution, and shelf life. As a result, numerous studies have been carried out to assess how drug-excipient interactions affect the formulation as a whole. The information on the excipient's physical and chemical instability and compatibility with the active pharmaceutical component in solid oral dosage forms during various drug manufacturing procedures is reviewed in this article. The impact of these interactions on the drug formulation process has been discussed in detail. Examples of multiple excipients used in solid oral dosage forms have been included to elaborate on drug-excipient interactions.[1]

KEYWORDS: Oral Solid Dosage Forms, Powder, Capsules, Tablet, Pills, Excipients for Solid Dosage Form.

INTRODUCTION

Since the nineteenth century, the oral solid dosage form, such as tablets and capsules, has been the most predominant and frequently used medication form. This is not only because of the convenience of oral solid dosage form administration for patients but also because of their cost-effectiveness in manufacturing for pharmaceutical companies. Hence, taking oral solid dosage form safely and effectively is particularly important. Important factors affect the oral solid dosage form medication adherence and taking tabletand capsule formulation correctly (FDA 2009). The successful esophagus passage and the transit time of oral solid dosage form depend significantly on the body position at swallowing time, even in subjects without an oesophageal motility disorder.[1]

One study showed that the overall rate of successful oesophageal passage of a tablet, such as a barium sulphate drug, was only 17% among 20 healthy participants who swallowed the tablets in a supine position. However, this passage rate of the tablets was significantly increased to 66.5% when swallowed in a 45° upright position of the upper body and to 69.7% when swallowed in a verticalposition. Although the transit time of tablets in the upright position was the shortest, the study also showed that the passage of the tablets was improvedby increasing the amount of water intake with the tablets in all three body positions. Solid dose forms of medications are frequently delivered, with oral administration being the most popular. Physical and chemical properties, as well as excipients added to the formulations, are critical in facilitating administration, getting the medication into the systemic circulation, and achieving the required therapeutic efficacy.

Tablets and capsules have been around since the nineteenth century. dosage forms in the form of tablets and capsules that include a combination of active and excipient components. These dosage forms include a precise dosage of the medication. The solid dosage forms are available mostly in unit dosage forms such as; Tablets, Capsules, Pills, Pastilles, Lozenges, Catches, and Powders.[1]

SOLID DOSAGE FORM

A solid dosage form refers to a category of medications that are formulated in a solid state for oral administration. These forms are designed to be ingested and then dissolve or disintegrate in the gastrointestinal tract to release the active ingredient. Solid dosage forms are favoured for their convenience, stability, and precise dosing. They are designed to ensure that the medication is delivered effectively and efficiently to achieve the desired therapeutic effect.[2]

POWDERS

A powder is a dry, bulk solid that can flow freely when shaken or tilted. It is made up of numerous, extremely small particles. Although the labels powder and granular are occasionally used to designate discrete classes of material, powders are a particular subclass of granular materials.[2]

Types of Powders

- Loose powders
- Pressed Powder
- Translucent Powder
- Coloured Powders
- Setting powder
- Finishing powder
- Colour correcting Powder.

Advantages of Powders

- Powders are more physically and chemically stable when compared to the liquid dosage form.
- The drug product in the powder dosage forms is less prone to microbial contamination.
- It is an ease mode of drug administration when the dose is very large.

Disadvantages of Powders

- Powders are not the dosage form of choice for drugs with unpleasant taste.
- Drugs that deteriorate rapidly with exposure to atmosphere or acidic pH shouldnot be dispensed as powders.
- Powders are bulky and inconvenient tocarry.

CAPSULES

Capsules are a solid dosage form in which the drug substances are enclosed in a water- soluble shell or an envelope. A capsule shell is made from gelatine. The capsules are available both as hard capsules.[2]

Types of Capsules

There are two types of capsules

1. Hard gelatine capsules
2. Soft gelatine capsules.

Hard gelatine capsules

A hard gelatine capsule is a type of capsule that is usually used to contain medicine in the form of dry powder or very small pellets. Oral medications include tablets and hard gelatine capsules that are filled with powder. Hard gelatine capsules are usually filled with powders, granules.

Soft gelatine capsules

A soft gel or soft gelatine capsule is a solid capsule(outer shell) surrounding a liquid or semi-solid center (inner fill). An active ingredient can beincorporated into the outer shell, the inner fill, or both. They are oral dosage forms for medicine similarto capsules.[2]

Advantages of Capsules

- Fast acting. Capsules tend to break down more quickly than tablets.
- Tasteless. Capsules are less likely to have anunpleasant taste or odour.
- Tamper-resistant. They're often made so that it's not as easy to split them in half or crush like tablets.
- Higher drug absorption.

Disadvantage of Capsules

- Less durable.
- Capsules tend to be less stable than tablets.
- Shorter shelf life. Capsules expire morequickly than tablets.
- More expensive. Capsules that contain liquids are generally more expensive to manufacture than tablets and may costmore as a result.
- May contain animal products.
- Lower doses.

TABLETS

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. Tablets are prepared from formulations that have been processed by one of three general methods.[3]

Method of Formulation of Tablets

1. Wet Granulation

Involves the mixing of dry powders with a granulating liquid to form a moist granular mass that is dried and sized before compression as per Fig 2. It is particularly useful in achieving uniform blends of low-dose drug substances and facilitating the wetting and dissolution of poorly soluble, hydrophobic drug substances.

2. Dry Granulation

Dry granulation can be produced by passingpowders between rollers at elevated pressure (roll compaction). Alternatively, dry granulation also can be carried out by the compaction of powders at high pressures on tablet presses, a process also known as slugging. In either case, the compacts are sized before compression. Dry granulation improves the flow and handling properties of the powder formulation without involving moisture in the processing.[3]

3. Direct Compression

Tablet processing involves dry blending of the drug substance (s) and excipients followed by compression. The simplest manufacturing technique, direct compression, is acceptable only when the drug substance and excipients possess acceptable flow and compression properties withoutprior process steps.[3]

Types of tablets

1) Compressed Tablets

A pharmaceutical tablet is formed by subjecting drygranular powders to sufficient pressure to make the particles cohere.

2) Sugar Coated Tablets

Sugar coating is used in immediate-release applications to mask unpleasant taste and odour of some drugs or to improve aesthetic qualities of the product.

3) Film-Coated Tablets

Film coating is widely used to achieve various pharmaceutical and therapeutic goals. Conventional solvent-based film coating involves the deposition of a thin polymer film on the surface of the tablet core, typically using a spray method.

4) Effervescent Tablets

Effervescent tablets are designed to release carbon dioxide upon contact with water, promoting their disintegration. Within a couple of minutes, the tablets completely dissolve and the drug becomes available in solution.

5) Enteric-Coated Tablets

Enteric coating is a polymer applied to oral medication. It serves as a barrier to prevent the gastric acids in the stomach from dissolving or degrading drugs after you swallow them. Without full enteric protection, many drugs would fall apart rapidly in stomach acids.

6) Chewable Tablets

Chewable tablets are an oral dosage form intended to be chewed and then swallowed by the patient rather than swallowed whole. They shouldbe designed to be palatable and be easily chewed and swallowed.

7) Buccal and Sublingual Tablets

Sublingual administration involves placing adrug under your tongue to dissolve and absorb into your blood through the tissue there. Buccal administration involves placing a drug between yourgums and cheek, where it also dissolves and is absorbed into your blood.[3]

Advantages of Tablets

- ❖ They are easy to carry.
- ❖ They are easy to swallow.
- ❖ They are attractive.
- ❖ The unpleasant odor or taste of the drug can bemasked by sugar coating or film coating.
- ❖ Sealed covering protects the tablet fromatmospheric conditions e.g., light, air, etc.
- ❖ Tablets provide prolonged stability to medicament, i.e., tablet is more stable than other dosage form.
- ❖ Easy to self-administration.
- ❖ Economically their cost of production is relatively low.
- ❖ Easy to handling.
- ❖ Tablet is the lightest and most compact dosage form.

Disadvantage of Tablets

- ❖ High dose cannot be administered

- Less area is available for absorption
- Not suitable for bitter and irritating drugs
- Less patient compliance
- No eating, Drinking, and smoking is allowed
- Highly ionic drugs cannot be administered

PILLS

Pills are in oral unit dosage form. These are small spherical or ovoid masses that are required to be made at the dispensing counter. These are rarely prepared extemporaneously nowadays. No formulaefor pills are given in the latest edition of Indian Pharmacopoeia. These are also not prescribed by thephysicians.[4,5,9]

Considerations in Formulation

1. **Drug Release and Absorption**: The design of solid dosage forms must account for how the drug is released and absorbed in the gastrointestinal tract. Immediate-release forms dissolve quickly, whereas extended-release forms are engineered to release the drug over a longer period.

2. **Manufacturing**: The process of manufacturing solid dosage forms involves several steps, including mixing, granulation, compression, and coating. Each step must be carefully controlled to ensure the final product's quality.

3. **Excipients**: Excipients are inactive ingredients added to solid dosage forms to aid in the manufacturing process, improve stability, and enhance the drug's performance. Common excipients include fillers, binders, disintegrants, and lubricants.

4. **Tablet Compression**: The compression of powders into tablets must be optimized to ensure that tablets are neither too hard nor too soft. Proper compression is crucial for tablet dissolution and drug release.

5. **Quality Control**: Rigorous quality control is essential to ensure that solid dosage forms meet specified standards for strength, quality, and purity. This involves testing for uniformity, dissolution, and stability.

Liquid Dosage Forms

Introduction

Oral liquid dosage forms are an essential part of pharmaceutical therapy, providing a viable alternative to solid dosage forms such as tablets and capsules. These formulations are designed to deliver medications in a liquid state, offering numerous advantages in certain clinical situations. This article examines the types of oral liquid dosage forms, their benefits, and key considerations in their formulation.[6,7]

Types of Oral Liquid Dosage Forms

- **Solutions**: Solutions are homogeneous mixtures where the drug is fully dissolved in a solvent. They can be categorized into
  - **Aqueous Solutions**: These solutions use water as the solvent. They are suitable for drugs that are soluble in water.
  - **Non-Aqueous Solutions**: These utilize solvents other than water, such as alcohol or oil, for drugs that are poorly soluble in water.

- **Suspensions**: In suspensions, the drug is dispersed as solid particles in a liquid. These formulations require shaking before use to ensure uniform distribution of the drug.

- **Emulsions**: Emulsions are mixtures of two immiscible liquids, such as oil and water, stabilized by emulsifiers. They are used when a drug is soluble in oil but not in water.

- **Syrups**: Syrups are concentrated solutions of sugar in water, often containing added medications. They also serve as flavouring agents to enhance patient compliance.

- **Elixirs**: Elixirs are clear, sweetened hydroalcoholic solutions containing one or more active ingredients. They are used for drugs that are soluble in alcohol but not in water.

Advantages of Oral Liquid Dosage Forms

- **Ease of Swallowing**: Liquid forms are particularly useful for patients who have difficulty swallowing tablets or capsules, such as children or elderly individuals.

- **Flexible Dosing**: Liquid formulations allow for easy adjustment of dosages, which is advantageous for patients needing precise dosing.

- **Faster Absorption**: Oral liquids often provide a faster onset of action compared to solids

because they are already in a dissolved state and can be absorbed more rapidly.

- **Improved Bioavailability**: For drugs with poor solubility, liquid formulations can enhance bioavailability compared to solid forms.

Considerations in Formulation

1. **Stability**: Maintaining the stability of the active ingredient in a liquid form is a significant challenge. Factors such as pH, temperature, and light can affect drug stability, requiring careful formulation design.

2. **Taste and Palatability**: Taste can be a major issue, particularly for pediatric formulations. Flavoring agents and sweeteners are used to improve palatability, but their interactions with the drug need to be evaluated.

3. **Preservation**: Liquid formulations are more susceptible to microbial contamination than solid forms. Preservatives may be needed to ensure the safety and efficacy of the formulation over time.

4. **Viscosity**: The viscosity of the liquid can influence ease of administration and drug release rate. Adjusting viscosity is crucial to optimize the formulation.

CONCLUSION

Oral liquid dosage forms offer distinct advantages in terms of administration and dosing flexibility. Advances in pharmaceutical technology continue to enhance the development of oral liquid dosage forms, improving patient care and compliance. As pharmaceutical technology advances, innovations in solid dosage forms continue to enhance their efficacy and patient compliance.

The above review article determines the preparation of oral preparations like solid dosage form and liquid dosage forms.

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