

A REVIEW ON PHARMACEUTICAL CONTAINERS AND CLOSURES

Bhavesh Kumar^{1*}, Ms. Arati Sharma¹, Mr. Susheel Kumar Tiwari²,
Dr. Dilip Agrawal³, Mr. Ashok Kumar Sharma², Mr. Mohit Khandelwal²

¹Research Scholar, Mahatma Gandhi College of Pharmaceutical Sciences, Jaipur, Rajasthan

²Professor, Mahatma Gandhi College of Pharmaceutical Sciences, Jaipur, Rajasthan

³Principal, Mahatma Gandhi College of Pharmaceutical Sciences, Jaipur, Rajasthan

Received: 18-03-2021 / Revised: 20-5-2021 / Accepted: 26-06-2021

Corresponding author: Bhavesh Kumar

Conflict of interest: Nil

Abstract

In the pharmaceutical industry, there are a variety of medicinal products are manufactured which is needed to be dispensed. These products are packed in suitable containers and closures. It is demonstrated that the containers and closures should protect, preserve and safely deliver to patients. Containers are the storage device. They are use for drug product which placed and enclosed in it and direct contact with them. Pharmaceutical products will be packaged in a suitable type of container, which depends upon the types of products and packaging materials. An ideal packaging will protect the drug from the external environment (such as humidity, temperature, pressure) and prevent from exclude the O₂, CO₂, and volatile substances during transportation. It also gives protection against the physical, chemical, microbial, mechanical factors, and climate hazards. Closures are an important part of the packing system to enclose the mouth of containers and open or close quickly. Both containers and closures do not affect the therapeutic effect of the drug product. This review provides better information about containers, closures, packaging materials, etc.

Keywords: Containers, Closures, Packaging Material

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INTRODUCTION

Pharmaceutical containers, a device that is used to store the drug product and is necessary to contain, preserve, protect and deliver it safe. If the drug product is direct contact with container, then it known as an immediate container.

Closures are the essential component of containers that used to enclose them properly. They have different shapes and sizes. It helps to prevent the release of air, volatile substances, and entry of any type of microorganisms.

Ideal features of containers and closures:

- Nontoxic in nature
- Non-reactive with drug product
- FDA approved
- Moisture-proofness
- Resistance to corrosion
- Resistance from micro-organisms, insect's, and rodents.
- Protect from damage and breakage.

- Must bear the heat when sterilized
- Protection from light, temperature, humidity, and moisture.
- Should have uniform distribution and easily handling.
- Easily available in different types of dosage forms such as ear drops, nasal drops, injections, etc.
- Should have been protected from environmental hazards.
- Available in different shapes and sizes.
- Closures should be readily openable and effectively sealed.
- Offers some additional features such as aid pouring, metering, child resistance, temper evidence.
- Should be available at a high economically rate.
- Capable for high-speed application for automation production.
- Doesn't impact tastes and odors. [2,3]

Pharmaceutical packaging:

It is defined as a combination of various types of components which is used to enclosing the pharmaceutical drug product and necessary to contain, preserve, protect, and deliver a safe.

Types of pharmaceutical packaging:

Primary packaging: It is considered as first packaging because the drug product is directly in touch with the packaging component. It ensures that there is no interaction between them and provides proper protection. Examples: strip packages, blister package. [4]

Secondary packaging: it is the exterior packaging of primary packaging. The drug product doesn't directly contact them. It is used for branding and display of products. Examples: cardboard boxes, cardboard/plastic crates, trays, paperboard cartons, shrink-wrapped bundles.

Tertiary packaging: it is used for the handling of bulk pharmaceutical products for transportation. It protects both primary and secondary packaging. Tertiary packaging makes it easier to transport heavy load, large consignment securely and prevent damage during transportation. Examples: pallets, barrels, etc.

Types of containers used in packaging:

Well-closed containers: this type of system protects the product from contamination, foreign particles, and loss of volatile substances during transportation or distribution.[5]



Figure 1: Well Closed Container

Single-dose container: this type of system is used for a single dose of the drug. Examples vials, ampoules.



Figure 2: Single Dose Container

Multi-dose container: these types of the system contain one or more medicaments and they withdraw at a various interval from the same containers without affecting the quality, purity, and strength of the product. Examples: vial.



Figure 3: Multi-Dose Container

Airtight container: this type of system has airtight sealing and closing. They prevent the entry of any moisture in packaging.



Figure 4: Well Closed Container

Light resistant container: this type of system helps to protect the drug from light. Some dosage forms are light sensitive, so they lose their character on exposure to light.



Figure 5: Light Resistant Container

Aerosol container: this type of system stores the aerosol. They are made up of suitable material to withstand the pressure.



Figure 6: Aerosol Container

Child-proof containers: this type of system help to protect the children from hampering the content because some products are harmful to children and cause hazardous effect.



Figure 7: Child-Proof Container

Types of packaging materials used in containers and closures:

- Glass
- Plastic
- Metal
- Rubber
- Paper and cardboard Cotton

Table 1: Packaging materials with package

Packaging Materials	Name Of Package
Glass	Vials, Ampules, Glass Bottles
Plastic	Plastic Bottle, Caps and Stoppers, Infusion Bags, Plastic Film, plastic pouches etc.
Metal	Blister, Foils, Niddle (Aluminum)
Rubber	Rubber Stoppers, Syringe Tips Etc.

CONCLUSION:

Nowadays pharmaceutical packing industry is consistently growing at least five percent per annum past years. They play a vital role in maintaining product quality, safety, and stability. Packaging

should provide protection and indemnification of the pharmaceutical product. The packaging material also affects the quality, efficacy, and stability of the product. Recently there are a variety of eco-friendly packaging materials are

used in the industry that is biodegradable in nature. The main objectives of this review article to provide better and short information about the pharmaceutical packaging, packaging system and materials.

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