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PACKAGING OF COSMETIC

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ABSTRACT: The word cosmetics has so many meanings, it means skilled in adornment, it also means to make for beauty, especially of the complexion or beautifying, it also means to beautify the defects and much more meaning is there. Cosmetic products in any category, any form or any type need a container to behold and protect them from the foreign environment. From jars for body care products to peeling packets of soap and from vials for mascara to bottles for perfumes, all these are the packaging of cosmetics using different containers of different materials. Packaging not only plays a part in the protection of the cosmetic product but also plays an important part in the branding of the product. There are several types of packaging material available and suitable for cosmetic products. This article explores the different types of packaging materials available for cosmetic products from different sources.

Keywords: Cosmetics, packaging, jars, bottles, branding, environment.

1. INTRODUCTION:

A cosmetic is defined as an item intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or applied to the human body or any part thereof for cleansing, protecting, beautifying, promoting attractiveness, or altering the appearance. [1] Cosmetics are classified into three main categories:

- According to their use: Use for the skin, use for the nail, use for the teeth and mouth, use for the eyes and use for the hair.
- According to their functions: Curative or therapeutic functions, Protective functions, Decorative functions.
- According to their physical nature: Aerosols, Cakes, Emulsions, Oils, Pastes, and Powder.

For the protection and safety of the cosmetic product, it needs packaging. Packaging is the science, art, and technology of enclosing or protecting products for distribution, storage, sale, and use. Packaging also refers to the process of designing, evaluating, and producing packages. [2] A package is a manufactured article that partially or encloses several products.

In prehistoric times ancient Greece and Egypt created cosmetics using flowers and berries and preserve them in simple clay dishes. Later dry gourds were used to store dry cosmetics and bowls and spoons were used to store kohl. [3] During the 4th-century china started using mulberry leaves due to their easy foldable nature which help to carry their cosmetics even during traveling. At the same time in India, banana leaves and jute packets were used to store cosmetics like powder and vermillion (sindoor). Between the 5th to 15th centuries wooden packaging was invented and accepted because it was available and was easily carved. Glass container packaging was costly and usually reserved for royalty. Metal containers were limited due to their reacting nature with the cosmetic product. 1760-1840 was the industrial revolution in packaging, it was the era of transition and modernization. For better quality demand rise in tin, cardboard boxes, and flexible packaging was seen. In the last 2 centuries, many other types of packaging have emerged for better quality and sustainable packaging. During these years' paper bags, cartons, and cellophane were invented and accepted as ideal packaging materials. In the year of 1926 plastic injection moulding machine was invented which leads to plastic packaging after cellophane, aerosol cans were invented in 1927, and plastic spray bottles in 1946. [4]



Fig. 1 Cosmetic box

Packaging also plays a great role in the branding of cosmetics products. The overall look of a cosmetics product is one of the most important factors in the market appeal, besides its quality. The container should be designed in such a way that it can allow the product to stand out from the other similar product available in the market. Products are packed in a suitable package for the following purpose: [5]

- Facilitate transportation and storage.
- Guard the product against contamination.
- Prevent any accidental spoilage.
- Prevent pilferage.
- Identify the products contained and the quality.
- Proclaim the manufacturer of the product.
- Explain the direction for use.
- Attract the shopper's attention and convince the customers to buy.

Besides the purpose of the container, the container should have compatibility with the cosmetic product. There are few physical, chemical as well as biological properties that allow the material ideal for cosmetic packaging. [6]

Table no. 1 Different properties of packaging containers

Physical properties	Chemical properties	Biological properties
<ul style="list-style-type: none"> • withstand heat, cold, and pressure • capable of clear labeling • ultraviolet absorbent 	<ul style="list-style-type: none"> • container and the closures should not react together • the substance must not be extracted from the product 	<ul style="list-style-type: none"> • withstand attack by insects • should not support bacterial growth

2. PACKAGING MATERIAL CLASSIFICATION

Cosmetics packaging should be easy to brand. It should allow the name of the product, the brand, and other necessary information like composition, usage instructions, and warnings to be printed as required. The container should be designed in such a way that it can allow the product to come out, but not go in. This is to prevent contamination. [7] The packaging material can be classified in more than one way, if it is classified according to functions, it will be primary, secondary, and tertiary; according to common property it will be Flexible, Semi-rigid or rigid packages, Breakable or Non-breakable packages; Transparent or Opaque packages; Liquid-Tight or gas-tight packages; according to the material it will be Glass Bottles, Metal Cans, Paperboard Cartons, Wooden Crates, Paper Labels, Plastic Bottles, Laminated Tubes. [8] Here we are classifying packaging material according to types.

2.1 Glass- Glass is one of the oldest packaging materials after wood and clay. Glass is made of silica along with other components. It is a nonporous and non-permeable material. It is chemically inert and does not degrade. It protects its content from outer environments like oxygen and moisture. This is one of the main reasons glasses is used as a packaging material for cosmetics for many years and till nowadays. Glass packaging is considered a highly sustainable packaging material because even after indefinitely recycling there is no loss in the quantity. Oxygen-sensitive products are usually packed in glass containers. Glass can be moulded into very attractive designs to provide an excellent brand or product image. [9] Glass packaging has three types- borosilicate glass treated soda-lime glass and regular soda-lime glass. [10] Advantages of glass- transparent, good protection power, and easily labeled. Disadvantages of glass- fragile, heavy, and costly.

- **Silicon inner bottle-** It is a silicon-based bottle that contains a refill packet (balloon) inside it which can be replaced with another packet (balloon) without wasting the outer protective bottle. It is a balloon-based solution for eco-friendly packaging. [11] The BPA-free (Bisphenol A) balloon is placed into a paper bottle and attached to a pump used to dispense the cosmetics, whether this is soap or spray. When pumped out of the bottle, the system leaves behind 2% of residue, this is compared to 30% when looking at other packaging formats. This has two benefits, with consumers getting more of the product and easier recycling for the balloon. [12]

2.2 Plastic- Polymers in packaging have proved useful for many reasons which include, that they are easily formed, they have high quality, and they provide freedom of design. Polypropylene and polyethylene are two polymer plastics that were used for many years not only for cosmetic packaging. Plastic containers are extremely resistant to breakage and thus offer safety to consumers along with a reduction of breakage losses at all levels of distribution and use. Plastic containers consist of one or more polymers together with certain additives. Because plastics are both rigid and flexible packaging it has become the main material for cosmetic packaging since they exhibit. [13] Polyethylene terephthalate- PET is a transparent strong and lightweight plastic. PET containers are better than ABS containers which are also widely used for the packaging of compact powder. PET is a biodegradable plastic polymer which makes it sustainable for cosmetic products. [14]

- **Bubble wrap-** was invented in 1957. It is used to protect the product and container from mechanical shock and transportation accidents. Bubble wrap is an ideal lightweight way to protect goods in transit, shipping, and storage [15]. It is widely used in cosmetics for the packaging of glass containers. Small bubble wrap made from at least 15% recycled material is also available, offering the usual degree of protection, as well as helping meet environmental impact demands [16]. There are different sizes of bubble wrap available. Small-size bubble wrap gives good protection and is recommended for light or fragile products. Large size provides enhanced protection and is recommended for fragile, heavy, and irregularly shaped products. The extra-large size provides high-performance protection and is recommended for large very heavy and very fragile products. [17]
- **Satchel and Refill-** many cosmetic products are packed in small plastic packets or satchels; they are convenient for one-time use and they also provide easy traveling because they are handy. These packagings are widely found in shampoo, creams, face packs, face masks, and many other cosmetic products which are used in small quantities. Another packet of packaging is used

for the refiling of products. Those products which are refilled to their actual container are now available in refill packets. For example hand wash. [18] Advantages of plastic- low cost, lightweight, durable, pleasant to touch, odorless, inert, unbreakable, and flexible. Disadvantages of plastic- interaction, adsorption, absorption lightness, and hence product instability, stress cracking, poor resistance, and environmental pollution.

- **Airless dispensers-** Cosmetic products such as lotions, foundations, toners, and serums are packaged in airless cosmetic bottles. These bottles are generally crafted to provide better preservation of the product; with airtight sealing, oxidation is minimized. Oxidation can cause cosmetic products to deteriorate faster and therefore packaging cosmetics in airless bottles means the quality of the product is preserved for longer and the shelf life is extended.
- 2.3 Metal-** Cans and tubes are commonly made of metals such as aluminum or tin. Aluminum protects against germs and is one of the most recycled materials on the planet. Metals containers are strong, relatively unbreakable, and opaque and they protect the content from moisture, odor, gases, and bacteria. In cosmetics packaging steel, tinplate and aluminum are used. They are resistant to high as well as low temperatures. In the packaging of the aerosol product, metal containers are used the majority. Tubes for toothpaste and face wash and other products are packed in metal collapsible tube containers. Ductile metals are used for making collapsible tubes for example tin, aluminum, and lead. Closure for many containers not only metal but also glass and plastic are made up of metal. [19]
- **Metalized films** are made from ductile metals like aluminum or they are polymer films coated with a thin layer of metal. They are used as a protective film between the container and closure. The properties like higher toughness, the ability to be heat sealed, and a lower density at a lower cost than aluminum foil. This gives metalized films some advantages over aluminum foil and aluminum foil laminates. It prevents the product from spilling. They are both rigid and collapsible. The rigid aluminum containers are used for the packaging of the cosmetics. [20] Advantages of metals-They look sophisticated, impermeable to light, moisture, and gas, light in weight, and can be printed directly onto their surface. The disadvantage of metals- They are expensive, may shed metal particles into products, and react with certain chemicals of the active.
- 2.4 Paper and board-** are composed of cellulose obtained by the mechanical or semi-chemical treatment of fibers dried from various sources like wood, hemp, cotton, etc. Mostly they are papers, corrugated sheets, cartons, or shippers. In some case, waste and regenerated paper is used. Paper and boards are usually used for secondary and tertiary packaging. They are paper boxes and containers used to protect the primary container during transport and mechanical shock. Many companies have started to make their primary container using paper and cardboard for the packaging of powder, eyeshadow, and other beauty products [21].
- 2.5 Natural source-** the natural source of packaging material are those packaging materials and techniques which is already been used by our ancestors. They used natural material as a tool for packaging due to the need and availability. They were attractive, cheap, easily available, and durable. It is a new sight towards sustainable and eco-friendly natural packaging to the market.
- **Mycelium packaging-** Mycelium is a new sustainable packaging that could replace less environmentally friendly options, such as plastic and polystyrene. It is a completely organic, farms growing material made from the roots of mushrooms. The roots grow around a mold to form a custom structure that holds products safely and securely in transit. [22]
 - **Seaweed-** seaweeds are edible as well as biodegradable. It's naturally high in fiber and vitamins and can be turned into packaging without the need for chemicals. As seaweed is biodegradable, even if the packaging ends up in a landfill or the sea it will break down without any damaging consequences. Seaweed packaging is a good choice for one-time packaging because it dissolves in water and fully decomposes. [23]
 - **Corn starch packaging-** is also known as PLA packaging, which stands for polylactic acid packaging. It is biodegradable and takes a few months to fully decompose in the presence of carbon dioxide. It is widely used in the food industry for packaging. Corn is the least expensive and most abundant source of commercially available sugar. Corn starched packaging does have some interesting advantages over synthetic materials such as reduced static electricity. [24]
 - **Jute bag-** jute bag is been used for many years for containing and preserving food items like cheese and waxes. Nowadays many companies have started to use jute bags as primary as well as secondary packaging for soaps. It is biodegradable and easily available. It is 100% natural. It is a sustainable and reusable fiber that plays a vital role in eco-friendly packaging. [25]
 - **Bamboo packaging-** bamboo is used as a packaging material because it is cheap, renewable, and easily available and it can be crafted in any shape. Bamboo packaging is not useful in the packaging of oily products and aerosol products. The advantages of bamboo packaging are that it is renewable, it can be recycled by reusing it as a jar or decomposing it; it takes lesser time to grow than any average tree; it has high durability; it is eco-friendly for the environment and last it can be shaped and decorated in so many different ways as a container to catch customer's eyes. [26]

3. PACKAGING CONTAINER CLASSIFICATION

The development in the field of cosmetic packaging is arising due to high demand in the easy application techniques or easy way to travel with the cosmetic or just for the appearance of the container to the purchaser's eye. These developments are a continuous process, in duration, every few months new varieties of material type or style for the packaging material comes in the market. These are a few examples of cosmetic products, whose packaging has been developed and will be developed in the coming future. [27]

- 3.1 Lip balms-** Lip balm is generally seen in round-shaped plastic containers are the most widely used among lip balm manufacturers. Plastic is a popular choice because it is easy, inexpensive, and works well for many thinner lip balm products. Glass containers are not as common, but still have a place in the lip balm market. Nowadays they are available in the form of sticks and packed in long containers having the shape of fruits or chocolates to gain teenagers' attention and interest.



Fig. 2 Evolution of lip balm container

3.2 Lipsticks- Since the beginning of the packaging of lipstick metals brass and aluminum are widely used. Then a plastic container took the place. The sticks are packed in a vertical plastic stick and the liquid lip colors are packed in PET containers, available in round, square, and rectangular shapes and it consists of a brush for its application. Liquid lip colors are containers that are usually transparent for determining the color shade. In these containers, a brush is present at the tip of the stick, which is dipped inside the bottle containing the color. The cap of the lipstick can or cannot be transparent, depending on its photosensitivity. The caps can be plastic or metallic caps can be also used. Few caps have a magnetic seal, which provides a better lock and protection to the lipstick.



Fig. 3 Evolution of lipstick container

3.3 Kajal and Eyeliner- Kajal were packed in wide mouth containers in the form of cake during the early days and fingertips were used for the application. Eyeliners were conventionally marketed in a glass bottle with a brush inside it. Nowadays kajal is seen in a variety of forms such as pencils, thick sticks, sleek sticks called twisters, and roll sticks are also there similar to lipsticks. Eyeliners in plastic containers are preferred highly, the modification with the brush has compelled consumers to opt for the finer version. The tip is hard and firm compared to the conventional form which makes application easy. Sketch pen kind of eyeliners is the latest in the market which looks like a sketch pen and possesses a firm tip. The old ways are coming back in many cosmetic products as in kajal. Round containers containing gel eyeliners are also new in markets and are available in PET containers along with a plastic brush.



Fig. 4 Evolution of kajal container

3.4 Eye shadows- Eyeshadow are compressed powders similar to face powder and rouge along with a high number of pigments. They are mostly packed in plastic containers of square, oval, round, and rectangular shapes having a brush for the application. Packaging containers are made up of ABS (acrylonitrile butadiene styrene), PP, and PETG & ALUMINUM. Containers with multiple bases are also available in which with more colors, it has a separate place for brushes and a mirror attached to them.



Fig. 5 Evolution of eyeshadow container

3.5 Mascara tubes- Mascara tubes are an important part of the makeup cosmetic. Mascara tubes and wands are made and designed in such a way to promote the best application. Mascara tubes come in all different types of shapes, sizes, and colors. Generic mascara tubes can be found in circular formations, and this is usually the most common shape for the tube. This allows the tube to be very easy to hold, as it's oval and slim enough to grasp with a couple of fingers. Fancy and unique wands give the mascara a different look because it is being administered to the lashes. The specific wands

have bristles that are closer together or thicker than the strands wands. Some wands even have one side that is strand and one side that is specific and unique.



Fig.6 Evolution of mascara container

3.6 Shampoo, lotions, body wash, and hair oil - These containers are HDPE, PVC, and PET. This type of material is used in jars and bottles. Glass was used back in the day but it is not much preferred nowadays. Aluminum is also used in making stylish bottles containing hair colors. The shape of the bottle is designed accordingly to get the consumer's attention. The closure or lid used are of various types like flip-top, press top, and screw caps. The packaging can be also selected according to the product. Like solid lotions are packed in tin containers, impermeable tissues are packed in PVC packets and dry shampoos are marketed as sprays. According to the target, the shape of the plastic container is decided.



Fig. 7 Evolution of cosmetic bottle

3.7 Perfumes- Perfumes are packed in glass bottles. A beautiful look is given to the glass to make it appealing to consumers. Glass and steel can be widely used in perfume packaging. According to the application, on and off perfume atomizers, bulb atomizers & refill purse atomizers are also seen in the market. For essential oils, droppers are also available. Solid perfumes are also available in containers similar to face powders. Rather than glass or steel, containers made up of high-grade plastic and aluminum alloy can be also used in the packaging of perfumes. Deodorants are available in three types- Sprays, Roll-on, and Sticks. The sprays are widely packed in aluminum containers to prevent is breakage like glass. Roll-ons and sticks made the application of deodorant easy and they are packed in plastic containers.

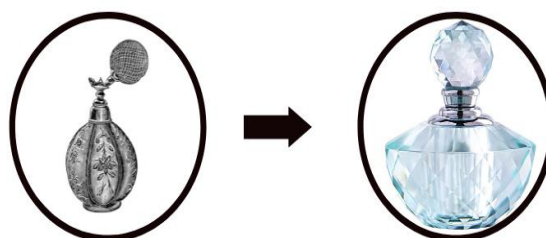


Fig.8 Evolution of perfume bottle

3.8 Face powders- Powders are marketed in the same fashion as earlier, only slight modifications are made in their packaging. The shape of the plastic keeps changing and more compartments are introduced to keep every individual part of face powder. The loose powder is packed in a closed container with a spray cap for easy application and the compressed powder is packed in two-layered containers, in the upper case powder is packed and the sponge in the lower case.



Fig 9 Evolution of face powder container

3.9 Nail lacquers- The basic container for the packaging of nail lacquers is glass for many years. Nail lacquer bottles can be available in different sizes of the bottle. Full-size bottles allow for a full-size brush and cap that is easy to hold while using the brush. Mini bottles have smaller brushes and caps which can make them more difficult to use. However, many consumers choose to purchase mini bottles to carry with them for quick touch-ups. The shape of the body of the bottle also plays a vital role. Round and square bottles are most common however many new containers are now available in different shapes.



Fig. 10 Evolution of nail lacquer container

4. GUIDELINES FOR LABELS OF COSMETIC PRODUCTS

Packaging and Labeling have become very significant as it is being used as a marketing tool to attract consumers. To prevent the exploitation of consumers and to standardize the bare minimum material information the government has enacted the Consumer Protection Act, of 1986. Packaging and Labeling Laws applicable specifically in the case of 'Cosmetics' are as follows: The Drugs & Cosmetic Rules 1945 passed under sections 12 and 33 of the Drugs and Cosmetic Act, 1940, and supplementary labeling guidelines requirement as provided under relevant BIS. The BIS is the national standards authority of India which formulate, recognize or promote the Indian Standards. [28]

Table. 2 the general categories of labeling contents, and the manner of its declarations [29-30]

Categories	Outer label	Inner label	Manner of declaration
Brand name along with product name	•	•	➤ If a package has more than 1 product, the name (and number of quantity) of each product to be mentioned on the package
Name and address of the manufacturer	•	•	<ul style="list-style-type: none"> ➤ Name of the Manufacturer. ➤ Complete address of the premises where the product was manufactured ➤ Additionally, the name and address of the packer or/and importer in relevant cases. ➤ If the size of the container is small- name + principal place of manufacture + the pin code.
Manufacturing date	•	•	<ul style="list-style-type: none"> ➤ Date of Manufacture, or Prepacked or Import of commodity ➤ The rubber stamp can be used, but without overwriting.
Expiry date	•	•	➤ Expiry date
Net Quantity	•	•	<ul style="list-style-type: none"> ➤ The standard unit of weight or measure <ul style="list-style-type: none"> • Weight of wrappers/containers excluded. • If package capacity is less than 10 cubic cm or less – a quantity declaration is to be made on the tag, card, tape, etc. • No Declaration required: - If the net content of the package of perfume, toilet water, or the like, is less than 60 ml or 30 gm. • In the case of wholesale packages, the total number/ net quantity of retail packages contained
Retail Sale Price	•	•	<ul style="list-style-type: none"> ➤ Of the package. ➤ For reducing MRP, a sticker with revised MRP may be affixed inclusive of all taxes.
Batch number	•	•	➤ A batch number is not required if the cosmetic is 10 grams or 25 milliliters or less.
Warning or Caution if a hazard exists		•	<ul style="list-style-type: none"> ➤ Directions for sale use ➤ A statement of names and quantities of the hazardous or poisonous ingredients.
Manufacturing License Number	•	•	<ul style="list-style-type: none"> ➤ Preceded by the letter "M". ➤ Provided that in case of imported products
List of Ingredients	•	•	<ul style="list-style-type: none"> ➤ Ingredients present in a concentration of more than 1% - are listed in the descending order of weight/volume. ➤ Not required to appear for the packs of less than 60 ml or 30 gm.
Registration Certificate Number (RCN)	•		<ul style="list-style-type: none"> ➤ Only the label of imported cosmetics should bear the RCN of the product. ➤ The name and address of the registration certificate holder for marketing the said product in India.
Consumer Care Details	•	•	➤ Name, address, telephone number, and E-mail address of the person who can be contacted in case of consumer complaints.

Brown/Red or green dot	•	•	<ul style="list-style-type: none"> ➤ For the package of soap, shampoos, toothpaste, and other cosmetics and toiletries. ➤ Non-Vegetarian origin Brown dot ➤ Vegetarian origin- Green dot.
'Not a standard pack size under Legal Metrology (Packaged Commodities) Rules, 2011'			<ul style="list-style-type: none"> ➤ Specific Cosmetics should be packed in the standard quantities as mentioned in the Second Schedule of the said rule. ➤ If packed in a size other than that prescribed in the schedule, then it should be prominently labeled in the said manner. ➤ Value-Based packages can be sold without complying with the Second Schedule.

5. CONCLUSION

The packaging material used for the cosmetic product should have a good appearance as well as compatibility with the contents. As per the need of the cosmetics, the material is selected and used. But after using cosmetic products the packaging is hardly collected and recycled, thus utilizing sustainable and environmentally biodegradable materials for cosmetic packaging has become an important challenge and opportunity for a sustainable environment. The need to find and use new sustainable packaging materials has become everyone's point of view. It is because in the modern era some people are more concerned about the environment and attractive look rather than the cost. The concept of packaging has gone far beyond just protection. This leads to the high cost of products for everyone. Makers need to work more on minimal cost and safe packaging with the least harm to the environment. Innovative bio-based and compostable materials are nowadays been developed and they are suitable for the production of cosmetic packages while others materials are under development with very promising properties. Packaging methods are going back to our roots and old natural ways not because we want it, but because we need it to make a sustainable environment. Even with every new packaging material and technique coming every other day, we can't neglect the importance and impact of old packaging materials which were used. We will be using new as well as old packaging for their properties and reasonable cost.

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