

Plastics in pharma packaging

Gainin an edge

Pharmaceutical packaging has seen many different phases over the past few centuries. The glass bottles used to store medicine, and the silica gel pouches used as desiccants are fast being replaced with plastics materials. As drug manufacturers today are spending a huge amount on research to keep a check and expose counterfeiting, plastics plays the role of an ideal substrate allowing flexibility towards innovative solutions. Also, with the increasing use of plastics in pharmaceuticals packaging, the identity of a product is easier to maintain. In this article, **Nishan Chandran** sheds some light on the role of plastics in countering counterfeiting, constructing identity and protecting the drug beneath the blister or inside the bottle.

Packaging of pharmaceuticals and healthcare products is the first thing that a consumer comes in contact with while buying a product. The packaging of the drug can reveal the true identity of the product packed in it. It was not so long ago that this pharmaceutical packaging segment was dominated by the usage of glass bottles, paper packs and metal foil packs. Today, we see more and more of this packaging being made of plastics. Gautama Buddha, senior director – Packaging Development, Dr Reddy's Laboratories Ltd mentions, "Packaging is one of the most critical aspects and an integral part of pharmaceutical products because it comes in direct contact with the drug. Packaging has a critical role in assigning shelf-life to the product and helps in the preservation of the product and its organoleptic properties."

Developments are seen in the packaging of all pharmaceutical products like tablets, capsules, creams, ointments and liquids. Besides, there are numerous developments happening in terms of plastics packaging materials, caps & closures and labels. Praful Naik, global chief scientific officer, Bilcare Ltd mentions, "Plastics plays a very important role in drug-specific packaging. Plastic films offer excellent thermoforming properties and increased gas & water vapour barrier, suitable for sensitive medicines. It also offers better machinability, high-abrasion resistance, the possibility of making non-toxic and pharmaceutical grade multilayered film. Thus, a drug

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senior director – Packaging Development, Dr Reddy's Laboratories Ltd



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manufacturer can choose from a wide variety of plastics, depending on the suitability & barrier properties of the packaging material and its inertness to the drug.”

Gaining inroads

A large number of pharmaceutical companies are now using plastics for packaging their products. Naik states, "Today, about 60 to 80 per cent of the total pharma packaging market is dominated by plastics. PVC, PVdC-coated PVC film, HDPE and LDPE are some of the materials which are used for packaging pharmaceuticals." But before zeroing in on a particular type of material for packaging, the properties of the plastic materials and their inertness to the drug along with the ease-of-use are some factors, which are considered.

Agrees P V Narayanan, chair professor and director, SIES School of Packaging, "Due to its amenability to autoclaving, sterilisation by irradiation, excellent physical, mechanical and thermal-resistant properties coupled with optical properties, plastics is fast gaining inroads into pharmaceutical

packaging. Some of the typical examples of plastics used in pharma packaging include oriented polyvinyl chloride (OPVC), oriented polypropylene (OPP) and PET- oriented & non-oriented."

PET bottles too are used to manufacture containers for pharmaceutical products as these are extremely transparent. Additives can be used to increase such PET pack's barrier effect. This results in a packaging product that ensures protection from either oxygen, carbon dioxide, gas or water.

Reveals Maurizio Bianchi, commercial director - Plastics Division, Bormioli Rocco, "New bottles for pharmaceutical products combine innovative raw materials with avant-garde manufacturing processes. Manufacturing these bottles using injection stretch blow moulding technique allows the PET syrup bottle's sides to be both thin and sturdy. This technique also helps in producing precisely calibrated bottle mouths and a completely uniform distribution of the plastic material. And since these bottles



Courtesy: Global Package Gallery

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are available in various sizes, they are able to answer clients' requirements accurately. Moreover, plastic packaging for pharmaceutical products has a simple and essential design that leaves ample margin for subsequent personalisation with ad hoc decorations and labels.”

Areas of application

Plastics are being used in blister packs, bottle packs, fluid packs, bottle caps and even where metal foils like aluminium is being used there is an inner lining of plastics for added protection. Narayanan says, “Plastics in various forms are used in the packaging of drugs and pharmaceuticals, unit dose and bulk packaging. Del cap metered dose, aseptic filled-FFS bottles, radiation-resistant PP bottles, double-decker spray aerosol, single dose blister- break open packs, capped global top cartons, refillable, reusable and recyclable aerosols, medical-grade pressure-sensitive materials, child-resistant,

elder-friendly packages and many more are made possible by using plastics.”

Even in the case of injectables packaging, many innovations have come up using plastics, which offers the customers safety. Buddha states, “Plastics makes it possible to have various innovations which otherwise would have not been possible with other materials. Blister-, bottle- and vial packs for injectables, laminated tubes, plastic drums and polybags are some of the different applications of plastics in pharmaceutical packaging. Plastics is also used for laminates as liners and also in pharmaceutical aids like droppers, spoons, etc. Many customer-convenient packs like dispensers and calendar packs or patient-compliant packs can also be offered.”

Though blisters are made of different materials, PVC, PVdC or cold formed laminates are mainly used. This is because PVC and PVdC are good moisture barriers. For products that are sensitive to moisture and gas, cold form laminate packs are

used and these packs make use of PVC, aluminium foil and polyamide. Many other materials too have been developed which give better barrier properties and are suitable to specific kinds of drugs.

Narayanan mentions, “Developments in the field of plastics have opened up quite a few possibilities both as alternatives and substitutes as well as new applications. In flexible areas PVDC, EVA, EVOH, EAA, VMCH and LLDPE are the new barrier materials. Besides these also provide better heat seal. Heat shrink and no-label look PS labels are new entrants along with a number of wadless closures moulded in thermoplastics from PE and PP. They are commonly used as push-in, snap over, clip-on etc.”

The pros and cons

Plastics has the advantage of being being flexible as well as non-fragile-something which is not offered by other materials used for packaging pharmaceuticals.

Buddha agrees, “Being flexible and thermoformable, plastics can be moulded into any shape or size and these factors are very important in building a brand identity. It also offers convenient and lightweight packaging solutions and unlike other materials like glass & aluminium, is easier to work with. It even offers greater inertness as compared to metals - which have a higher potential of reacting with an active pharmaceutical product.”

