Pharmaceutical Plastic Packaging Market

TechSci Research Analysts in Conversation with:

Priyank Banker

(Regional Sales and Business Development Manager)

How is your work related to pharmaceutical plastic packaging?

We are one of the global packaging leaders offering range of pharmaceutical packaging including vials, nasal spray bottles, throat sprays, closures, drug delivery devices for multiple application under inhalation.

How have you seen the pharmaceutical plastic packaging industry evolve over the years?

Pharmaceutical plastic packaging has definitely evolved over the years. With right selection of material, plastic becomes more cost effective and flexible compared to traditional packaging material primarily considering glass. Plastics also have an edge over glass in terms of aesthetics with possibility of being molded into any shape and color.

What are the key trends driving innovation in pharmaceutical plastic packaging?

Fit-to-size: Designing right packaging as per need. This has effectively reduced waste generation and carbon footprint

Tamper evident packaging: One of the most important factors in ensuring patient's health and safety

QR Codes: This facilities in giving all the relevant information precisely

Sustainability: Lot of efforts are being made in developing sustainable packaging solutions.

Priyank Banker

Regional Sales and Business Development Manager

In your opinion, how does pharmaceutical plastic packaging compare to other materials like glass or metal in terms of efficacy and safety?

All these materials are used for pharmaceutical packaging with each of them having their own benefits and drawbacks. Plastic being the most popular choice because of its lightweight, easy to process, cost-effective, availability, resistance to impact.

What are the main challenges regarding the use of plastic materials in pharmaceutical packaging, particularly in terms of safety and stability?

Plastics has its own challenges when it comes to safety and stability. Leaching, permeability, poor thermal properties, contamination, change in physical properties are the major challenges. It is very important to select right combination of material to make sure the drug is safe and stable during its entire shelf life.

How do you assess the role of regulatory bodies (e.g., FDA, EMA) in ensuring that plastic packaging is safe for pharmaceutical use?

Regulatory bodies hold a very crucial role is ensuring and enforcing standard and safety of the drugs and packaging material being used for these drugs. They establish the compliances, regulations, guidelines and good manufacturing practices (GMP) for pharmaceutical as well as packaging industry.

What kind of tests and certifications are essential for validating the safety of plastic pharmaceutical packaging materials?

Sterility testing, chemical resistance testing, extractable and leachable study, shelf life testing are few of the crucial and critical tests to ensure the safety of pharmaceutical packaging material. All these tests are also essential to identify correct packaging material and work on optimizing the packaging cost as well.

How do you view the potential risks of plastic leachables and extractables, and what advancements are being made to mitigate these risks?

Plastic leachables and extractables can potentially alter the shelf life of the drug, have impact on the potency of the drug causing risk to human health and environmental safety.

To mitigate this risk, regulatory bodies have included in the extractable and leachable study in the guidelines to ensure drug safety. Lot of efforts are being taken to work on designing eco-friendly plastics, raw material selection, risk assessment strategies for packaging material with systematic approach.

How is the pharmaceutical packaging industry addressing concerns about the environmental impact of plastic packaging?

The pharmaceutical packaging industry is definitely going through a shift in its approach towards plastics. With increasing concerns over plastic waste being generated, stricter environmental regulations are being put in place and people have started evaluating sustainable material and manufacturing processes keeping the objective of human health and safety at its core and reducing the carbon footprint of pharmaceutical plastic packaging.

What is your opinion on the role of recyclable or biodegradable plastics in the future of pharmaceutical packaging?

Biodegradable or recyclable plastic surely helps improve the environmental impact and also aligns with the principles of circular economy. Although when it is applied to pharmaceutical industry, there are challenges of purity, contamination and inconsistent processing leading to compromised quality and making it unsuitable for those drug products that are directly injected into the bloodstream.

To overcome these challenges, pharmaceutical packaging industry should have a circular approach starting with sustainability in designing, reduced or optimising product weight, minimizing the process wastage. This in turn will help reduce the carbon footprint of the products.

How do you balance the need for sustainability with maintaining the stringent safety and performance standards required for pharmaceutical products?

Keeping drug safety and performance at its core, balance can be achieved by mapping out the entire end-to-end packaging product life cycle, use closed loop energy systems to improve energy efficiencies during manufacturing processes, use digitalization to track and trace every action.

What technological advancements in plastic packaging have had the most significant impact on the pharmaceutical industry?

There has been a significant development in terms of technology advancements in plastic pharmaceutical industry. A lot of efforts are being done towards developing smart or intelligent packaging solutions for enhanced end user or patient experience.

Tamper evident features to ensure that the drug is not altered or exposed till it has reached the consumer, anti-counterfeiting measures or RFID tags to ensure traceability and authenticity of the product, direct drug delivery devices and patient centric packaging are designed to make it easier directly for the patients to take their own medicine.

Can you discuss the role of smart packaging, such as integrated sensors or RFID tags, in improving drug safety and patient adherence?

Smart or intelligent packaging can play a very important role in improving the drug safety and patient adherence. There are smart packaging already available that improve the overall patient experience and can help track the drug delivery, dosage information, reduce or eliminate

medication errors, real time interaction with healthcare provider and other important parameters related to drug delivery and health safety.

How is the integration of advanced manufacturing technologies like injection molding and blow molding enhancing the quality of pharmaceutical plastic packaging?

Evolution of manufacturing technologies has proved to be a game-changer in pharmaceutical packaging industry. Automation has helped streamline the production processes. Advanced censors and real time monitoring has improved process efficiency. Integration of robotics with the advanced manufacturing techniques has further improved production rates, precision, repeatability, improved overall process control and reduce human risk.

What are the most significant regulatory challenges you foresee for pharmaceutical companies using plastic packaging?

According to me, the most significant regulatory challenges that pharmaceutical plastic packaging today faces is to design a sustainable solution that has balance of drug safety and efficacy to meet the patient or consumer needs.

How do the compliance requirements differ across various global markets (e.g., U.S., EU, Asia) when it comes to pharmaceutical plastic packaging?

Compliance requirement largely vary across different global markets keeping in focus the cultural sensitivity of the region, target patient or consumer needs, country specific guidelines, mandatory information, language and waste management policies of the region.

What role do you believe regulatory harmonization across regions could play in advancing innovations in pharmaceutical plastic packaging?

Regulatory harmonization across regions would mean optimizing cost of trials, reducing the efforts in innovation and saving the duplication cost by improving the overall experience of knowledge sharing among innovators.

Although it will have its own challenges as we need to understand if the target consumer is actually going to be benefitted.

How important is patient-centric packaging in pharmaceuticals, and what role do plastics play in designing packaging that improves the patient experience?

Like mentioned earlier, patient centric packaging will help improve overall experience and reduce medication error. It will help keep track of dosage delivered, manage medication schedule and reduce risk of drug misuse.

What packaging innovations are being developed to ensure ease of use, especially for elderly or paediatric patients?

Child resistant and senior friendly design is one of the examples of innovative design solutions especially for the elderly patients.

Closures with single dose storage have been designed to aid as a medication reminder and ensuring correct dosage is being administered to the patient. Smart device linked technologies to keep a track of entire health condition.

How do you see the role of plastic packaging in improving patient compliance with medication regimes?

Medication adherence plays a vital role in prevention and successful management of chronic diseases in patients. It would help patient in sorting and administering correct drug with right dosage.

What is the cost-benefit analysis of using plastic over other materials in pharmaceutical packaging?

To sum it up in simple words plastics have edge over other packaging material and ultimately resulting in cost saving in comparison to other available options

- Durability
- Safety
- Security
- Light Weight
- Design Freedom / superior aesthetics
- Handling and transportation

How do you think the pharmaceutical industry can optimize the cost of production while maintaining high-quality plastic packaging?

Cost reduction / optimization projects are key to improving cost of packaging without compromising the quality and safety of the packaging. Adapting to using resources efficiently, working on reducing the process waste and implementation of automation, robotics and digitalization in synchronization with the manufacturing process could help in optimising the overall production cost. Looking at new and alternate raw material as a part of innovation projects is also a key towards cost reduction.

How has automation and digitalization impacted the production of pharmaceutical plastic packaging?

Automation and digitalization has changed the overall approach for the packaging industry.

It has let to improved quality controls, better repeatability with reduced or zero errors, improved overall production efficiency, better safety controls while storage and transportation, monitoring key parameters like moisture, temperature, humidity to ensure correct efficacy of the drug throughout its shelf life.

What do you foresee as the next big innovation in pharmaceutical plastic packaging?

Use of eco-friendly material of development leading to easier sorting and recycling of plastic material post consumption could be the next big innovation and future of pharmaceutical packaging industry.

The counterfeit drug industry is also growing at a rapid pace, for which the packaging industry needs to play a vital role in increasing drug safety and identify the fake products in the market.

How do you think the industry will evolve in terms of material selection, manufacturing processes, or regulatory changes over the next 5-10 years?

Pharmaceutical packaging industry to growing with a rapid pace and expected to evolve on multiple fronts taking into account few critical factors:

- Consumer centric / consumer friendly
- Inclusion of artificial intelligence, data analysis and modern manufacturing techniques using automation, robotics
- Collaboration with different partners for innovative solutions
- Development of safer chemicals or sustainable raw materials keeping in mind the impact on human and environment safety

What impact do you think emerging issues like the circular economy or zero-waste manufacturing will have on pharmaceutical plastic packaging?

Circular economy or zero-waste manufacturing for pharmaceutical industry will surely have a positive impact with players adapting to more cleaner and greener ways for manufacturing, working on waste management and recycling programs, constantly look out for sustainable solutions.

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