The plastic conundrum

Environmental issues have been a growing concern, but devoid of positive action. Hence, when a company like HUL flexes its clout for recycling, it's a sign of things to come. At Plastivision 2020 hosted in BEC, Goregaon in Mumbai, the WhatPackaging? team tries to find out where the industry is heading in terms of a circular economy.

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The WhatPackaging? team stumbled upon a Hindustan Unilever (HUL) product Love Beauty and Planet Tea Tree body wash at a retail store. It was packed in a 100% recycled bottle. The product claimed to have less carbon footprint. It was a great sign of the things to come, as according to its extended producer responsibility (EPR) commitment, HUL says that by 2025, 25% of its plastic packaging will come from recycled plastics.

On the flip side, it was the only HUL product in the entire supermarket, which had such packaging. According to the New Plastics Economy Global Commitment 2019 progress report, less than one per cent (by weight) of post consumer recycled content is currently being used in the company's packaging. So, consider the amount of recycled packaging that the HUL would need to produce to fulfil its 2025 commitment.

Nonetheless, it was a positive start, a sign of the capabilities in recycling technologies, and of the fact that recycled packaging has started to populate the retail shelves in India. A week later, at Plastivision 2020, the WhatPackaging? team encountered the back-end of these products and how the products are being manufactured.
Beginning from the alternatives to the roots of plastic manufacturing - the input raw materials till the post-consumer collection, sorting and recycling mechanisms. The show was packed with a solution to cater to every facet of a product's lifecycle.

While there still exists some grey areas about what the regulations are and what's transpiring on the ground, what was evident is that these solutions are being implemented globally, and are capable of being adopted in India in conformity with the announced deadline on the usage of single-use plastics (June 2022).

A look at the green alternatives

Let's begin by exploring these solutions with the input raw materials, which can be sourced either from petrochemicals, natural resources such as corn starch, or plastics itself through recycling. Now, even though there are alternatives, the questions arise; are the alternatives good enough to compete in terms of properties of virgin plastics? What is their availability in comparison to virgin plastics? Are they economically viable?

During a conversation with Florencio Cuetara, CEO of a USA-based company Okeanos, which has established an office in Mumbai through collaboration with Kandui Industries, Cuetara says that the company has introduced a – Made from Stone – product line with a formula of calcium carbonate combined with a small amount of biodegradable plastic. And the product is a cheaper alternative to virgin plastics. Also, the availability of calcium carbonate is hassle-free as the resource is available just a few kilometres away from Kandui's Daman plant.

Edward Kosior and Kevin Davies of Nextek Technologies

Another company, Hyderabad-based Blend Colours says that it has an oxo-biodegradable range of additive masterbatches, which uses Oxygreen technology activated by natural sunlight that will enable the disposed product to lose its molecular weight and turn it into hydrophilic molecular fragments, which helps in faster degradation.

Then, there was a stall of Mangaluru-based masterbatch manufacturer Konspec, which has established a technical collaboration with Netherlands-based bioplastics manufacturer Total Corbion PLA (polylactic acid) to cater to India, Nepal and Bangladesh markets. Total Corbion recently invested in a facility in Thailand that has enabled the company with a global production capacity of PLA bioplastics to increase by almost 50%, to 2,40,000 tonnes per year.

To understand more about these 'green' masterbatches, we spoke to Edward Kosior and Kevin Davies of Nextek Technologies. They explained that firstly, it is imperative to understand what the terms compostable, biodegradable

and oxo-biodegradable mean.

Compostable means that the plastic could be eaten by bacteria. A biodegradable material can also be compostable, but under specific ambient conditions. If the material is oxo-biodegradable then it is mixed with chemicals to enable the product to be oxidised, which fragments the product into smaller microparticles. However, the particles won't disappear on its own if the specific conditions aren't met. This, in turn, can cause more hazards to the environment.

Kosior says, "A lot of additive manufacturing companies claim that these smaller particles are digested by bacteria. But, there is no evidence of this yet and there should be more signs to prove it. And it is illegal to use the words oxo-biodegradable in the West. What we really require is naturally biodegradable solutions."

One exhibitor, who requested anonymity, mentioned that the country is experiencing newer establishments and technology collaborations. But the availability of raw materials such as sugarcane or corn starch to cater to the rapid consumption of Indian plastics is still a big question mark. He further said that in terms of properties these greener alternatives lack properties such as transparency. Currently, the range of applications is limited, too. But, it has a huge potential to grow due to the constant research and development being carried out.

Is the growth of virgin plastics being hampered?

In the wake of newer alternatives, the other EPR commitment by brands is towards the reduction of the usage of virgin plastics in its production. HUL claims that it will reduce virgin plastic in packaging by 50% by 2025. While, Nestle is set to invest close to Rs 14,698 crores to lead the shift from virgin plastics to food-grade recycled plastics and reduce its use of virgin plastics by one third by 2025. But, are these initiatives really hampering the growth of virgin plastics?

Bottle crushers installed at the exhibition premises to create awareness and promote recycling

According to a Plastindia report, plastic consumption in India is growing at a steady rate of 9% and it has reached 20 million metric tonnes in 2020. Gilles Rochas, general manager, polymer marketing, Oman Oil and Orpic Group, commented that it took a long time for India to touch 10 million metric tonnes, but it had grown to 20 million metric tonnes in a quick time.

Indian petrochemical major, Indian Oil Corporation has invested in a polypropylene plant with a capacity of 680 kilo tonnes/annum (kta) in 2019, and it is set to invest in a 356 kta ethylene glycol plant in Odisha by 2021. And the talks of a PurifiedTerephthalic Acid project incorporation is underway. Meanwhile, ONGC has added up its HDPE (high-density polyethylene) and polypropylene capacities, too.

At Plastivision, we asked recyclers and associations that in a scenario where the landfill in Ghazipur, New Delhi, which reached its saturation point in 2002, is set to surpass the height of Taj Mahal this year, why are manufacturers adding to the existing capacity? And if not for virgin plastics, then how will one cater to this growing plastic consumption rate?

We put this question forward to PV Ravindra of Srichakra Polyplast, which claims to be the first bottle-to-bottle recycler in the country. According to Ravindra, one of the reasons why the growth of virgin plastics has increased in India is because there are no regulations on the virgin content to be used in packaging, while there are stringent regulations on the recycled content that can be used.

Another issue is to upscale the value of the disposed plastic after recycling such as for food-grade applications. In India, recycled plastic is largely being used for non-food-grade applications, as there are norms in place that restrict its usage to maintain the necessary safety parameters, which might be misused otherwise. But, it is a different story in the West, which is taking newer strides towards a circular economy.

A case in point is, Nestle. In order to create a market of recycled materials, Nestle has committed to sourcing up to two million metric tonnes of food-grade recycled plastics and allocating more than Rs 11,000-cr to pay a premium for these materials between now and 2025. Also, such solutions are more expensive than virgin plastics. According to a SEP Global Plastics report, the prices of rPET exceeded virgin PET for 2019 by up to Rs 39,000 per tonne.

The growth of recycling in India

Ravindra says that a major problem in recycling lies in segregation, as the processes that follow such as decontamination, shredding, washing and extrusion are manageable. He says, “If the packaging is homogeneous, then recycling is easier.”

In a conversation with E Tirupati Reddy of Ramky, which claims to be the largest recycler in the country, which includes India's largest waste energy plant in New Delhi, and the biggest eWaste facility in India, says, "We usually face challenges in the collection process. On the recycling side, we don't have any notable challenges, as we have all the technologies in hand. Currently, we are disposing of multilayer plastics in our waste energy plant and generating energy. In total, we are generating almost 24 MW of power from municipal waste every day."

Ramky is in the process of beefing up its capacity as well, by establishing close to five plants in the next year. Meanwhile, Ravindra also mentioned that he has expanded his recycling capacity to specifically cater to bottle-to bottle manufacturing.

Arpit Patel of Ahmedabad-based Gaurav Engineering, which specialises in manufacturing recycling machines, had a similar outlook. He says that the recycling potential in India is growing. But if segregation is done at the source, then it gives them more opportunities to upgrade the recycled products at their end.

On the recyclability end, Vijay Habbu of Reliance Industries explains that it is vital to understand that plastics are not a monolithic group, as there are various complexities such as multi-polymer, multi-materials in rigid as well as flexible. And each category needs a different outlook.

Suhas Dixit of Navi Mumbai-based Agile Process Chemicals, says, "We can subject multi-material and multi polymer plastics to physical recycling, depolymerisation, pyrolysis, gasification and incineration. However, pyrolysis as technology is far better than any other technology options. Pyrolysis is the technology suitable for multi-polymer and multi-material plastic waste."

Meanwhile, Habbu added that there are solutions in place. Be it plastic to fuel or plastic to energy. The only problem lies is, in the collection, and it cannot be solved by brand owners or the government alone. It has to be a collaborative approach. It all narrows down to collection and segregation

Is collection the culprit?

The entire plastic conundrum in India narrows down to one single point: source segregation and collection. Even though brand owners have taken steps to trigger the buy-back mechanism in place, it has not garnered the expected results. And in the end, it all lies in the collection mechanism.

One solution is to boost the automatic sorting operations and the introduction of newer technologies. Sandeep Patel, founder and CEO, Nepra, says, “Effective and efficient sorting technology can reduce the cost of PCR (post consumer recyclate) sorting from Rs 5-6/kg to Rs 1.5-2/kg per kg which is almost 70% reduction in the sorting cost.” Nepra has incorporated an IRS AI vision system to boost its sorting mechanism.

Meanwhile, Norwegian multinational corporation active in the manufacturing of advanced collection and sorting solutions, Tomra, which currently has17 units in India and it is set to reach a total of 38 units by June 2020; has introduced a sensor-based solution. In which, the sorting is carried out with the help of a near-infrared (NIR) light source, which helps in separating the waste categories through wavelengths of light.

Recykal, a sub-brand of Rapidue Technologies, is focusing on providing an online platform for the aggregators and recyclers to buy and sell waste, such as eWaste, plastic and paper waste. This, according to Rakesh Kumar of Recykal will minimise the involvement of middleman or traders, who take away almost 30% of the profits in the process.

While, the government and brand owners take a jibe at each other on who should do what, whether to incentivise waste, or to improve the collection mechanism, or to improve the efforts on the segregation at source. Meanwhile, some experts say, the need of the hour is remodelling the packaging design with 100% recyclability, while some say the recycling activities should be greater than 70% of the packaging production.

Meanwhile, the landfill keeps on piling up.