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Second life: closing the PCR loop

With mountains of plastic waste accumulating on the planet, could post-consumer recycled material be the solution?

Oriol Aran, Quadpack's Head of Product Engineering, explores the issue

Some 400 million tonnes of plastic waste are produced globally every year, according to the United Nations. Around a third of this comes from packaging. Much of it is left in the earth, to become part of the fossil record of our era. Besides waste pollution, the generation of raw materials also causes harmful emissions. This is not a legacy we want to leave for future generations and the industry is working together on multiple levels to address climate change.

One of the oft-touted solutions is to reuse this waste as raw material; in other words, post-consumer recycled (PCR) material. PCR is a great way to help offset the waste problem, but there are many challenges in establishing a closed-loop recycling stream that incorporates beauty packaging. Creating a working process for material recovery is no easy task. It impacts the entire value chain, from material availability to the validation of the final product.

Much has already been written about PCR but, in a nutshell, it refers to material that has had a previous life, having been used by the consumer in another product. It has been collected, sorted and recovered as raw material to be integrated in a new product. To this should be added PIR. Post-industrial recycled (PIR) material comes directly from factory scrap, having never been used in any product delivered to the market, and it serves just as well as a source of recycled raw material.

The PCR value chain

To establish PCR as an efficient option to reuse plastic waste, all links in the value chain must be aligned and functional – and therein lies the challenge. It requires that all implicated parties – do their bit. In the first place, the brands and packaging consumer goods industry must design products that can be easily recycled. That means reducing material content (less is more!); using

Contact Details

Mariam Khan

Quadpack Group Press Office

Summit Media Services

Tel: +34 93 265 4463

E-mail: summit_media@compuserve.com

only materials where a recycling stream exists or can easily be created; and ensuring that packaging can be easily disassembled for recycling when the design cannot be monomaterial.

Next, consumers must properly recycle their waste. Whether they do so or not largely depends on knowledge and commitment, but also on municipalities providing readily-available recycling containers, with clear instructions on their use. This is critical to avoid marine and terrestrial litter and its impact on our eco system. In the end, all this pollution is returned to us in microplastic form through the trophic chain.

Within recycling streams, there are still many challenges in getting materials prepared for processing at the sorting plants. Currently, small items like makeup packaging do not get captured in the sorting trommels and end up being incinerated, or worse, as landfill after all. There is also a need for consolidation at the sorting stations of recycling plants. Moreover, certain types of plastic widely used in the beauty industry, like SAN, PETG, SMMA and PMMA, cannot be picked up by today's scanners. A consensus must be reached whether recycling streams are to include those types of materials or, as is more likely, we need to switch to using currently recyclable ones, such as PET, PP and PE. In any case, there is a lot of work to do to ensure that the material collected actually becomes used.

The next step in the chain involves processing the plastic into raw material for manufacture. There are two main systems, mechanical and chemical, although others are emerging, like enzymatic recycling. The latter breaks down plastics into the original monomers that allows it to be used in infinite loops; as there is no degradation in the material properties, it becomes as good as virgin material. However, this process must be scaled up before it becomes a viable solution.

Currently, mechanical recycling is the most established system and carries a lower cost. In this process, the sorted material is basically ground, washed, dried and pelletised, and reintroduced into the loop as new raw material. However, the mechanically recycled plastics degrade in each loop, so they can only be recycled up to seven times, after which they must be incinerated to recover some energy.

Chemical recycling, on the other hand, allows the production of "food-grade" material, which is required for cosmetics packaging in contact with the bulk. Organisations like the ISCC (International Sustainability & Carbon Certification) certify their supply chain for traceability thereby countering greenwashing, too.

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The final steps involve using the material to manufacture new products “ and selling them, too. Manufacturers may offer PCR packaging solutions, but brands must be willing to buy them. A change in mindset is required among both brands and consumers, especially in the luxury segment. Recycling plastic affects its aesthetics and may result in imperfections. However, these imperfections can be considered part of a product’s “beauty”, sending strong message of sustainability and responsible behaviour.

The cost impact will have to be accepted as part of the trade-off. In other sectors like food, this acceptance has already been won. No doubt beauty will not be far behind, especially with ethically-minded younger generations growing up and gaining purchasing power.

Driving the change

Climate change is a priority for all industries now, not just beauty and, by extension, cosmetics packaging. The 2030 Agenda for Sustainable Development offers a clear roadmap, with goals set by the United Nations back in 2015. In addition to voluntary measures, legislation is being introduced, most prominently in Europe. The EU Packaging and Packaging Waste Regulation (PPWR) is expected to come out in the next two years. Meanwhile, local legislation is hitting the packaging industry, introducing taxes for non-recycled plastics. In Spain, for example, this has been implemented at a cost to the importer or manufacturer of €0.45 per kg introduced in the Spanish market.

Once legislation regarding the use of recycled plastics is enforced worldwide, demand for PCR will soar, possibly beyond available supply. The number and spread of recyclers must grow exponentially and will likely require government incentives or grants to meet future demand.

The reduction of CO₂ emissions is a clear goal of the 2030 Agenda and switching to recycled material is among the many building blocks to get there. We are already rethinking packaging, from refillable and reusable designs, through renewable resource usage, to implementation of low-impact and even carbon-neutral processes. The ultimate aim is to change the way we work to have a positive impact on the planet and on society. However, in the meantime, we have mountains of plastic waste covering the earth’s surfaces. Using PCR plastic as raw material “ with an efficient, earth-friendly PCR value chain “ will go a long way towards reversing its impact.

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Contact Details

Mariam Khan

Quadpack Group Press Office

Summit Media Services

Tel: +34 93 265 4463

E-mail: summit_media@compuserve.com

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About Quadpack Industries SA

Quadpack Industries is an international manufacturer and a provider of enhanced packaging solutions for beauty brand owners and contract fillers. With offices and production facilities in Europe, North America, and the Asia Pacific region and a strategic network of manufacturing partners, Quadpack develops bespoke and customised packs for prestige, masstige and mass market customers. For more information, please visit www.quadpack.com.



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