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TECHNOLOGY

COSSMA

INNOVATION

Renewable resources
from the sea

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OPTIMISATION

Circular product
design

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**“THE HUMAN
BODY IS LIKE
A PLANET”**

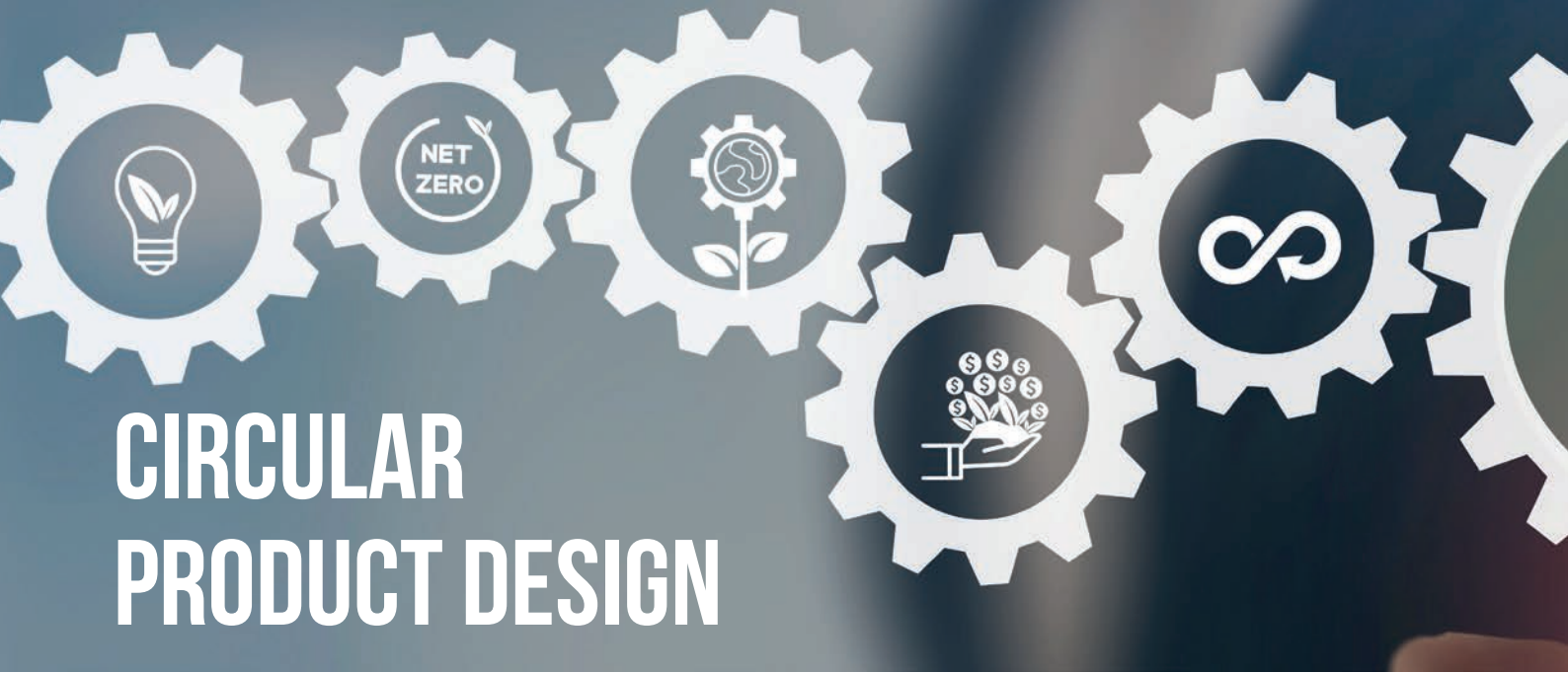
Dr Kristin Neumann, Scientific
Director, MyMicrobiome

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CIRCULAR PRODUCT DESIGN

Research and development | The cosmetics industry is moving fast to adopt life cycle assessment. Many individual steps can be optimised in the manufacturing of a product. Ella Ceraulo explains what is possible.



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Walter Stahel coined the phrase 'Cradle to Cradle' in the 1970's. Though it has taken time, the rise of B-Corps and the Ellen Macarthur Foundation are driving change to facilitate a circular economy. Environmental benefit claims cannot be slapped onto a product after development, and when this is perceived to be the case, brands are drawing negative attention¹. Circular design needs to be at the heart of product innovation and full Life Cycle Analysis (LCA) considered to evaluate sustainability. The cosmetic industry is in a relative sweet spot for this kind of development, in a Personal Care Products Council study 68% of consumers see sustainability as an important purchasing factor².

Packaging

The personal care and beauty industry produces more than 120 billion units of packaging every year globally³, with most of this not being recycled. Opting for packs made from post-consumer recycled material is an option when sourcing, but there is a limit to how many times plastic can be recycled, and in some areas, recycling is not possible. Several design methodologies allow brands to reduce packaging waste:

Get naked: The soap bar fell out of favour to syndets but there has been a resurgence in bar products. Some brands re-popularised the convenient bar format for shampoos, conditioners and even skincare. Eliminating the need for individual plastic packaging. Many brands sell reusable tins for storing the product in or suggest consumers should get creative to reuse some other packaging within the home.

Plastic alternatives: Many alternatives are emerging in the market. Paper and board-based products are easily

recognisable as being natural, but in a LCA may not be more environmentally friendly due to their high carbon footprint⁴. Polylactic acid is paving the way for a new era of packaging with a lower carbon footprint and degradability. One of the issues affecting the uptake of these materials is limited access to recycling.

Refill: Possibly the most effective strategy but easier said than done. Any refilled product will need to comply with Cosmetic regulations, ensuring the packaging is sanitary, preventing microbial contamination detrimental to the product's safety. Options are refill in store, collect containers for off-site washing and refill, or refill at home. Pouch refills for shower gel or handwash and packaging innovations, such as refill pods, allow for a premium glass jar to be reused without contamination issues. Care must be taken when choosing this route as non-recyclable pouches used by some brands have been perceived as a step in the wrong direction⁵. BYOW (Bring your own water)



formulations are an exciting development. These products can be mixed up in the home, allowing a pack to be re-filled, reducing the weight of products shipped around the world. Again, care must be taken when choosing packaging material.

Formulation Strategy

Simplicity: Every raw material used creates complexity in the supply chain. Each product will be shipped in its own packaging and, unless it is an IBC, will often not be re-used. The impact of each material's growth, harvest, freight, and packaging should be considered. One way to reduce the impact is simpler formulations or purchasing from suppliers who have control over their supply chain and can supply a pre-blended product. If three products can be replaced with one, that could have a significant impact in the LCA. Blends are commonly available of emulsifiers with fatty alcohols, surfactants, and waxes in lipstick bases. Using these blended products can also offer reduced heating and mixing times in the process. Likewise, looking for multi-functional products can cut the number of ingredients. Look for emulsifiers with rheology modifiers or emollients that can offer additional sensorial benefits or actives that can be used to make multiple claims.

Low energy processing: Innovations allowing for lower energy manufacture should also be considered. Easy to disperse gelling agents and surface treated pigments can reduce mixing time, making significant and measurable reductions in CO₂ and potential cost savings. Liquid or polymeric emulsifiers⁶ and gelling agent⁷ are a great choice for cold mix processing. The newly developed Low Energy Water in Silicone (LEWSi)⁸ emulsification system is an option to speed up manufacture and save energy during production of W/Si emulsions, typically used for colour cosmetics and premium skincare.

Ingredient Choice

The notion that plant products are perceived to be kinder to the skin, 'clean' and sustainable persists. Raised awareness of issues caused by palm oil cultivation has increased interest not only in RSPO grades but also alternatives. Coupled with pressures to provide enough food for the planet, even Greenpeace's policy director has agreed grain produced for biofuel should be put back to food use amid the food crisis⁹. Making use of waste natural products from the food industry to create raw materials of benefit to cosmetics. One example, grapeseed oil¹⁰, is a by-product of the wine industry. The

seed oil, extracted from the pomace has an elegant silky skin feel and high content of unsaturated fatty acids to leave skin soft and supple. Synthetically made materials mimicking molecules found in nature can now be synthesised at scale with minimal contaminants and are less impacted by global events.

The Earth's most available elements are making a comeback. Silica and Oxygen are used to create silicones, which are seeing renewed interest. After years of misinformation, the benefits of Dimethicone are being re-recognised, and its use is defended by dermatologists¹¹. Dimethicone is a safe, vegan, non-comedogenic material with many sensorial benefits as well as functioning particularly well in anti-aging, colour, moisturising, and protection for compromised skins¹².

Multifunctionality

If one formulated product can have several uses, it could save on further products needing to be developed, along with all the packaging and energy that those products would need. This is also an advantage to the consumer who will have to buy less product and save space in the bathroom. Multifunctionality can avoid the product ending up in the cosmetic graveyard. □

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