

# Sustainable Cosmetics



05/2024 Expert Letter



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2. Lifecycle Steps
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**Sellcare**  
creative chemicals

# Introduction

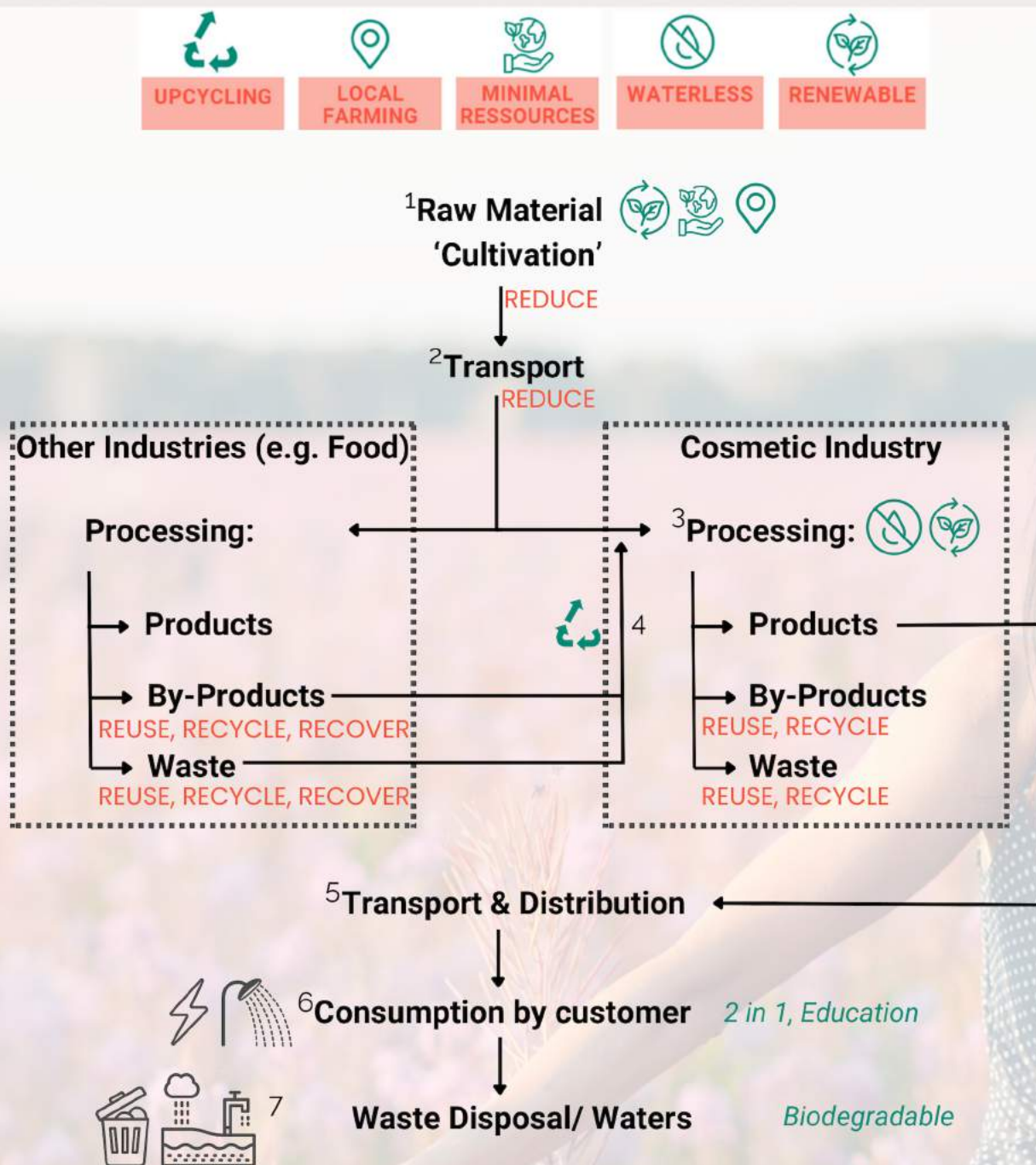


## Dear Expert

In this issue of the expert letter, we have created an overview of various sustainability approaches within the cosmetics industry. Our goal is to provide you with a holistic overview of different approaches. A schematic listing of the life cycle stages, from creation to disposal, is provided, highlighting the five main approaches discussed later in this letter. Happy reading!

“  
Rocca et al. 2022: Not all natural ingredients are good and not all synthesized one's are bad, it depends on the way they are processed (synthesized, extracted, purified).  
”

On the next page, the full lifecycle of cosmetic material is visualized schematically, showing a holistic overview of ways to increase sustainability. Including the 4Rs principles of the European Commission.



Circular economy based on the European Commission's 4Rs principles: reduce, reuse, recycle, recover.

Adapted from Mondello et. al (2024) and Sasounian et. al (2024).

## Life Cycle Stages & Environmental Impact

- 1 **Raw Material:** Non- vs. renewable energy (for cultivation), lower emissions (CO<sub>2</sub>, pesticides, fertilizers), monoculture vs. biodiversity, agricultural resources vs. in-house cultivation or waste/by-product resources
- 2 **Transport:** Local farming, harvest and processing vs. long distance
- 3 **Processing:** Optimizing processing resources: electricity, water, solvents - optimized vs. unoptimized
- 4 **Upcycling:** Waste and by-products from other industries' processes used as secondary raw material for cosmetic industry -> reducing waste vs. using new material
- 5 **Transport:** Concentrates vs. diluted products -> less space & transport weight
- 6 **Consumption:** Hot water for rinse-off products -> energy & water resources vs. 2 in 1 products and education
- 7 **Waste:** Accumulation of cosmetic residues (ZnO, Triclosan, squalene, micro/nanoplastics, ..) vs. biodegradable formulation (also for packaging)



## Upcycling

Upcycling waste material, often sourced from food production but not exclusively, is increasingly common. Research systematically seeks high-value compounds within these materials. The United Nations Food and Agriculture Organization (FAO) prioritizes waste reduction, for which upcycling presents a potential solution. While utilizing waste is commendable, it's crucial to consider logistics, including transportation, storage requirements, ingredient seasonality, and the solvents used in the extraction process.

An example: in Sardinia, Italy, 200'000 tons of waste are generated annually from myrtle liquor production. This waste is rich in linoleic acid, fatty acids and antioxidants, highlighting its potential for utilization.

While many suppliers are using upcycled material, The Upcycled Beauty Company (TUBC) goes beyond, creating a community around upcycled beauty. It connects sustainable producers and customers in search of upcycled material and provides informing about upcycling.

### Our Partners:

#### TUBC

Various oils and exfoliants from upcycled material are available, including berries, hemp, rice, barley, charcoal, olive, and more.

#### Fazer's Oat Oil

Fazer Mills use waste from the grain industry. They use a CO2 extraction to receive pure golden yellow oat oil.

#### Greenphyt

Uses co-products from the food and cosmetic industries such as seed cakes, whole seeds, peels, shells & kernels, and spices, to produce exfoliants, flower water, & micronized powders.



## Local Farming



ALPAFLOR® fields

### Our Partner:

#### dsm-firmenich

ETERWELL® YOUTH, a plant extracted with recycled ethanol/water, cultivated in the Swiss Alps and processed a few kilometers from the field. Farmers receive income per cultivated area and are thus protected from poor crops.

dsm-firmenich has been growing Swiss alpine plants since 1997 in Valais. They utilize their extensive knowledge to carefully select the most suitable plant species and altitude for each, ensuring the highest quality of active ingredients. The pristine air and water, intense UV radiation, and wide temperature fluctuations contribute to the superior active quality of ALPAFLOR®.

Through local farming, dsm-firmenich can guarantee traceability, transparency, sustainability and a fair relationship to local farmers (Fair trade certified according to the Fair For Life standard). The plants are processed in the same area using renewable electricity, with only ethanol and water as solvents, both of which are recycled. Additionally, an improved process reduces water consumption by 40%. In essence, ALPAFLOR® upholds sustainability throughout the production stages.



## Minimal Resources

The key of this approach is to use as few agricultural resources as possible. This means:

- small amount grows in large quantities
- minimal agricultural land to cultivate
- reduces water and solvents
- minimal heat/electricity
- no destruction of biodiversity

*(not all of the above apply to each production technique)*



algae



yeast/  
bacteria



in vitro

### Our Partner:

#### Aethera Biotech

Our Italian partner from the Vicenza region, itself a model for sustainable production facilities, develops maximized and standardized mersistematic cell lysates:

- customizable
- patentable
- standardized
- sustainable
- save
- available

This can be achieved by using microorganisms such as bacteria or yeast. But also algae and seaweed, especially microalgae results in large quantities of biomass (Sasounian et. al, 2024). Valuable ingredients for the cosmetic industry can be obtained, such as agar as a gelling agent, or amino acids, vitamins, sugars and minerals. dsm-firmenich offers various products made from the mentioned microorganisms or algae (e.g. PEPHA® range).

The in vitro process of Aethera Biotech is a rather new and very promising way of saving resources. It needs very little of the original plant, which makes it perfect for saving endangered species. It uses meristematic cells, these cells are able to convert into all different plant cells, similar to animal stem cells. These cells can quickly adapt to epigenetic stimuli and thus produce protective metabolites. This process is not depending on seasonality or crop. The process is save and free of GMO.

## Waterless Formulations

Besides efficiently using resources in order to be sustainable, it is also important to reduce CO2 emission, waste, water consumption and plastic use (Morea et al., 2021). In this section, we will explore waterless formulations, aiming to save water, potential heat, and packaging. Our partner Innospec has been developing concentrates and solid product formats for many years, providing new ideas annually in line with current market trends.

Due to Innospec's patented technology, the shampoo concentrate blend is low viscosity and can be easily diluted with water at a ratio of 1:4. Not only does it contribute to emission reduction during transit from production to point of sale, but it also offers an ideal solution for travelers facing liquid restrictions.

The Shampoo-in-a-Sheet and Shampoo Bar turn into a soft foam when added to wet hair (and fur for the Shampoo Bar):



Shampoo Concentrate



Shampoo-in-a-Sheet



Shampoo Bar for Furry Friends



## Erneuerbare Ressourcen



Our partner Biosynthis' sustainable H<sub>2</sub> production in France, spanning 5000 m<sup>2</sup>, can produce up to 1'000 kg of hydrogen per day. Renewable solar and wind energy powers this plant, where water is split into oxygen and hydrogen using an electrolyser. This green hydrogen is then utilized to hydrogenate bio alkanes, fatty alcohols and glycols. This process adheres to COSMOS standards, resulting in vegan products made from renewable resources.

Biosynthis began by replacing silicones with biodegradable alternatives, and has since expanded its portfolio to include emollients, butters and solvents. The BIOSYNTHIS team has successfully developed eco-friendly ingredients using coconut oil, olive oil, and sunflower oil sourced from organic farming regions.

Oleosomes are designed by nature and naturally found in all oil bearing plant seeds. As a delivery system, they can reduce the amount of e.g. sunfilters in a formulation by enhancing distribution and efficacy. Some oleosomes offer additional value, such as our partner Sharon Personal Care's Hydresia™, which acts as an emulsifier for cold processes and an emollient for premium skin-feel. Sasounian et. al (2024) recognize the potential of oleosomes and other encapsulating systems in controlled release in the skin, rheology control and enhancement of the ingredient safety. We aim to highlight the environmental and economical potential of reducing UV filters in skincare, and the skin care benefits, for instance, the protection of ingredients prone to oxidation by oleosomes.



# What's Sellcare's take on sustainability?

All businesses depend on biodiversity; for the cosmetic industry, it's a significant source of ingredients (Rocca 2022). More than ever, consumers of all generations, consider the environmental impact in their purchasing decisions. Together with our partners, we are eager to present you with different options for sustainable cosmetic ingredients.

**Do not hesitate to discuss with our team:**

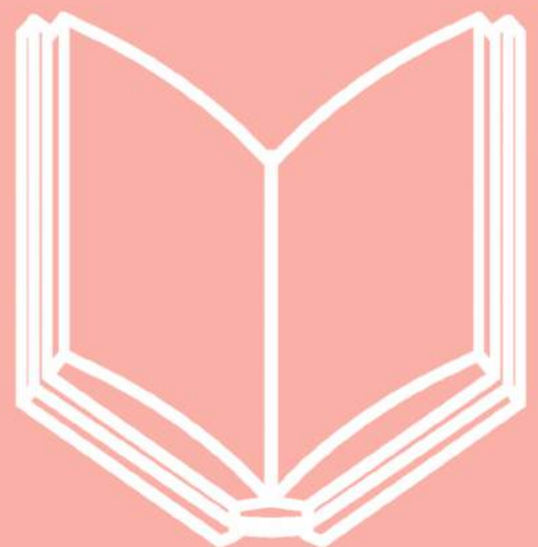
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# Literature

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