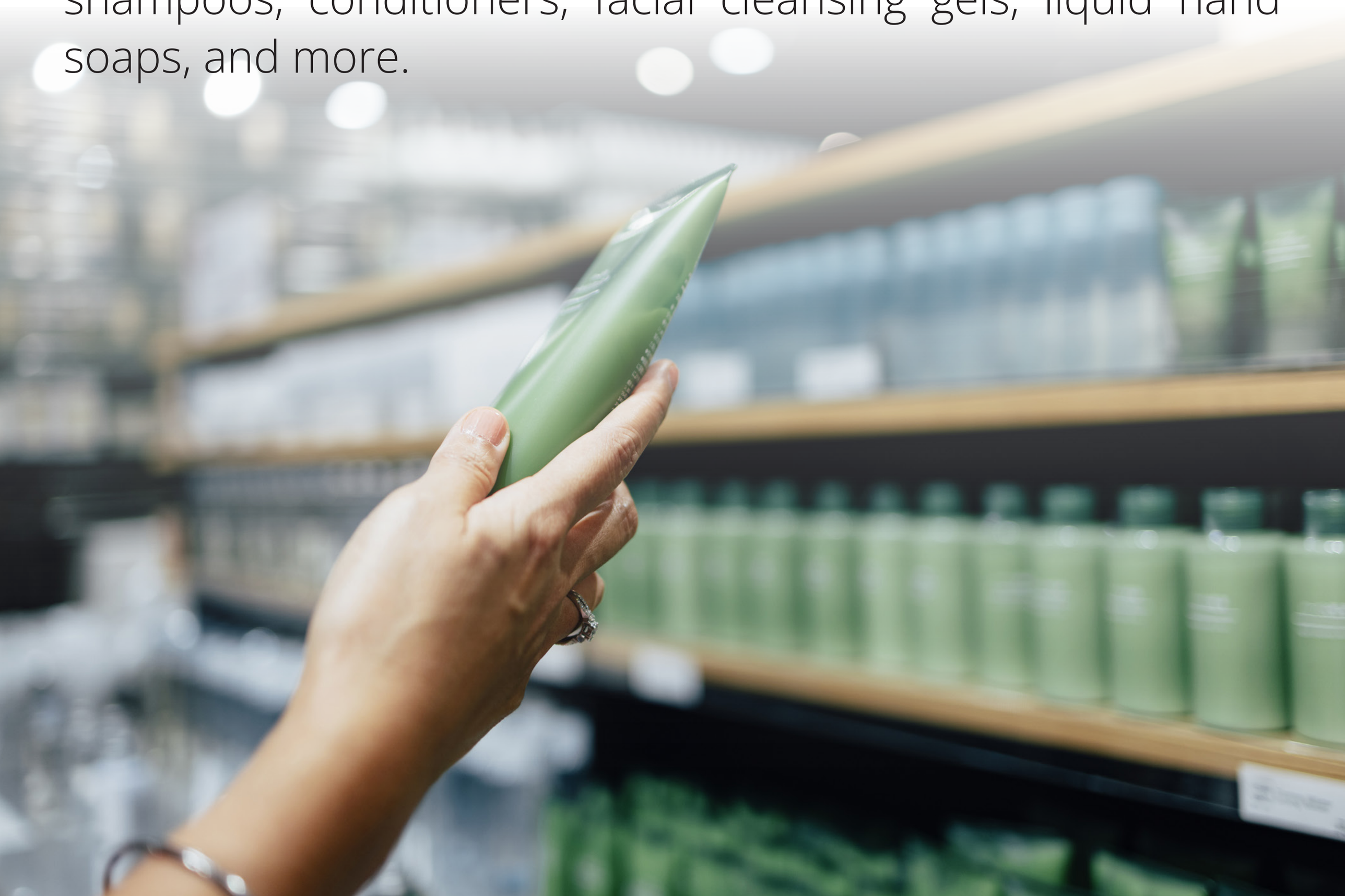
Natural Surfactant Systems and how to formulate them

RAHN

The most common **sulfate-based ingredients** found in personal care products are **sodium coco sulfate**, **sodium lauryl sulfate** and **sodium laureth sulfate**.

Sulfates possess **cleansing and foaming properties**, making them essential in cosmetic products such as shower gels, shampoos, conditioners, facial cleansing gels, liquid hand soaps, and more.



Now, new regulations have been published, presenting the next challenge for **sulfate-free** and **COSMOS-approved natural products:**

COSMOS announced the end of sulfates' acceptance by the end of 2028.

***12.3.2** Specific cases*

- *§8 — packaging criteria:* must be met before 1st of June 2025, if the submission date is prior to the 1st of June 2023
- *§6.1.3 — physically processed agro-ingredients/ primary raw materials harvested/ collected by threatened species listed in the IUCN red list:* criteria must be met before the 1st of December 2024, regardless of the submission date
- ***Appendix II — sulphated surfactants*** **are allowed until the 1st of January 2029**

SULPHATION/SULPHATATION (at carbon or oxygen atom, without use of chlorinated sulfation reagents) – permitted only for surfactants for rinse-off products

This implies a market need for innovative surfactant system solutions addressing this challenge.

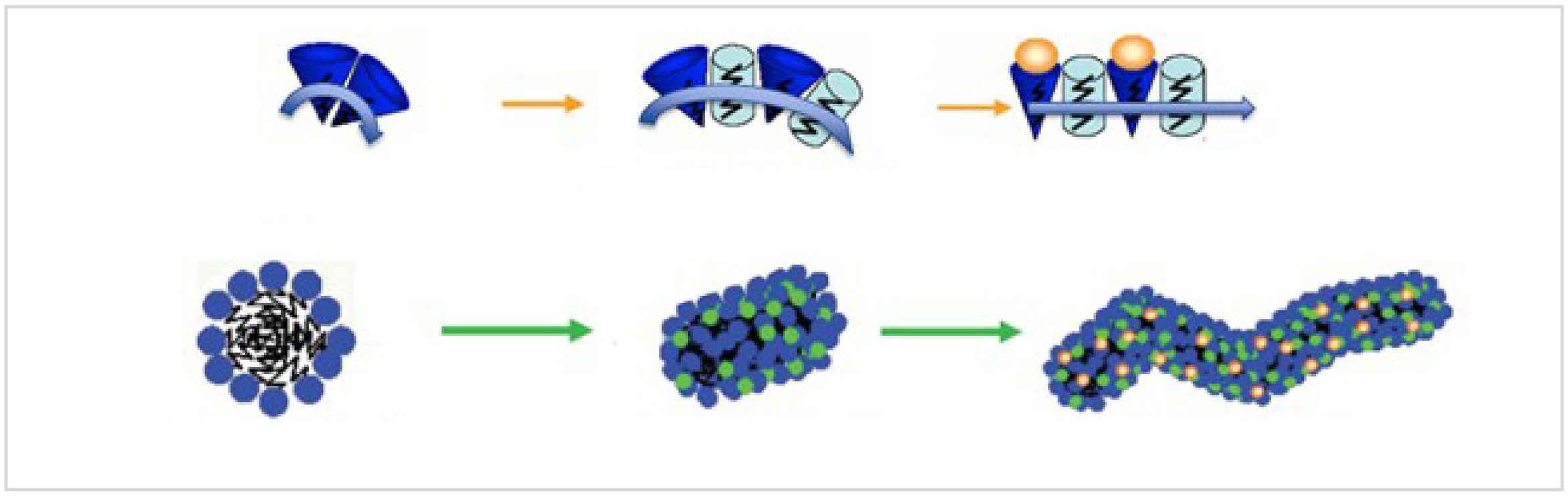
Surfactant thickening system options

Option 1:
Hydrophobic Thickening System

Amphoterics are key sulfate replacements, such as:

- Sodium Cocoamphoacetate
- Cocamidopropyl Betaine (CAPB)

The thickening effect is created through worm-like micelle formation. Hydrophobic thickeners support the correct organisation of surfactant molecules, moving from spherical micelles to worm-like micelles (see picture below).



Surfactant thickening system options

Option 2:
Biopolymer Thickening

Lambda-Carrageenan is used to create viscosity with a nice flow, such as:

- Genuvisco CG-129 (CP Kelco)

When using this type of polymer option, it comes with a significant benefit: **the freedom to choose the surfactant type and solubilisers freely**. *However, it's important to note that the use of long-chain quats is typically not possible.*

Left: Genuvisco CG-129 (Carrageenan)
Right: Keltrol CG-SFT (Xanthan Gum)