

A Sugar-Based Amphoteric Surfactant with Improved Mildness for Shampoo

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Introduction

Most existing shampoos, that are based on alkyl ether sulphates, clean the hair extremely well, but these types of surfactants are the main cause of stratum corneum (SC) lipids and proteins damages. These conventional surfactants are also known to have adverse effects on the environment.

Functionalization of sugar-based surfactant to produce amphoteric surfactant in the sultaine class offers ultra-mildness resulting in significantly lower irritation than traditional betaines. This novel renewably sourced surfactant is environmentally friendly and cost-effective.



The Consumer Sustainability Survey (2019) found that **72%** of consumers **buy more** environmentally-friendly products than five years ago.

Increasing **demand** in **milder body wash & shampoo** especially for baby and special skin conditions/needs i.e., sensitive skins, eczema.



The study aimed to assess a novel sugar-based amphoteric surfactant (SBA) as a hair shampoo component for its performance attributes against other commercial amphoteric surfactants; cocoamidopropyl betaine (CAPB) and cocoamidopropyl hydroxysultaine (CAHS), and the commercial shampoos, Cetaphil and Botanifique by Lux Premium.

Performance Test Method

Mildness

Irritancy potential

- Scalp and hair protein damage test by using zein solubilization test

Dryness potential

- Scalp lipid damage test by using stearic acid solubilization test

Foaming

Foam Height & Foam Stability

- Cylinder shake test

Efficacy

Cleansing Test

- Cleansing ability to remove synthetic sebum from hair tresses

Stability Test

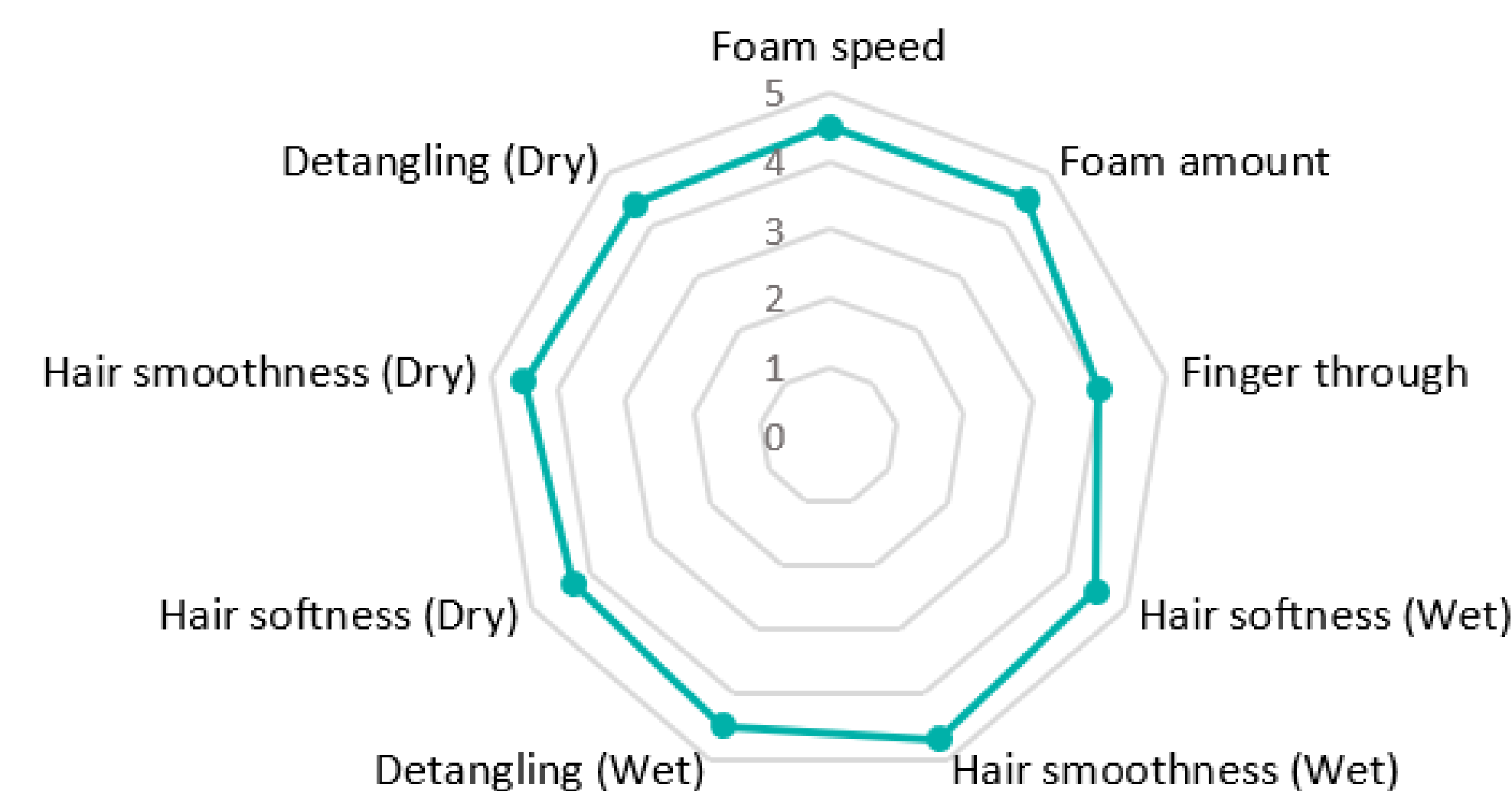
Freeze-thaw cycling stability (5 cycles)

- 4 ° C for 24 hours
- 25 ° C for 24 hours

Acceleration stability

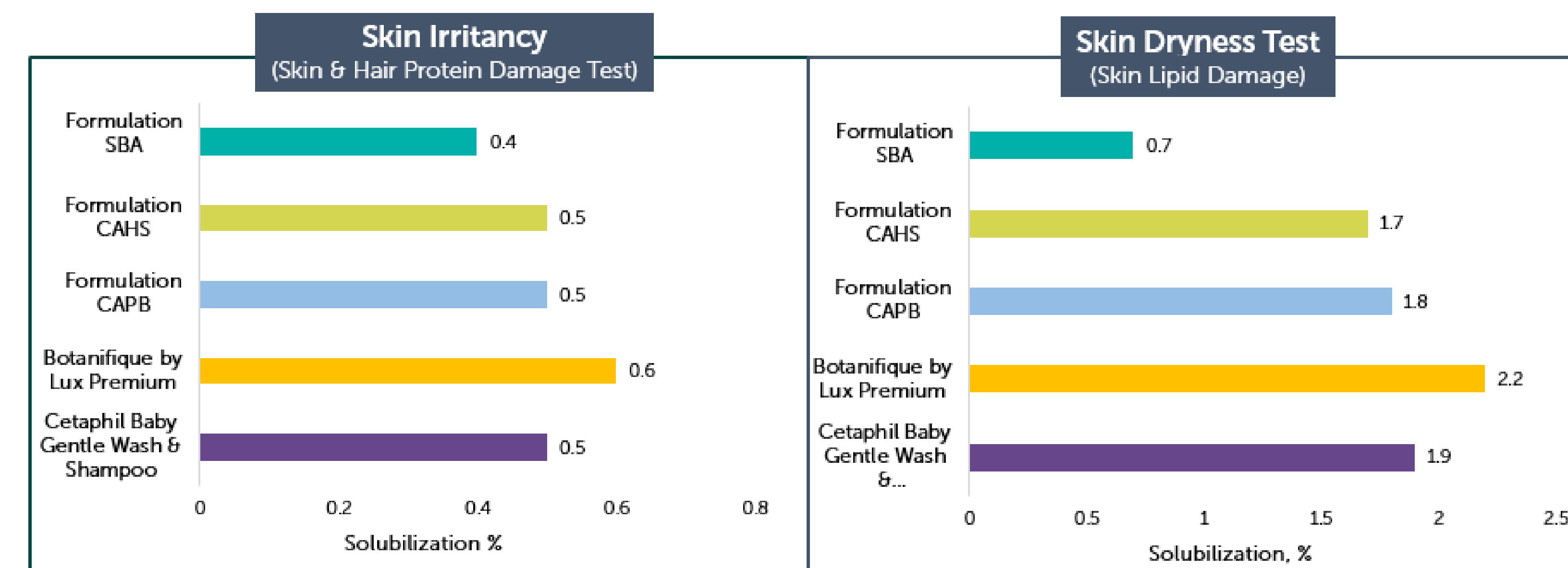
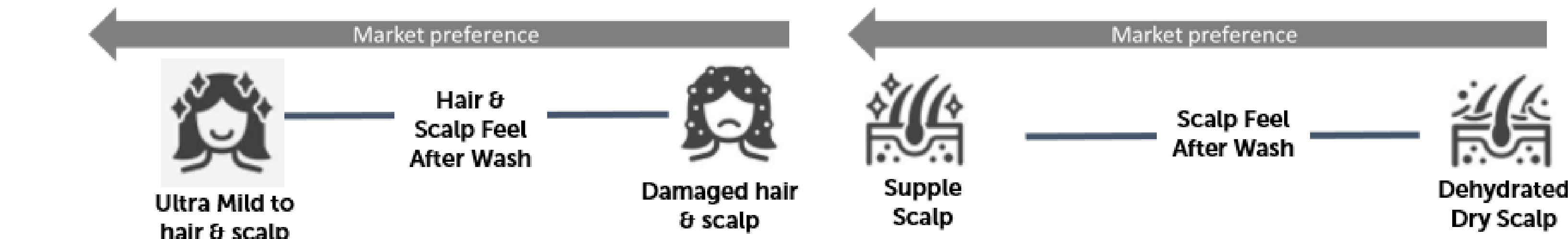
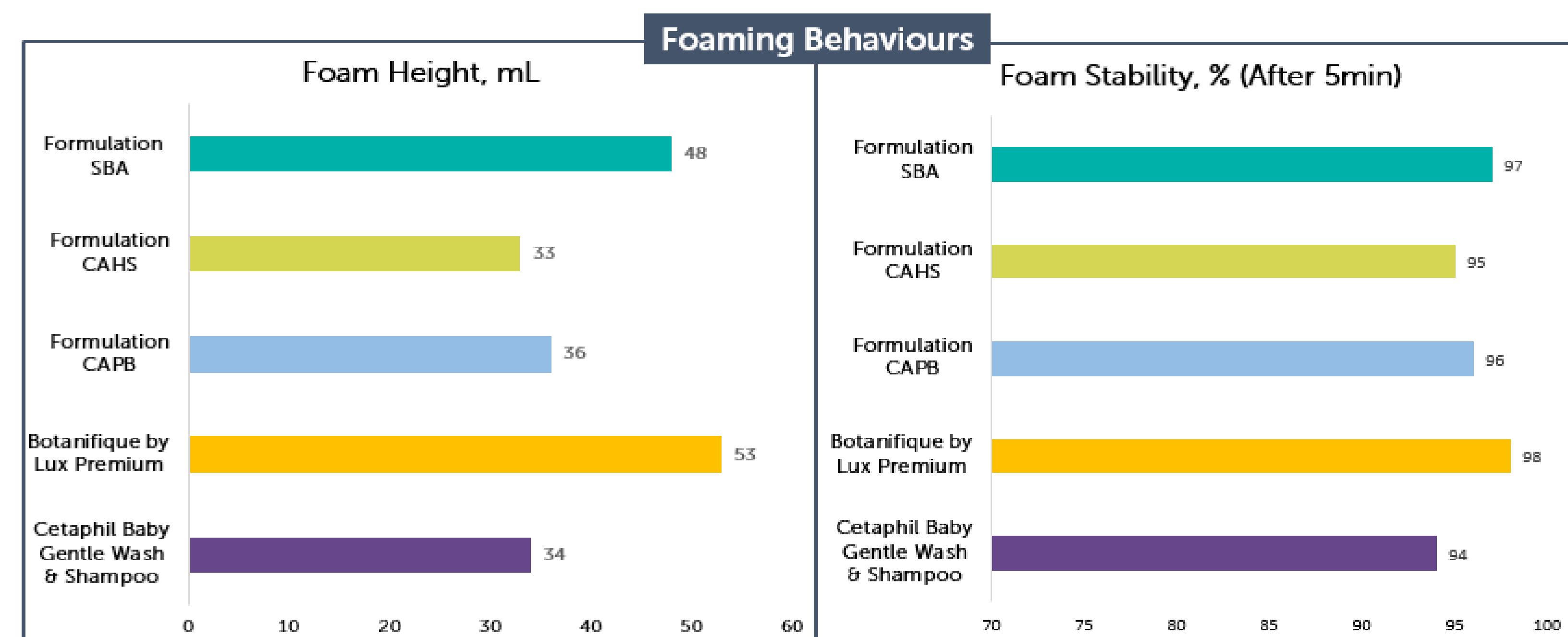
- 45 ° C for 1 month

Preference Test



*Preference testing with 10 untrained subjects (Blind samples, 6 female & 4 male)

Results



Alignment with the UN's Sustainable Development Goals (SDGs)



Conclusions

The novel SBA surfactant was successfully investigated and used in shampoo formulation. The lowest value of zein and stearic acid solubilization percent values indicate that SBA adds to the mildness qualities of the shampoo. The cleansing and foaming results show that SBA shampoo are on par with the commercial shampoos. The stability tests demonstrate that the SBA is not only compatible with other shampoo components, but stable to be used and stored under appropriate conditions in the final product.