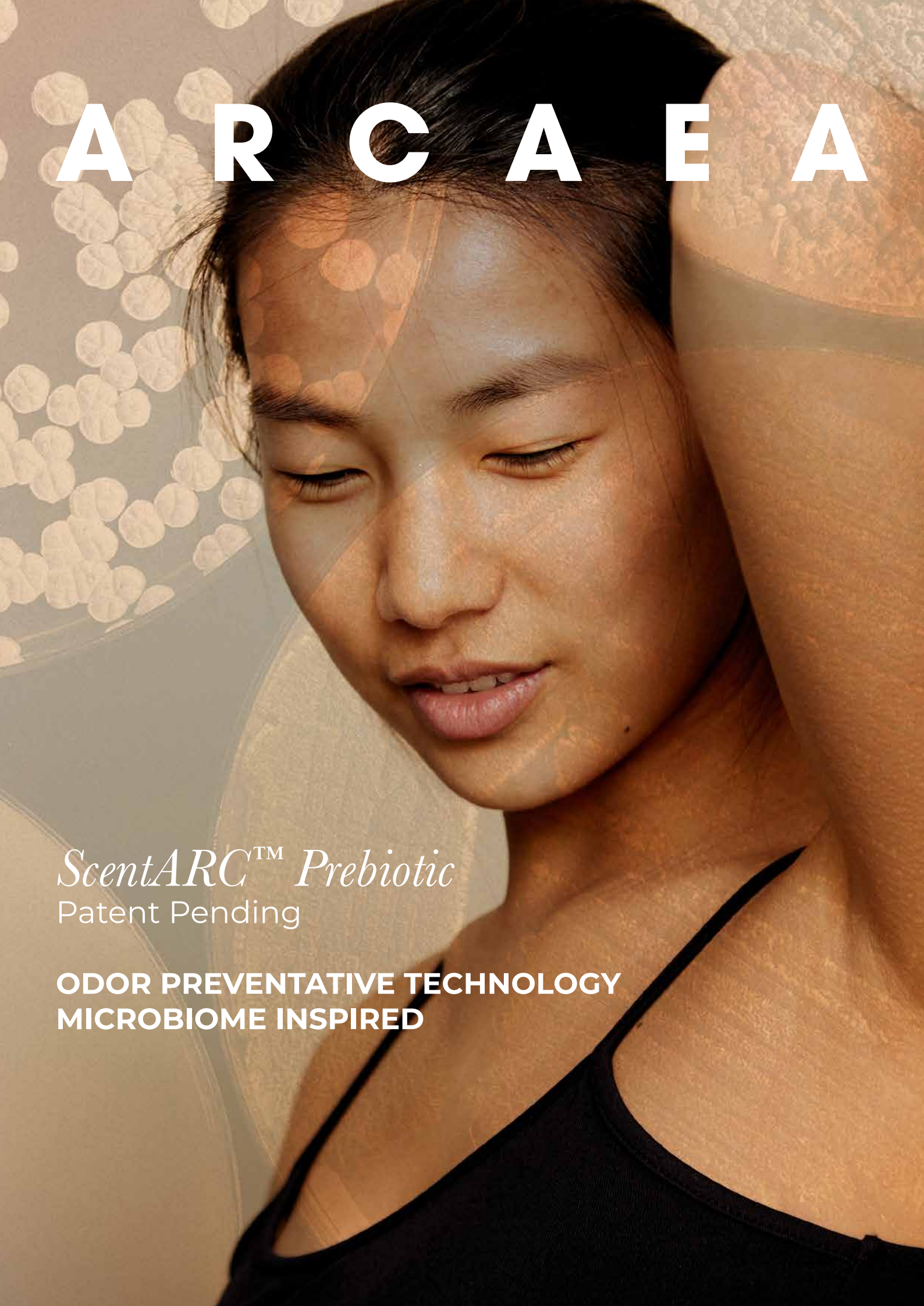




ARCAEA

ScentARC™ Prebiotic

Patent Pending

**ODOR PREVENTATIVE TECHNOLOGY
MICROBIOME INSPIRED**



ScentARC™ Prebiotic

ScentARC™ prebiotic blend has been designed to shift the odor profile in the underarm area to a neutral and more natural scent by modulating the underarm microbiome. Studies show that it selectively suppresses the growth of odorous bacteria while supporting the growth of non-odorous bacteria, gently balancing the underarm skin microbiota. It was designed by leveraging the latest advances in biotechnology and bioinformatics, resulting in a precisely engineered material that can be used as a stand-alone deodorant active. Consumer studies have shown ScentARC deodorant formulations provide outstanding performance, with the majority of panelists reporting effectiveness in eliminating malodor, willingness to purchase, and an enjoyable user experience.

THE OPPORTUNITY FOR DEODORANT BRANDS

Various market research firms estimate the global deodorant market size in the range of \$30 billion, predicting modest 5% growth rates over the next decade. The segment of naturally positioned brands, however, is growing at much higher rates due to increasing consumer scrutiny of ingredient lists, awareness of harmful effects of certain chemical ingredients, and a growing desire for clean and effective products that work with our own bodies.

The first deodorants produced over 130 years ago solved odor issues with antimicrobials, killing all the bacteria in the underarm area to delay or limit the production of malodor compounds. Today, the current toolkit for preventing malodors includes materials such as baking soda, magnesium hydroxide, bactericides, and masking fragrances. All exhibit various levels of effectiveness, often needing to be used in combination, and present drawbacks like irritation that lessen the consumer experience.

The opportunity for deodorant brands is clear – the consumer is ready for new and effective natural deodorant solutions that address the overall skin health of the underarm area. ScentARC prebiotic is the new, enabling technology for deodorant brands to capture this opportunity.

ScentARC benefits are:



Strong deodorant efficacy with superior aesthetics and added skin benefits.



Promotes underarm skin health



Enables innovation-based brand differentiation – 'microbiome balancing' resonates with consumers



Mildness that enhances consumer experience

THE SCIENCE BEHIND

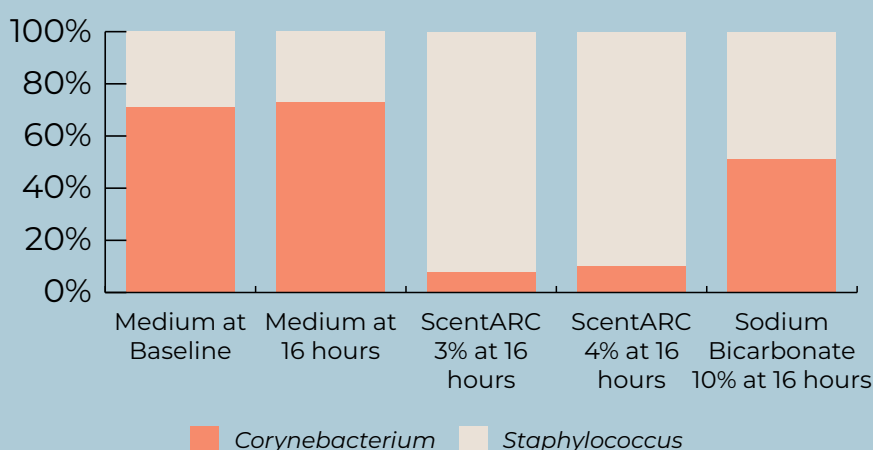
ScentARC Technology

Arcaea began its underarm malodor research and development program by collecting underarm microbes through swabbing. Next, the team accessed established libraries with the aim of identifying the most relevant strains that influence the production of malodors and those that do not. Once promising blends were identified via whole genome sequencing and in silico gene analysis, the team used high throughput screening techniques to evaluate the impact of various compounds and conditions on their growth. Tens of thousands of data points were developed. Bioinformatics and machine learning were employed to prioritize the top prebiotic blend candidates for future screening. This screening consisted of in vitro testing of the prebiotic candidates' impact on target microbes individually and in mock communities, combined with analytical techniques to identify and quantify production of malodor compounds. Top performing prebiotic blends were then tested with in-house panels and consumers to finalize the optimum ScentARC blend.

in vitro PREBIOTIC MECHANISM VALIDATION

The prebiotic mechanism of ScentARC technology was demonstrated through in vitro experiments on mock communities of bacteria simulated to represent proportions of odor and non-odor causing bacteria in the underarm area. *Corynebacterium* strains are known to be responsible for odor-causing compounds found in the underarm area, while *Staphylococcus epidermis* is known to represent the majority of the non-odor causing microbial community and have beneficial effects on skin.

Communities consisting of 70% *Corynebacterium* (odor producing) and 30% *Staphylococcus* were incubated for 16 hours in sweat-like media to mimic the development of underarm odor. Two of the mock communities were treated with ScentARC in concentrations correlating to 3% and 4% use levels, respectively. A third community was treated with baking soda, representing a 10% use level. The data show a significant shift in relative abundance of both bacterial species with *Corynebacterium* being reduced to approximately 10% of the community for both ScentARC tests while *Staphylococcus* increased to 90%. In comparison, baking soda had a limited effect on the relative abundance of *Corynebacterium* and *Staphylococcus* in the mock community.



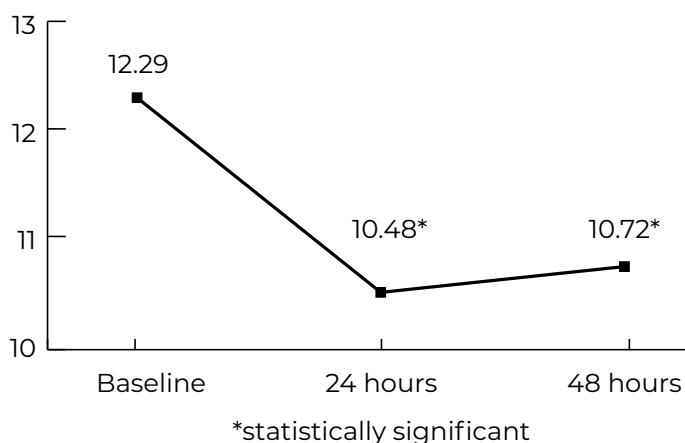
For the ScentARC prebiotic studies, Arcaea correlated the shift in the microbiome to reduction of 3M2H, a major underarm odorous compound that is easily detected by humans. In a study representing the 3%–4% ScentARC prebiotic use level, the concentration of 3M2H exhibited statistically significant reduction compared to the control.

CONSUMER PERFORMANCE DATA

An anhydrous deodorant stick containing 4% ScentARC prebiotic was developed for consumer testing. No other deodorant actives, antimicrobials, or fragrances were included in the formula. 30 panelists were instructed not to use any deodorant for three days before using the ScentARC formula. After three days of use, the panelists responded to a questionnaire regarding the performance of the ScentARC deodorant. The results demonstrate a high degree of deodorant efficacy for the formula using ScentARC prebiotic as a stand-alone deodorant active, with product satisfaction and prevention of malodors noted by 80% and 87% of the panelists, respectively.

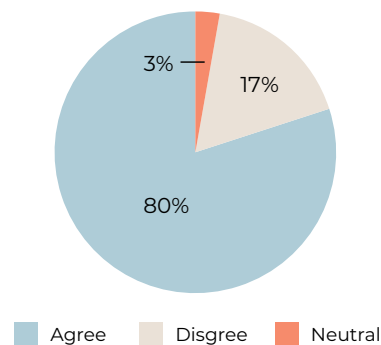
SKIN BENEFITS

ScentARC prebiotic was evaluated in a clinical study for moisturization and skin barrier repair properties. 50 µL of a 4% ScentARC aqueous solution were applied to the underarm areas of 33 female volunteers between the ages of 18 to 65. Transepidermal water loss (TEWL) was measured at baseline (prior to treatment) and again at 24 hours and 48 hours after treatment. The results show a statistically significant 15% and 13% increase in barrier function over 24 and 48 hours, respectively.

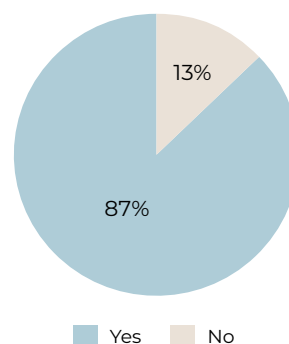


Deodorant products that use ScentARC technology have the potential to support claims of hydration, moisturization up to 48 hours, and skin barrier repair.

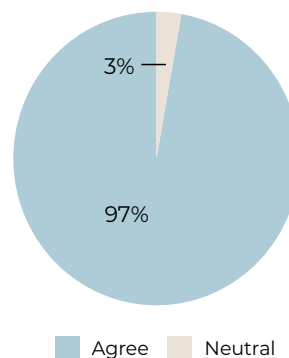
I was satisfied with how long the odor protection lasted with this product.



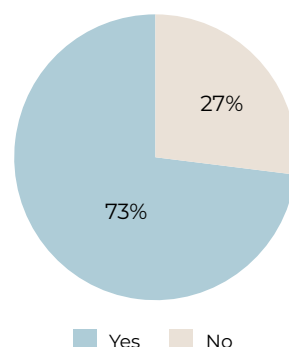
This product prevents malodors from developing throughout the day.



This product did not irritate my underarms.



Would you recommend this deodorant to a friend?



PRODUCT FEATURES

INCI: Yeast Beta Glucan (and) PCA (and) Glucosamine HCl (and) Betaine (and) Glutamine (and) Lysine HCl

- 100% Naturally derived per ISO 16128
- Non-animal tested
- Vegan
- Non-GMO
- Global compliance

FORMULATION

ScentARC prebiotic can be used broadly across a wide range of deodorant formats and formulations. The recommended use level range is 3% to 4%. For anhydrous sticks, ScentARC prebiotic can be pre-dispersed in water (see Hybrid Anhydrous Stick formulation) before adding to the batch at the cool down phase (below 78C°). In emulsion systems, ScentARC prebiotic should be added to the water phase.

The following prototypes represent the range of ScentARC formulation possibilities.

Hybrid Anhydrous Deodorant Stick with ScentARC Technology

Phase	INCI	Function	%
A	Water	Solvent	6.0
	Glucosamine HCl (and) PCA (and) Glutamine (and) Lysine HCl (and) Betaine (and) Yeast Beta Glucan	Prebiotic active (ScentARC™)	3.0
	Glyceryl Stearate (and) Polyglyceryl-6 Palmitate/ Succinate (and) Cetearyl Alcohol	Emulsifier	0.5
	Sodium Hydroxide	pH Adjuster	a.n.
B	Caprylic/Capric Triglyceride	Carrier	q.s.
	Tapioca Starch	Absorbent	18.0
	Coco-Caprylate/Caprates	Emollient	9.0
	Oryza Sativa (Rice) Bran Wax	Structuring agent	8.0
	Helianthus Annuus (Sunflower) Seed Wax	Structuring agent	5.0
	Cocos Nucifera (Coconut) Oil	Emollient	4.0
	Joboba Esters	Structuring agent	4.0
	Ricinus Communis (castor) Seed Oil (And) Silica	Thickener	4.0
	Theobroma Cacao (Cocoa) Seed Butter	Emollient	2.0

Procedure:

1. Dissolve ScentARC in water and adjust pH to 6 - 7.
2. While mixing, add the emulsifier and heat to 75°C.
3. Separately combine Phase B ingredients and heat to 80°C.
4. Add Phase A into Phase B and mix well.
5. Cool to 76-78°C and pour into deodorant molds.

Aqueous Deodorant Spray with ScentARC Technology

Phase	INCI	Function	%
A	Water	Solvent	q.s.
	Tetrasodium Glutamate Diacetate	Chelator	0.5
	Glucosamine HCl (and) PCA (and) Glutamine (and) Lysine HCl (and) Betaine (and) Yeast Beta Glucan	Prebiotic Active (ScentARC™)	3.0
B	Lactobacillus Ferment	Preservative	a.n.
	Sodium Hydroxide	pH adjuster	a.n.

Deodorant Cream Emulsion with ScentARC Technology

Phase	INCI	Function	%
A	Water	Solvent	q.s.
	Propanediol	Humectant	3.0
	Xanthan gum	Thickener	0.4
	Glucosamine HCl (and) PCA (and) Glutamine (and) Lysine HCl (and) Betaine (and) Yeast Beta Glucan	Prebiotic active (ScentARC™)	3.0
	Sodium Hydroxide	pH adjuster	a.n.
B	Cetearyl Olivatate (and) Sorbitan Olivatate	Emulsifier	5.0
C	Coconut Alkanes (and) Coco-caprylate/caprate	Emollient	1.0
	Helianthus Annuus (Sunflower) Seed Wax	Structuring agent	0.75
D	Lactobacillus Ferment	Preservative	a.n.
	Oryza Sativa (Rice) Starch	Absorbent	1.0

Procedure:

1. Dissolve ScentARC in sufficient water, then combine remaining Phase A ingredients and adjust pH to 5 - 6.
2. Heat to 80-85°C and add Phase B emulsifier while stirring.
3. Separately prepare Phase C and heat to 75°C.
4. Add Phase C to Phase AB and homogenize.
5. Cool with gentle stirring to 45°C.
6. Add Phase D and homogenize.

Deodorant Roll-on Emulsion with ScentARC technology

Phase	INCI	Function	%
A	Water	Solvent	q.s.
	Glycerin	Humectant	3.0
	Xanthan Gum	Thickener	0.5
	Glucosamine HCl (and) PCA (and) Glutamine (and) Lysine HCl (and) Betaine (and) Yeast Beta Glucan	Prebiotic Active (ScentARC™)	3.0
	Sodium Hydroxide	pH Adjuster	a.n.
B	PEG-7 Glyceryl Cocoate	Surfactant	1.0
	Glyceryl Stearate (and) Polyglyceryl-6 Palmitate/ Succinate (and) Cetearyl Alcohol	Emulsifier	3.0
	Cetearyl alcohol	Emollient	2.0
	Isopropyl Myristate	Emollient	1.0
C	Lactobacillus Ferment	Preservative	a.n.

Procedure:

1. Separately heat Phase A and Phase B to 80°C while mixing.
2. Adjust the pH of Phase A to 5 - 6 with sodium hydroxide.
3. Emulsify Phase B slowly into Phase A while stirring.
4. Homogenize for 2 - 5 minutes.
5. Cool to 35°C and add Phase C while stirring.



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