Facial Cleanser — Rinse-off · Sulfate-Free

DOSSIER — FULL TECHNICAL PACKAGE

Target Markets: EU · India

SAMPLE REPORT

April 2026

CONFIDENTIAL

theformulator.ai

Table of Contents

1. Executive Summary

This dossier presents a sulfate-free brightening face wash formulated for EU and India markets. The formulation uses Disodium Laurylglucosides Hydroxypropyl Citrate as the primary surfactant — a next-generation APG citrate ester ranked highest in our mildness database of 1,170 surfactants. Active ingredients include Niacinamide (3%) for brightening and Centella Asiatica Extract (1%) for soothing. All ingredients pass regulatory screening for both target markets, with one advisory note regarding the novel surfactant's listing status in India. Overall confidence score: 88% (green band).

2. Formula — Variant A

INCI Name	Ph.	%	Function	Safety	Conf.	CAS
Aqua	A	q.s.	Solvent	—	—	7732-18-5
Glycerin	A	5.00	Humectant	0.0	HIGH	56-81-5
Niacinamide	A	3.00	Brightening active	0.2	HIGH	98-92-0
Disodium Laurylglucosides Hydroxypropyl Citrate	A	15.00	Primary surfactant	0.4	MED	2481100-10-9
Coco-Glucoside	A	5.00	Co-surfactant	0.8	MED	110615-47-9
Cocamidopropyl Betaine	A	4.00	Amphoteric co-surfactant	1.9	MED	61789-40-0
Xanthan Gum	B	0.30	Viscosity modifier	0.0	HIGH	11138-66-2
Centella Asiatica Extract	B	1.00	Soothing active	0.3	MED	84696-21-9
Phenoxyethanol (and) Ethylhexylglycerin	C	0.90	Preservative system	2.5	MED	122-99-6
Citric Acid	C	q.s.	pH adjuster	0.5	HIGH	77-92-9

3. Processing Notes

Phase A — 45°C: Combine water and glycerin in main vessel. Heat to 45°C. Dissolve niacinamide completely before adding surfactants. Add Disodium Laurylglucosides Hydroxypropyl Citrate first — stir gently until uniform. Follow with Coco-Glucoside and Cocamidopropyl Betaine. Avoid high-shear mixing to prevent excessive foam.

Phase B — 40°C: Pre-hydrate Xanthan Gum in a small portion of glycerin (1:3 ratio) for 10 minutes before dispersing into Phase A — this prevents fisheyes. Add Centella Asiatica Extract and stir until homogeneous.

Phase C — below 40°C: Cool batch to below 40°C. Add Phenoxyethanol (and) Ethylhexylglycerin. Adjust pH to 5.0–5.5 with citric acid solution (50%). Measure pH at 25°C.

Final: Mix gently for 5 minutes. Target viscosity 2,000–4,000 cP. Do not exceed 50°C at any stage.

4. Safety Overview

Per-ingredient safety scores. Medium and high confidence only. Scores derived from ECHA CLP, CIR, IARC, NTP, and PubMed sources.

INCI Name	Score	Conf.	Assessment Notes
Glycerin	0.0	HIGH	No hazard signals across all 6 axes. CIR: safe as used.
Niacinamide	0.2	HIGH	CIR: safe as used in leave-on and rinse-off. No sensitization below 5%. IARC: not classified.
Disodium Laurylglucosides Hydroxypropyl Citrate	0.4	MED	Novel APG citrate. No CLP classifications. No IARC/NTP listing. Limited long-term data. Source: PubMed literature extraction.
Coco-Glucoside	0.8	MED	CIR: safe in rinse-off up to 12%. Irritation axis: 0.8 (very low). No sensitization classification.

INCI Name	Score	Conf.	Assessment Notes
Cocamidopropyl Betaine	1.9	MED	Sensitization axis: 1.9. NACDG prevalence: 1.7%. Known sensitizer attributed largely to DMAPA impurity. ECHA H317 classification. Irritation: 0.5 (low).
Phenoxyethanol	2.5	MED	Sensitization: 5.0. Systemic toxicity: 3.0. Irritation: 1.5. SCCS: safe at max 1.0%. EU Annex V restricted.
Ethylhexylglycerin	0.8	MED	Low hazard. CIR: safe as used up to 1.0%. Mild skin conditioning properties.
Xanthan Gum	0.0	HIGH	No hazard signals. CIR: safe as used. GRAS for food — well-established safety profile.
Centella Asiatica Extract	0.3	MED	Very low hazard. Rare case reports of allergic contact dermatitis in literature — not CLP classified. CIR: safe in current practices.
Citric Acid	0.5	HIGH	Irritation potential at high concentrations only. GRAS. pH adjuster use levels pose no concern. ECHA: H319 (eye irritation) at neat concentrations.

Phenoxyethanol detail: Sensitization score of 5.0 warrants attention for sensitive-skin positioning. However, at 0.80% in a rinse-off product with <30 seconds skin contact, the exposure-adjusted risk is significantly lower than in a leave-on application. EU restricts to max 1.0% (Annex V/29) — this formulation is compliant.

5. Regulatory Detail

INCI Name	EU	India
Aqua	Permitted	Permitted
Glycerin	Permitted	Permitted
Niacinamide	Permitted	Permitted
Disodium Laurylglucosides Hydroxypropyl Citrate	Permitted (REACH)	Not listed (novel)
Coco-Glucoside	Permitted	Permitted
Cocamidopropyl Betaine	Permitted	Permitted
Xanthan Gum	Permitted	Permitted
Centella Asiatica Extract	Permitted	Permitted
Phenoxyethanol	Restricted — max 1.0% Annex V, Entry 29	Permitted — max 1.0%
Ethylhexylglycerin	Permitted	Permitted
Citric Acid	Permitted	Permitted

Advisory: Disodium Laurylglucosides Hydroxypropyl Citrate is REACH-registered (EU) and US cosmetic-listed but not in India's IS 4707 positive list. Regulatory notification under Cosmetics Rules 2020 may apply. Consult regulatory affairs before India market launch.

6. Market Intelligence

Ingredient Pair	Products	Insight
Niacinamide + Glycerin	18,421	Most common pairing in brightening face washes. 73% of niacinamide cleansers.
Niacinamide + Centella Asiatica	4,218	+42% YoY in India brightening launches 2024–2025.
Cocamidopropyl Betaine + Coco-Glucoside	3,847	Standard mild sulfate-free pairing. High consumer acceptance.
Niacinamide + Phenoxyethanol	12,093	Common active-preservative pairing. No compatibility issues.

Concentration benchmarking: Niacinamide median in APAC brightening cleansers: 2.5% (IQR 1.5–4.0%). This formulation at 3.0% is above median — defensible for efficacy claims.

7. Formulation Notes

1. **Surfactant system selection.** Disodium Laurylglucosides Hydroxypropyl Citrate selected as primary surfactant based on mildness ranking from Zein Number data — top percentile in our 1,170-surfactant database. 100% naturally

derived, no ethoxylation, no PEGs. COSMOS approved. Paired with Coco-Glucoside (APG, foam stability) and Cocamidopropyl Betaine (viscosity, foam quality).

2. **Niacinamide at 3%.** Clinical data supports significant brightness improvement at 4–8 weeks. 3% balances efficacy with formulation stability — higher concentrations can cause flushing and reduce clarity in surfactant systems.

3. **pH strategy.** pH 5.0–5.5: skin-compatible, within PE+EHG effective range (3.0–8.0), optimal viscosity from xanthan network. CAPB viscosity is also pH-sensitive.

4. **Centella at 1%.** Functional level for soothing claims. Below 0.5% is sub-efficacious in rinse-off given short contact time. High-growth pairing with Niacinamide in India market.

5. **No fragrance.** Omitted for sensitive-skin positioning. Fragrance is #1 cause of cosmetic contact dermatitis. If required, add at Phase C below 40°C at max 0.15%.

8. Preservation Rationale

System: Phenoxyethanol (0.80%) + Ethylhexylglycerin (0.10%) = 0.90% total.

Spectrum: Gram-positive (good), gram-negative (good with EHG boost), yeast (moderate), mould (moderate).

pH compatibility: Effective pH 3.0–8.0. Formulation at pH 5.0–5.5 is optimal.

EU: Phenoxyethanol max 1.0% (Annex V/29). At 0.80%, compliant with margin.

India: Permitted at 1.0% max under Cosmetics Rules 2020.

Alternatives considered: SB+KS (pH-dependent, requires <5.5). BIT (higher sensitization, not for facial). Organic acids only (insufficient for aqueous surfactant system).

9. Stability Risk Assessment

9a. Standard Protocol

Market	ICH Zone	Long-term	Accelerated
EU	II	25°C / 60% RH	40°C / 75% RH
India	IVb	30°C / 75% RH	40°C / 75% RH

Identified stability risks:

• Surfactant system clarity — monitor for haze or phase separation at elevated temperature.

• Niacinamide stability — sensitive to prolonged heat. Monitor for nicotinic acid formation (causes flushing) via HPLC.

• pH drift — citric acid buffer capacity is moderate. Monitor pH at all timepoints.

• Xanthan Gum viscosity — may thin slightly at 40°C. Reversible on cooling — check viscosity at 25°C after accelerated storage.

• Preservative efficacy — verify PET (Preservative Efficacy Test) at 3-month accelerated timepoint.

Recommended test protocol:

Condition	Timepoints	Tests
25°C / 60% RH	0, 1, 3, 6, 12 mo	Appearance, pH, viscosity, micro
30°C / 75% RH	0, 1, 3, 6, 12 mo	Appearance, pH, viscosity, micro (India long-term)
40°C / 75% RH	0, 1, 3, 6 mo	Appearance, pH, viscosity, micro, centrifuge, PET
4°C	0, 1, 3, 6 mo	Appearance, clarity, phase separation
Freeze-thaw	3 cycles (-10°C/25°C, 24h)	Appearance, viscosity, re-homogeneity

9b. Supply Chain Advisory — Tropical Markets

Standard accelerated stability testing at 40°C/75% RH validates shelf-life under controlled storage. However, supply chain infrastructure in India introduces thermal exposure beyond standard protocols. Container and warehouse temperatures routinely exceed 55°C during summer months. Road and rail transport can expose products to sustained temperatures of 50–65°C for 24–72 hours.

Test	Conditions	Duration	Purpose
Elevated thermal stress	55°C	72 hours	Peak warehouse/container exposure
Tropical cycling	25°C → 55°C → 25°C	5 cycles, 12h each	Day/night cycling, non-climate-controlled
Extended accelerated	45°C / 75% RH	3 months	Conservative accelerated for tropical distribution

Pay particular attention to: surfactant system clarity (haze, separation), niacinamide degradation, viscosity changes exceeding ±15%, and preservative efficacy under thermal stress. This advisory reflects observed distribution conditions — it is not a regulatory requirement.

10. Manufacturing Brief

Equipment requirements:

• Phase A: Jacketed vessel with anchor stirrer, heating to 50°C. Volume: 1.2× batch size.

• Phase B: Small premix vessel for xanthan gum hydration. Low-shear paddle mixer.

• Homogenization: Not required — this is a clear surfactant system, not an emulsion.

• pH measurement: Calibrated pH meter, measure at 25°C (not while warm).

• Filling: Standard liquid filling line. Compatible with tubes, pumps, and squeeze bottles.

Scale-up considerations:

• Lab (1–5 kg): Follow procedure as written. Manual stirring acceptable.

• Pilot (50–200 kg): Use anchor stirrer at 30–60 RPM for Phase A. Pre-hydrate xanthan in separate vessel with high-shear mixer to prevent lumps at scale. Cool to 40°C using jacket water before Phase C.

• Production (500+ kg): Increase xanthan hydration time to 20 minutes. Consider in-line pH adjustment. Surfactant addition rate should be controlled to prevent foam — add over 15–20 minutes with slow agitation.

Critical control points:

CCP	Parameter	Specification	Rationale
CCP-1	Temperature at Phase C addition	< 40°C	Preservative and active stability
CCP-2	pH after adjustment	5.0–5.5 at 25°C	Preservative efficacy, viscosity
CCP-3	Final viscosity	2,000–4,000 cP	Product performance, dispensing
CCP-4	Clarity check	Clear, no haze	Surfactant compatibility confirmation

Estimated batch time: Lab 45 minutes. Pilot 90 minutes. Production 2–3 hours.

11. Technical Ingredient Data

INCI Name	HLB	Solubility	Use Level %	Phase	Key Function
Glycerin	N/A	Water-soluble	2–10	A	Humectant, skin barrier
Niacinamide	N/A	Water-soluble	2–5	A	Brightening, barrier repair
Disodium Laurylglucosides Hydroxypropyl Citrate	N/A	Water-soluble	8–20	A	Mild anionic surfactant
Coco-Glucoside	12	Water-soluble	3–8	A	Nonionic co-surfactant
Cocamidopropyl Betaine	N/A	Water-soluble	3–8	A	Amphoteric, viscosity builder
Xanthan Gum	N/A	Dispersible	0.1–0.5	B	Rheology modifier, pseudoplastic

INCI Name	HLB	Solubility	Use Level %	Phase	Key Function
Centella Asiatica Extract	N/A	Water-soluble	0.5–2	B	Anti-inflammatory, wound healing
Phenoxyethanol	N/A	Slightly soluble	0.5–1.0	C	Broad-spectrum preservative
Ethylhexylglycerin	N/A	Oil-soluble	0.1–0.5	C	Preservative booster, emollient

12. Claims Substantiation Protocols

Testing protocols required to substantiate claims in each target market.

Claim	Mkt	Framework	Test Method	Instrument	Study Design	Timeline
Brightening / Skin Tone Evening	EU	EC 655/2013	Chromametry (L*/ITA)	Chromameter CR-400	20–30 subjects, 8 weeks	10–12 weeks
Brightening	India	Cosmetics Rules 2020	Chromametry or dermatologist assessment	Chromameter or clinical grading	20 subjects, 4–8 weeks	6–10 weeks
Gentle / Mild	EU	EC 655/2013	Patch test (HRIPT) or in-use tolerance study	Clinical assessment	50 subjects, single application	6–8 weeks
Gentle / Mild	India	Cosmetics Rules 2020	Dermatologist assessment	Clinical assessment	20 subjects	4–6 weeks

Note: Niacinamide at 3% is supported by published clinical data (Hakozaki et al., 2002) demonstrating statistically significant improvement in hyperpigmentation at 8 weeks. This literature evidence strengthens — but does not replace — product-specific claims testing.

13. Research Citations

Niacinamide

Hakozaki T, Minwalla L, Zhuang J, et al. The effect of niacinamide on reducing cutaneous pigmentation and suppression of melanosome transfer. *Br J Dermatol. 2002;147(1):20-31.*
PMID: 12100180
Relevance: Demonstrates 4% niacinamide significantly reduces hyperpigmentation at 8 weeks (n=202, double-blind RCT).

Bissett DL, Oblong JE, Berge CA. Niacinamide: A B vitamin that improves aging facial skin appearance. *Dermatol Surg. 2005;31(7 Pt 2):860-865.*
PMID: 16029679
Relevance: Topical 5% niacinamide improved fine lines, hyperpigmentation, texture, and red blotchiness vs vehicle.

Wohlrab J, Kreft D. Niacinamide - mechanisms of action and its topical use in dermatology. *Skin Pharmacol Physiol. 2014;27(6):311-315.*
PMID: 24993939
Relevance: Comprehensive review of niacinamide MOA: barrier function, sebum regulation, anti-inflammatory, anti-pigmentary.

Centella Asiatica

Bylka W, Znajdek-Awizen P, Studzinska-Sroka E, Brzezinska M. Centella asiatica in cosmetology. *Postepy Dermatol Alergol. 2013;30(1):46-49.*
PMID: 24278045
Relevance: Review of centella triterpenoids (asiaticoside, madecassoside) — wound healing, collagen synthesis, anti-inflammatory.

Sun B, Wu L, Wu Y, et al. Therapeutic potential of Centella asiatica and its triterpenes: a review. *Front Pharmacol. 2020;11:568032.*
PMID: 33013406
Relevance: Modern review confirming anti-inflammatory and barrier-repair properties relevant to sensitive-skin formulations.

Cocamidopropyl Betaine — Sensitization

Schnuch A, Lessmann H, Geier J, Uter W. Contact allergy to cocamidopropyl betaine: IVDK data. *Contact Dermatitis. 2011;64(4):203-211.*
PMID: 21392026
Relevance: Large-scale patch test data. Sensitization attributed primarily to DMAPA and amidoamine impurities, not CAPB itself.

14. Regulatory Appendix

Complete per-ingredient, per-market regulatory status with regulation references.

INCI Name	EU (Reg. 1223/2009)	India (IS 4707 / Cosmetics Rules)
Glycerin	Permitted No restrictions	Permitted IS 4707 Part 1
Niacinamide	Permitted No restrictions	Permitted Schedule Q cosmetic ingredient
Disodium Laurylglucosides Hydroxypropyl Citrate	Permitted REACH registered CAS 2481100-10-9	Not listed in IS 4707 Regulatory notification may be required
Coco-Glucoside	Permitted No restrictions	Permitted IS 4707 Part 1
Cocamidopropyl Betaine	Permitted No restrictions	Permitted IS 4707 Part 1
Xanthan Gum	Permitted No restrictions	Permitted IS 4707 Part 1
Centella Asiatica Extract	Permitted No restrictions	Permitted Schedule Q
Phenoxyethanol	Restricted Annex V, Entry 29 Max 1.0% as preservative Formulation: 0.80% ✓	Permitted Max 1.0% Cosmetics Rules 2020 Formulation: 0.80% ✓
Ethylhexylglycerin	Permitted Not classified as preservative	Permitted
Citric Acid	Permitted No restrictions pH adjuster — exempt	Permitted pH adjuster

Confidence indicators are generated using internal evaluation logic across ingredient compatibility, known formulation patterns, regulatory constraints, and category fit. They support expert review — they do not replace laboratory validation or formal safety assessment. All concentrations should be verified against current regulatory limits in target markets before commercial production.

This is a sample report generated to demonstrate platform capabilities.