Unique&Easy Micro-Encapsulation Solutions

HydroSal® FreshCool (HS FC)

Feel the long-lasting, refreshing, cooling sensation

HydroSal® FreshCool is a proprietary encapsulated delivery system developed by Salvona to provide a long-lasting, refreshing, and cooling sensation on the skin or scalp. It is designed for personal care products such as facial mists, body sprays, scalp treatments, and after-sun products.



The Technology

- A submicron encapsulation system (HydroSal®) that contains a blend of cooling agents (mostly menthol derivatives, like menthyl lactate) within a polymeric shell.
- The spheres adhere to the skin and gradually release the actives gradually, triggered by friction, moisture, or time.

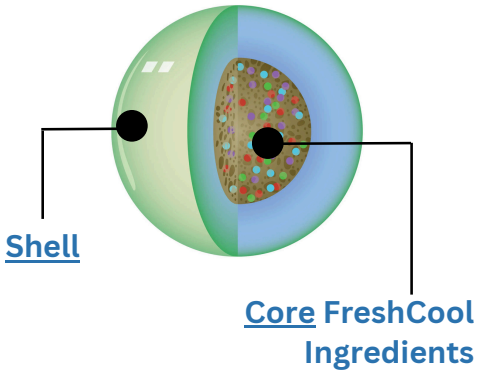


Figure 1: Structure of HydroSal® FreshCool with its core infused with FreshCool complex.

Unique Features

- **Immediate & Prolonged Cooling/ Freshness**
- **Clear and Easy to Formulate with**
- **Reduced Potential for Irritation**

HydroSal® FreshCool delivers a cooling effect by triggering sensory neuron receptors, specifically TRPM8 (Transient Receptor Potential Melastatin 8)—the cool-sensing receptor on the skin and scalp.

Upon application, users experience an immediate burst of coolness. The blend of cooling mechanisms ensures prolonged freshness without overwhelming the senses . The encapsulation also minimizes odor and potential irritation, making it suitable for sensitive skin areas. HydroSal® FreshCool is alcohol-free and integrates seamlessly into various water-based formulations, including deodorants, lotions, shaving gels, and lip care products

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Technical Data Sheet

SPECIFICATIONS	CHARACTERISTICS
Appearance at 20C	Translucent Liquid
Color	No Color
Odor	Characteristic
pH (1% aqueous)	4.0-6.0

Table 2: Specifications of HydroSal® FreshCool

Key Ingredients: Menthol, Methyl Diisopropyl Propionamide, Ethyl Menthane Carboxamide

Other ingredients: Propylene Glycol, Hydroxypropyl Cellulose, Silica, Perservative

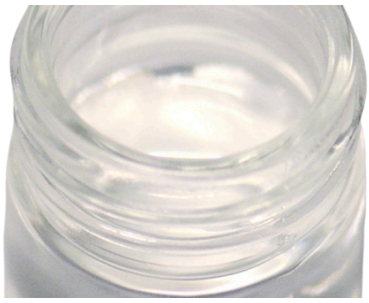


Figure 2: Raw HydroSal® FreshCool

Value of Activating Freshness in Skincare

Enhanced Sensory Experience

Freshness, creates a pleasant, invigorating sensation.
Improves user satisfaction, making daily skincare routines enjoyable and memorable.

Perceived Efficacy

Cooling effects signal immediate action, reinforcing the perception that the product is working.
Boosts consumer confidence in the product's hydrating or soothing claims.

Functional Benefits

Cooling can temporarily soothe irritated or inflamed skin, beneficial for post-sun exposure or sensitive skin.
Moisture-triggered freshness (e.g., via HydroSal® technology) provides ongoing comfort in humid or sweaty conditions.

Market Differentiation

Freshness sets products apart in a competitive market, appealing to consumers seeking innovative, multi-sensory skincare.
Aligns with trends toward experiential and wellness-focused cosmetics.

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Mechanisms of Action

Cooling Mechanism

Encapsulated Cooling Agents

HydroSal® contains functional ingredients that are TRPM8 agonists, protected within a submicron polymer shell.

Controlled Release on Skin/Scalp

Upon application and triggering conditions (friction), HydroSal gradually releases the actives, ensuring non-irritating, sustained exposure.

TRPM8 Receptor Activation

The released cooling agents bind to TRPM8 receptors found on sensory nerve endings in the skin.

This mimics the cold sensation (as if exposed to temperatures <25°C), even though the actual temperature remains unchanged.

Neural Signal Transmission

TRPM8 activation sends a signal to the brain via afferent neurons, which interpret it as “cool” or “fresh.”

The controlled dosing prevents overstimulation or rebound irritation, making the effect pleasant and long-lasting.

Extended Release Mechanism

Submicron Capsule Structure

Each HydroSal® particle is a core–shell structure, typically 0.1–1 micron in diameter.
-The core contains the functional ingredients.
-The shell is a polymer matrix that protects the active and controls its diffusion.

Controlled Diffusion Through Shell

The polymeric shell is designed to allow a slow, continuous release of the active.

The release rate depends on:
-Polymer composition and permeability
-Skin temperature
-Moisture and friction

Triggered Release Conditions

Mechanical: Friction (e.g., rubbing skin)
Time: A gradual diffusion of actives over hours

Surface Adhesion

The submicron size allows deep adherence to skin or hair surfaces, preventing immediate rinsing off and allowing prolonged contact time.

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Sensitivity Guidelines

Skin sensitivity to cooling functional ingredients varies across different areas of the body. Therefore, the dosage must be carefully adjusted to suit the intended application site.

Skin sensitivity varies by body region due to differences in nerve density, skin thickness, vascularization, and exposure. Here are the most sensitive areas—and why:

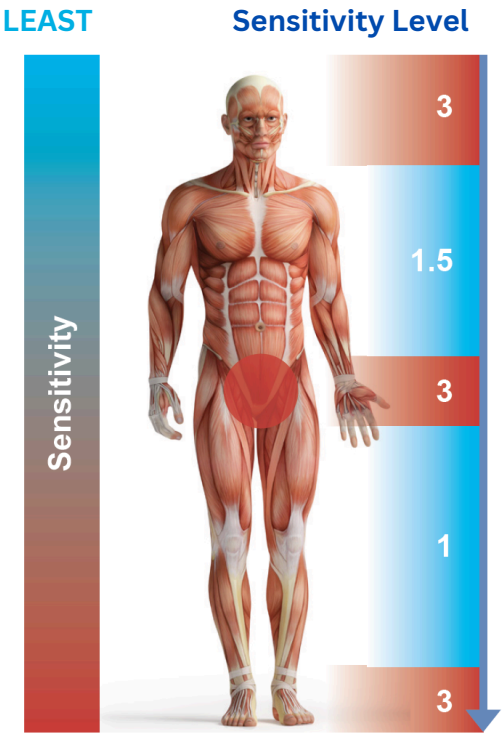


Figure 3: Areas of the body that are more sensitive to HydroSal® FreshCool.

Area	Why It's Sensitive
Face (esp. around eyes, lips)	High nerve density (esp. trigeminal), thin stratum corneum, high blood flow
Scalp	Rich nerve endings, many hair follicles, high vascularity
Neck and Décolleté	Thin skin, frequent sun exposure, high nerve responsiveness
Underarms	Moist, thin skin with high friction and many sweat glands
Groin/Genital Area	Extremely thin epidermis and high concentration of sensory receptors
Fingertips & Palms	Dense mechanoreceptors, adapted for touch sensation, not chemicals
Back of Knees / Elbows	Thin, flexible skin over joints, higher absorption potential

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Clinical Evaluations

To evaluate the performance and safety of HydroSal® FreshCool on skin, a controlled in vivo sensory and tolerability test protocol was used. Below are the testing conditions and assessment methods:

Testing Conditions

Panelist Selection, n= 10, healthy volunteers

- Age Range: 18–65
- Skin Types: Include sensitive, normal, and dry skin types
- Exclusion: No ongoing dermatological treatments; no known allergies to menthol or mint derivatives

Application Protocol

Parameter	Condition
Application Site	Inner forearm, neck, or scalp
Area Size	5 cm × 5 cm (marked)
Test Product	HydroSal FreshCool 5% in lotion format
Control	Vehicle formula (without HydroSal FreshCool)
Application Method	Single application with light massage

Measurement Methods

Subjective (Sensory Evaluation)

- Use a Visual Analog Scale (VAS) from 0–10:
  - 0 = No cooling
  - 10 = Intense cooling
- Ask panelists:
  - How soon did cooling begin?
  - How strong was it?
  - How long did it last?
  - Any discomfort, tingling, or irritation?

Results

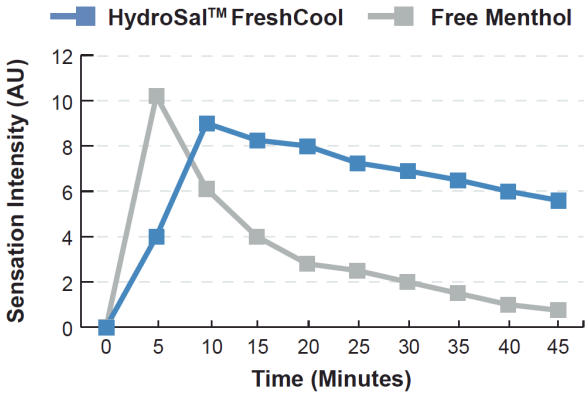


Figure 4: A clinical sensory test compared HydroSal® FreshCool to free menthol at 1% concentration in a lotion.

HydroSal® FreshCool demonstrated a slower onset compared to free menthol. However, its sensory intensity reached a level comparable to menthol and remained consistently high for over 45 minutes. In contrast, the cooling effect of menthol declined steadily, reaching a negligible level after approximately 20 minutes.

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Dose Response Evaluation

Dose-response testing is critical in product development—especially for HydroSal® FreshCool.

Why it's important:

1. Determine the Minimum Effective Dose (MED)
   - Identifies the lowest concentration that delivers the desired effect (e.g., cooling, soothing)
   - It avoids overuse of actives, which saves cost and reduces the risk of irritation
2. Define the Therapeutic Window
   - Establishes the range between effective and irritating/toxic doses
   - Ensures the product performs well without overstimulating the skin or scalp
3. Optimize Sensory Performance
   - Different concentrations can affect:

Onset, Intensity, and Duration.

4. Cost–Benefit Optimization
   - It avoids excessive use of expensive active ingredients.
   - Ensures performance is not over-engineered or underwhelming

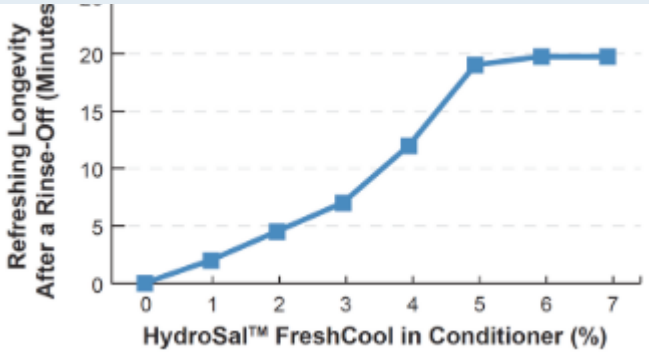


Figure 5: Dose–response profile of HydroSal® FreshCool in a lotion base.

The Minimum Effective Dose (MED) for HydroSal® FreshCool varies, but a 2% concentration in a lotion base applied to the forearm typically produces a perceptible cooling sensation, with response varying among individuals.

HydroSal® FreshCool's cooling intensity rises linearly up to 4%, and peaks at 5%, with higher concentrations extending duration but not intensity.

HydroSal® FreshCool delivers a customizable cooling /fresh experience—sensory intensity increases steadily up to 5%, offering a powerful yet comfortable sensation. While higher concentrations don't feel stronger, they extend the refreshing effect, providing longer-lasting coolness with no added irritation."

Unlike conventional menthol, HydroSal® FreshCool delivers a smoother, longer-lasting cooling sensation. While menthol fades within 20 minutes, HydroSal® maintains its fresh, invigorating feel for over 45 minutes—without the harsh sting.

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Applications

Ideal Applications

- Scalp refreshers or anti-itch treatments
- Cooling facial mists or toners
- Aftershave or after-sun products
- Athletic sprays or foot care
- Deodorants or body sprays for hot climates

Refreshing Serum with HydroSal® Youth and HydroSal® FreshCool

Description

A lightweight, water-based serum that combines HydroSal® Youth for hydration and anti-aging benefits with HydroSal® FreshCool for a long-lasting fresh sensation. Suitable for all skin types, including sensitive skin, with a clear, non-irritating finish.

Formulation Procedure

- In a clean vessel, add Water
- Slowly sprinkle Xanthan Gum into the water while stirring to avoid clumps. Mix until fully hydrated and a clear gel forms.
- Add Glycerin, Propanediol, Sodium PCA, and Aloe Vera Leaf Juice. Mix until uniform.
- Add HydroSal® Youth and HydroSal® FreshCool to the water phase under low-shear mixing.
- Mix until fully dispersed.
- Add the Preservative and pH Adjustment to 5.0-5.5 using Citric Acid as needed.

INCI	w/w %
Aqua	79.50
HydroSal® Youth	2
HydroSal® FreshCool	5
Glycerin	4
Propanediol	3
Sodium PCA	1
Aloe Barbadensis Leaf Juice	1
Xanthan Gum	3
Preservatives	1.5

Table 1: Serum Formulation

Specifications

- Appearance: Clear to slightly opalescent liquid
- pH: 5.0-5.5
- Viscosity: Low, flowable (100-500 cP, Brookfield, spindle 2, 20 rpm)

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Functional Ingredient Overview

HydroSal® FreshCool uses these ingredients in combinations to customize the cooling intensity, onset, and duration, especially to further control of their delivery.

🌿 1. Menthol

- Source: Natural (from mint) or synthetic
- Mechanism: Strong agonist of TRPM8 (cold receptor)
- Onset: Immediate
- Duration: Short (10–15 mins)
- Sensory Profile: Sharp, intense, sometimes stinging
- Uniqueness:
  - Classic, fast-acting cooling
  - Recognizable aroma (can be overpowering)
  - Can irritate at higher doses
- Best Use: Quick-hit freshness (e.g., oral care, chest rubs, aftershave)
- Oil-soluble, alcohol-soluble
- It may recrystallize at low temperatures. It has a strong odor and high potency. To reduce irritation, it is best used in small amounts or encapsulated.

2. Methyl Diisopropyl Propionamide

- Source: Synthetic
- Mechanism: TRPM8 activation (like menthol) but without odor
- Onset: Fast
- Duration: Medium (~20 minutes)
- Sensory Profile: Clean, non-tingling cooling
- Uniqueness:
- Odorless → great for fragrance-free or scented products
- Lower irritation risk vs. menthol
- Often used in oral care, skin, and scalp products
- Best Use: Smooth, non-sensitizing cooling (scalp sprays, eye gels)
- Alcohol-soluble, slightly oil-soluble

3. Ethyl Menthane Carboxamide

- Source: Synthetic menthol derivative
- Mechanism: TRPM8 activation
- Onset: Moderate
- Duration: Long (~1 hour)
- Sensory Profile: Mild onset, long-lasting, non-burning
- Uniqueness:
- Longer-lasting than menthol
- Low odor, low irritation
- Suitable for sustained cooling in leave-on formulations
- Best Use: Freshness in body lotions, deodorants, foot care
- Alcohol-soluble, slightly oil-soluble

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Substantiation

Claim	Substantiation	Source
Methyl Diisopropyl Propionamide	" Methyl Diisopropyl Propionamide is a cooling agent for cosmetic and personal care products. The most valuable characteristics of Methyl Diisopropyl Propionamide are its long-lasting cooling effect, its low odor, and its low volatility.	https://www.ulprospector.com/en/na/PersonalCare/Detail/117398/6073260/Methyl-Diisopropyl-Propionamide#:~:text=Methyl%20Diisopropyl%20Propionamide%20is%20a,odor%2C%20and%20its%20low%20volatility.
Ethyl Menthane Carboxamide	Ethyl Menthane Carboxamide " is similar in function to menthol but is milder."	https://cosmetics.specialchem.com/inci-ingredients/ethyl-menthane-carboxamide
Menthyl Lactate	Menthyl Lactate is a cooling agent for cosmetic products. It is derived from menthol but is less likely to cause irritation than pure menthol but with a similar level of cooling effect. It has a lower odor than Menthol.	https://www.ulprospector.com/en/na/PersonalCare/Detail/34152/5123945/Menthyl-Lactate
Menthol	"Menthol has **cooling** properties and a peppermint odor, and is most commonly found in detoxifying shampoos, conditioners, cleansers, ointments, shaving creams, or any products aimed at delivering an instantly refreshed, energized feeling to skin."	https://cosmetics.specialchem.com/inci-ingredients/menthol