SALVONA
Unique&Easy Micro-Encapsulation Solutions

Product Overview - 8011-01

MultiSal® MultiLayer

Hydrate. Lift. Brighten—one layer at a time

MultiSal® MultiLayer is an advanced microsphere technology that releases exfoliating, hydrating agents, collagen-boosting peptides, and skin-toning brighteners in a consecutive sequence—targeting multiple layers of the skin for a true transformation.

This technology solves several fundamental problems in modern skincare: Most skincare products deliver all their ingredients at once, and nearly all of them remain on the skin's surface.
Additionally:

- Without even mild exfoliation, anti-aging actives have limited penetration.
- Many everyday active ingredients cannot be delivered together because they destabilize or counteract each other.
- Hydration fades quickly.
- Peptides cannot reach the deeper layers where they are needed.
- Brightening agents lose effectiveness before they can impact the skin.

As a result, the skin never fully benefits from the formula.
MultiSal®MultiLayer solves these issues by releasing each ingredient group at the optimal time, in the optimal order, and into the optimal layer of the skin.



MultiSal® MultiLayer is built on a core–shell architecture, Figure 1.

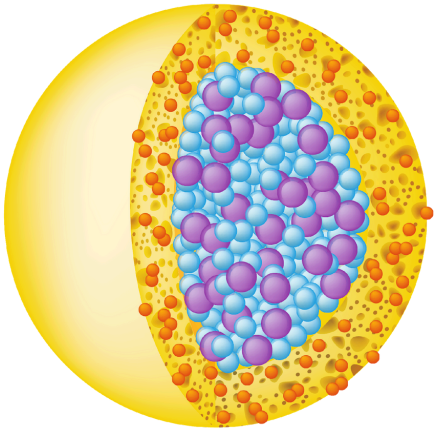


Figure 1: Illustrates the structure of MultiSal® MultiLayer.

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The special structure:
The core contains two types of SalSphere® submicron spheres, each carrying different functional ingredients: 1, collagen-boosting peptides, and 2, a brightening agent.
The shell is a biodegradable coating infused with AHA.

Mechanism of Release – MultiSal® MultiLayer:
The dry microspheres can be easily incorporated into mist formulations and disperse uniformly. When the spheres come into contact with water, they absorb moisture and swell to nearly double their original size, yet they remain structurally intact.

Once applied to the skin and gently rubbed, the outer shell breaks, releasing the exfoliating and hydrating AHA. This initial exfoliation step helps loosen dead cells and increase surface hydration, creating optimal conditions for penetration.

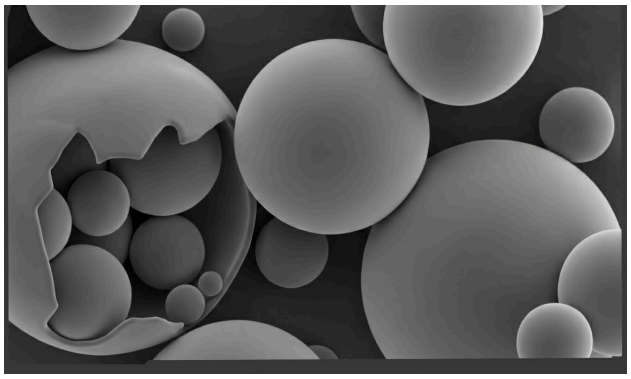


Figure 2: SEM illustrates the structure of MultiSal® MultiLayer. The microsphere includes several smaller spheres.

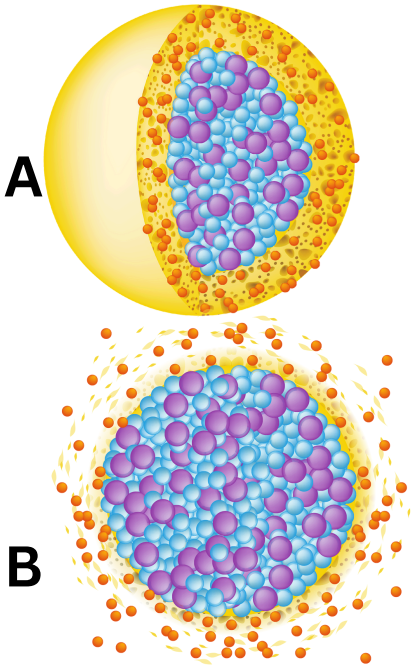


Figure 3: A: MultiSal® MultiLayer. B. Errosion of the shell triggers a release of the AHA.

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Continue

As exfoliation and hydration begin, the submicron SalSpheres® in the core start their journey into the deeper layers of the skin. Their penetration is influenced by their size and lipid-based composition:

Being lipid-based, the spheres can penetrate

Smaller SalSpheres® containing peptides penetrate deeper into the skin, where they support collagen production and anti-aging activity.

Larger SalSpheres® containing brightening agents migrate less deeply, delivering their benefits to the upper layers where tone correction is most effective.

This sequential, multi-layer delivery ensures that each active ingredient reaches the layer of the skin where it performs best, leading to a more complete and effective skin transformation.

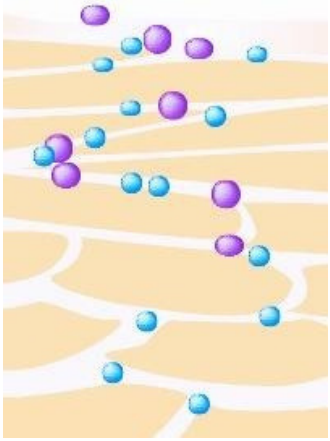


Figure 4: Illustration of the submicron spheres penetrating through the intercellular space and releasing their content as they dissolve in the deeper layers of the skin.

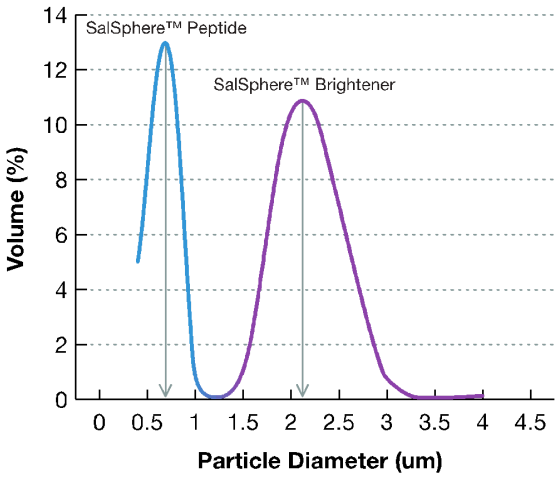


Figure 5: Particle size distribution of SalSphere inside MultiSal® MultiLayer.

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Technical information

INCI	CAS No.	EINECS	ORIGIN
Sodium Starch Octenylsuccinate	52906-93-1	610-914-7	Plant
Butyrospermum Parkii (Shea) Butter	91080-23-8	293-515-7	Plant
Hydrated Silica (amorphous)	112926-00-8	231-545-4	Synthetic
Glycerin	56-81-5	200-289-5	Synthetic
Cocamidopropyl Dimethylamine	68140-01-2	268-771-8	Plant
Lactic Acid	50-21-5	200-018-0	Synthetic
Phenylethyl Resorcinol	85-27-8	480-070-0	Synthetic
Water	7732-18-5	231-791-2	Mineral
Sodium Hydroxide	1310-73-2	215-185-5	Synthetic
Palmitoyl Tripeptide-5	623172-56-5	-	Synthetic

TEST:	**SPECIFICATIONS:**
Appearance at 20 °C (Visual)	Free flowing powder
Odor	Odorless
Color (Visual)	White
pH (1 % solution)	4.0 ± 1.0
Optimal Storage Conditions (°C)	Closed container at 12 – 32 with < 45% RH
Maximum Durability (Months)	24

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Technology breakthrough

The mechanism of action of Phenylethyl Resorcinol (PER)
The formulation challenges associated with PER
How MS MultiLayer® solves these problems through encapsulation and sequential release.

Phenylethyl Resorcinol (PER) is considered one of the most potent tyrosinase inhibitors used in cosmetic science. It works through the following mechanisms:

A. Strong Tyrosinase Inhibition

- PER inhibits tyrosinase, the key enzyme in melanin synthesis.
- It has much higher inhibitory activity than traditional brighteners such as kojic acid or arbutin.
- By slowing melanin production, it helps reduce: Dark spots, Hyperpigmentation, Uneven tone, Post-inflammatory marks

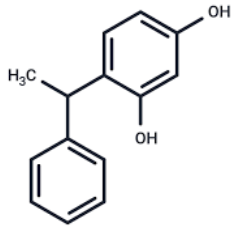
B. Antioxidant Activity

- PER scavenges free radicals in the skin, preventing melanin overproduction triggered by UV or inflammation.

C. Works Synergistically With Other Brighteners

- PER enhances the performance of niacinamide, vitamin C, and peptides when delivered correctly and when irritation is minimized.

Phenylethyl Resorcinol (PER)
is commonly known as SymWhite® 377.



It is available as White to off-white crystalline powder, with a melting point of 78-82 °C. LogP of 3.0. Its solubility in water is very low (<0.01%). It's sensitive to light and oxygen and prone to oxidation.

Implications:

Its high logP gives it vigorous biological activity but poor skin penetration unless properly delivered. Its sensitivity to light and heat is the reason PER often discolors formulas or loses potency.

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Technical Challenges of Phenylethyl Resorcinol in Formulation

Although PER is powerful, it is tough to formulate due to the following issues:

A. Low Water Solubility

PER is lipophilic and barely soluble in water. Requires solvents or surfactants to dissolve → complicates formulation.

B. Oxidation & Instability

PER is sensitive to: Light, Heat, and Air
Can discolor formulas (yellowing) and lose activity over time.

C. Irritation Potential

At high levels or in unstable systems, PER may irritate sensitive skin.

D. Interaction With Other Actives

PER can be destabilized by acidic ingredients (e.g., AHA/BHA) or potent oxidizing agents.
It cannot be easily combined with peptides or specific vitamins in a traditional formulation.

E. Poor Penetration

PER must reach the upper epidermal layers where tyrosinase resides, but:

- Its lipophilicity limits diffusion
- Skin barrier blocks access
- Poor delivery reduces efficacy
- This means that even though PER is highly potent in vitro, it often underperforms in real-world products due to delivery limitations.

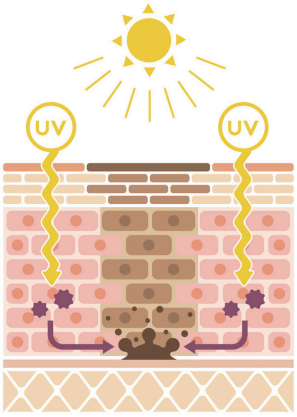


Figure 6: PER is a tyrosinase inhibitor, so it must reach the Stratum Granulosum / Stratum Spinosum. These layers contain keratinocytes that receive melanin from melanocytes. Reducing melanin transfer here improves overall skin tone.

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How MultiSal® MultiLayer Solves These Problems

MultiSal® MultiLayer is specifically engineered to overcome the limitations of ingredients like PER.

A. Protects PER from Light, Heat & Oxidation

Encapsulation isolates PER from external stressors, preventing:
Degradation, Discoloration, Activity loss
This significantly increases shelf-life and formula stability.

B. Allows PER to Be Delivered at the Right Layer of Skin

MultiSal® MultiLayer uses:
A biodegradable AHA shell → exfoliates and prepares the skin.
PER is placed into a larger SalSphere®, meaning:
It stays in the upper layers of the epidermis. It delivers maximum effect where tyrosinase activity occurs
This solves the penetration problem.

C. Controlled Release Reduces Irritation

Encapsulation prevents sudden exposure to concentrated PER.
The skin gradually absorbs the active, improving tolerability—especially for sensitive users.

D. Prevents Ingredient Interactions

PER is kept separate from incompatible actives such as:
AHA/BHA, Peptides
Each ingredient is released in sequence, not in direct physical contact.
This is essential for:
Stability
Efficacy
Safety

E. Enables Formulation in Mist, Serum, Gel, or Cream

- Because PER is encapsulated:
- No solvents are needed
- No special emulsification steps
- Works in water-based and low-solvent systems
- This gives formulators far more flexibility.

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Clinical study

Salvona collaborated with a significant global skincare brand to conduct a clinical study evaluating the performance of MultiSal® MultiLayer.

A lotion containing 4% MultiSal® MultiLayer was applied once daily for 30 days on three facial areas:

- Forehead
- Around the eyes
- Around the lips

Standardized photographs were taken at baseline (Day 0) and after 30 days of use. The results demonstrated visible improvements in multiple skin attributes, including hydration, smoothness, brightness, fine lines, and overall texture—confirming the effectiveness of the sequential release system in real-world application.

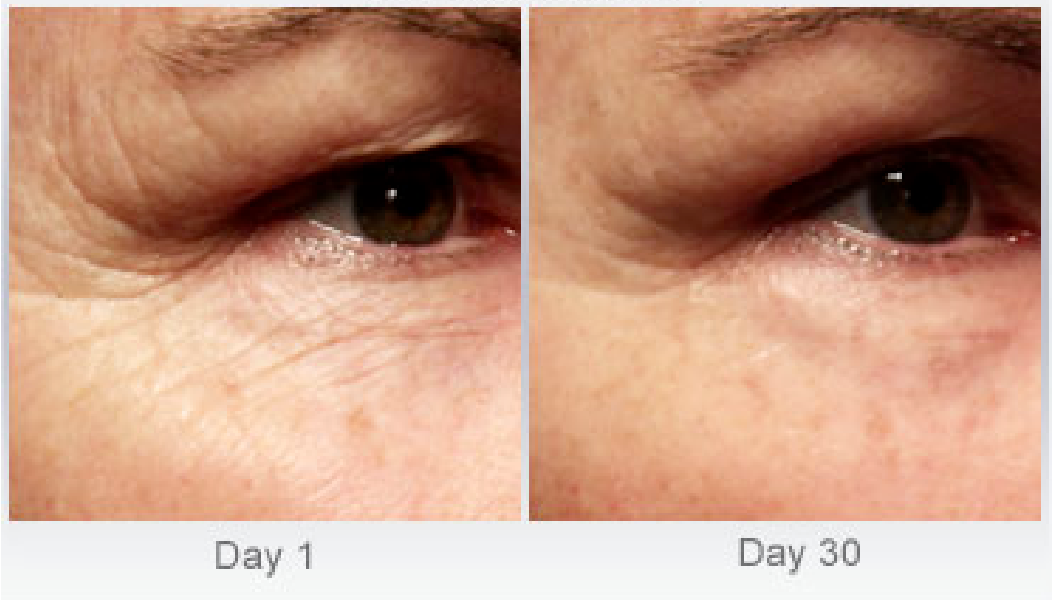


Figure 7: The results demonstrated visible improvements across multiple skin attributes, including hydration, smoothness, skin tone, fine lines, and overall texture.

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Figure 8: The results on the forehead showed a visible reduction in fine lines, improved skin tone, and enhanced overall texture.



Figure 9: The results indicate a visible firming and reduction of fine lines around the lips.

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How to Use MS MultiLayer® in a Lotion

1. Phase & Order of Addition

MultiSal® MultiLayer must be added at the very end of the formulation process.
Add to the cool-down phase, when the batch is below 30–35°C.

Never homogenize after adding the MultiSal® MultiLayer microspheres.

2. Mixing Conditions

Treat the microspheres gently.
Paddle or propeller mixer
Slow agitation: 50–150 rpm (just enough to disperse evenly)
Mix for 5–10 minutes or until uniform
Avoid: High shear, Rotor–stator mixers
Homogenizers, Long, intense mixing
These can rupture the spheres and reduce performance.

3. Base Compatibility

MultiSal® MultiLayer works best in:
Lotions, creams, serums
Low-viscosity emulsions

pH Range

Ideal pH: 4.5–7.0
Very low pH (<4) or very high pH (>8) may destabilize the AHA shell or core spheres.

Viscosity

Medium–high viscosity helps suspend the spheres
If needed, adjust with: Carbomer, Acrylates, Xanthan gum, Cellulose derivatives.

4. Recommended Use Level

Typical loading: 2–5%
For clinical-grade performance: 4% (as used in the recent study)
Lower levels provide mild exfoliation + tone improvement; higher levels support anti-aging and brightening benefits.

5. Storage & Stability Considerations

- Avoid long-term exposure to heat (>35°C)
- Protect from direct UV light
- Store in airtight opaque containers to maintain AHA stability



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Clinical research evidence for PER (and actives/peptides) effectiveness:

- PER effectiveness for skin brightening/tyrosinase inhibition. One study demonstrated that when PER was formulated in a lipid-based carrier (smartLipids), it retained strong tyrosinase-inhibiting activity and remained chemically stable — improving skin-lightening potential compared to free PER. PubMed+1
- Improved delivery systems enhance PER performance. Research on PER incorporated into vesicular drug-delivery systems (e.g., transferosomes or invasomes) showed improved skin permeation, reduced irritation, and enhanced melanin inhibition compared to free PER. PMC+1

These illustrate that PER (and similarly, peptide actives) can be clinically effective when properly delivered, and that encapsulation or advanced delivery systems markedly improve their performance and stability.

Evidence that Exfoliation or Barrier Disruption Enhances Active Penetration / Anti-Aging Efficacy

- Chemical exfoliation improves skin renewal and penetration. A recent review confirms that chemical exfoliants (like AHAs) facilitate the removal of dead skin layers, improve skin renewal, and help active ingredients penetrate more deeply — enhancing overall anti-aging benefit. Taylor & Francis Online+1
- Combining exfoliation with active delivery improves results. A 2024 study showed that exfoliating treatment significantly enhanced the efficacy and performance of actives by improving penetration. PMC

These support the rationale for a design: exfoliate → hydrate/brighten/repair, which is the principle behind MultiSal® MultiLayer (shell contains exfoliating AHA, core contains actives).