Solutions for Acne Prone Skin

How to win the battle against acne-causing bacteria

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When a pore is blocked, *Propionibacterium acne* (an anaerobic bacterium) overgrows and secretes chemicals that blend with dead cells to form an acne lesion (folliculitis, pimple).

Pimples also may include the non-pore-resident *Staphylococcus epidermidis*, *Staphylococcus aureus*.

Occurs at all ages, affects 60-70% of Americans. 20% will have severe acne, which results in permanent physical damage and scarring.

Affects areas most densely populated by sebaceous follicles, including the face, the upper part of the chest, and the back.

*P. acnes* can be killed by benzoyl peroxide, tetracycline, chlorhexidine gluconate, Clindamycin.
The Acne Myth

1. What causes Acne?

2. What is the best strategy to treat acne?
1. Antibiotics treat the symptoms of acne but do not work long term.

2. Everyone has acne bacteria on their skin.

3. If you expose perfect skin to the bacteria, it would not have any negative effect.

4. If you expose acne prone skin to the bacteria, it would cause redness, swelling, and inflammation.

*Propionibacterium acnes* grown in thioglycollate medium. Aerotolerant anaerobic gram positive bacterium (rod) that is linked to the skin condition acne.
Acne Prone Skin

Hormonal changes
Comedones

Oil and skin cells clog hair follicles.
Inflammation and Severe Acne

Papules are comedones that become inflamed, forming small red or pink bumps on the skin. This type of pimple may be sensitive to the touch. Picking or squeezing can make the inflammation worse and may lead to scarring. A large number of papules may indicate moderate to severe acne.
Salicylic Acid (API)
Exfoliating and Anti-bacterial Agent

What are the challenges?

1) Not formulation-friendly: poor solubility in water. Requires alcohol/surfactants to reach OTC levels.

2) Dryness and irritation due to low pH (< 2.7).

3) Reduced efficacy, short contact time.

4) Chemically reactive in soap bars.

Properties

- Powder
- Molecular formula: C\textsubscript{7}H\textsubscript{6}O\textsubscript{3}
- Density: 1.443 g/cm\textsuperscript{3}
- Melting point: 159.0 °C, 318 °F
- Boiling point: 211 °C, 412 °F (20 mmHg)
- Solubility in water: 0.2 g/100 mL (20 °C)
- Acidity (pK\textsubscript{a}): 2.97

Extracted from the inner bark of White Willow tree.
Rationale: Salicylic Acid will continuously exfoliate the skin, to open the pores, and allow “air” to fight acne.

Sub-micron spheres provide the ability to:

- Encapsulate Salicylic Acid for stability and compatibility
- Enable easy formulation in facial wash and leave-on products
- Form a clear emulsion for facial/body washes
- “Time release” for longer-lasting benefits
- Slow release and pH control for healthy and skin-friendly condition
- Cost-effective
Successful use of Salicylic Acid:

• Practical formulations of facial/body washes and leave-on lotions.
• Effective, potent acid form
• Enhanced deposition on skin for longer-lasting effect
• Maintain a skin-friendly and healthy pH environment on skin (5 - 5.5)
SalSphere™ Salicylic Acid 30

Structural Characteristics

Salicylic Acid

Hydrophobic Core (0.1 – 0.3 micron)

Bio-adhesive polymer

SalSphere™ Major Features:

• Water-based
• Results in clear emulsion
• Deposition
• Slow release
• Skin-friendly pH
SalSphere™ Salicylic Acid 30

Exfoliation of the skin

Exfoliating the skin results in more air penetrating the pores and inhibit bacteria growth.
SalSphere™ Salicylic Acid 30

Properties

- Formulation-friendly
- Stable and clear emulsion
- Skin-friendly pH (4.5 - 5.5)
SalSphere™ Salicylic Acid 30 - Clinical

Before

After (1 week)

• Reduced redness and irritation within 1 day.
• Doesn’t dry the skin due to release of small dosages over longer time.
• Long term benefit due to longer exposure to the skin.
Salicylic Acid Technology

Enhanced Efficacy of “Cosmetic-Grade” Consumer Use Test

![Bar chart showing blemish count comparison between 0.5% MultiSal™ SA 30 and Control groups. The chart indicates a significant reduction in blemish count in the treated group.]

(n=57; washed 3x/day for 30 days)
SalSphere™ Salicylic Acid 30

Longer-lasting Salicylic Acid on Skin

![Graph showing the comparison between encapsulated and free salicylic acid over time.](graph.png)

Extraction Method
SalSphere™ Salicylic Acid 30
pH Control

Encapsulated SA = pH 5 - 6

Free SA = pH 3
SalSphere™ Salicylic Acid 30

Skin pH : *In-vivo*

![Graph showing skin pH over time for encapsulated SA, free SA, and untreated skin.](image-url)
SalSphere™ Salicylic Acid 30
Long-lasting on Skin

![Graph showing the comparison of encapsulated and free Salicylic Acid over time.](Image)
Proven Results
Product Compatibility
MultiSal™ Salicylic Acid 30
Triggered Release

Shell

Sub-micron Spheres
MultiSal™ Salicylic Acid 30
Proven Effective
## MultiSal™ Severe Acne
*Multi-Symptom Relief*

<table>
<thead>
<tr>
<th>Functional Ingredients (FI)</th>
<th>Purpose</th>
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<tbody>
<tr>
<td>Salicylic Acid</td>
<td>Anti-Acne</td>
</tr>
<tr>
<td>Benzalkonium Chloride, Camellia sinensis Leaf Extract</td>
<td>Antibacterial/Antiseptic</td>
</tr>
<tr>
<td>Cocamidopropyl Dimethylamine, Butyrospermum Parkii (Shea Butter) Fruit, Cera Alba, Fucus Vesiculosis (Seaweed) Extract, Palmitic Acid, Lactic Acid</td>
<td>Modulate Hydration</td>
</tr>
<tr>
<td>Camellia Sinensis Leaf Extract, Conjugated Linoleic Acid, Anthemis Nobelis (Chamomile) Flower Extract</td>
<td>Anti-Inflammatory</td>
</tr>
<tr>
<td>Palmitoyl Tripeptide-5, Ascorbic Acid</td>
<td>Rejuvenation</td>
</tr>
<tr>
<td>Hydrolyzed Corn Starch, Hydrolyzed Silica, Zinc Sulfate, Kalonite</td>
<td>Sebum Control</td>
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Smart Delivery Systems
Solutions for Acne Prone Skin

Advanced technologies that allow:

1. Seamless incorporation in formulations
2. Gentle yet effective exfoliation
3. Higher deposition, targeted release, and longer-lasting benefits.
4. Increased efficacy; once a pore is opened, air will help effectively reduce acne.
5. Keeps skin healthy and clear, preserves overall healthy appearance
Thank You

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