

# BioReNuva<sup>®</sup>

## Salicylic Acid (BHA) Solubility and Pore Cleansing

### ReNuva<sup>™</sup> SL-A70

<b>Date test Initiated:</b> 07/23/2025		<b>Researcher:</b> Jiyoong Park, Hanacare	
<b>Date test completed:</b> 07/29/2025		<b>Report Date:</b> 25.08.05	
<b>Study Objective</b>			
1	To evaluate ReNuva SL-A70 (glycolipid biosurfactant) as a solubilizer for salicylic acid (BHA) in aqueous, ethanol-free systems.		
2	To evaluate ReNuva SL-A70 (glycolipid biosurfactant) as a pore-hygiene active that helps inhibit <i>Cutibacterium (P.) acnes</i> in simple formulas.		
3	To evaluate ReNuva SL-A70 (glycolipid biosurfactant) as a pore-care active that visibly improves pore cleanliness and pore appearance with continued use.		

## 1. Salicylic Acid (BHA) Solubility Study

### Design

- Model solutions containing 0.5% salicylic acid in water and polyols were prepared with and without 3% ReNuva SL-A70.
- Polyol systems included butylene glycol, glycerin, and dipropylene glycol at varying levels.
- Samples were stored at room temperature and at 5 °C/45 °C and visually checked for crystallization vs. stability.

INCI Name		Without SL-A70		With SL-A70			
		#1	#2	#3	#4	#5	#6
Water		92.50	89.50	94.50	93.50	93.50	93.50
Salicylic Acid		0.50	0.50	0.50	0.50	0.50	0.50
ReNuva SL-A70 (Glycolipids)		X	X	3.00	3.00	3.00	3.00
Glycerin		-	-	-	1.00	-	-
Butylene Glycol		7.00	10.00	-	-	1.00	-
Dipropylene Glycol		-	-	-	-	-	1.00
Stability	R/T	Crystal	Crystal	Crystal			
	5 Degrees, 45 Degrees	Crystal	Crystal	-	Stable	Stable	Stable
Results		ReNuva SL-A70, with minimal polyol, enables stable salicylic acid solubilization even without ethanol					

### Key Findings

- Without ReNuva SL-A70 (Formulas #1–3):
  - 0.5% salicylic acid + water + 7–10% butylene glycol showed crystal formation at room temperature and under stress conditions (5°C/45°C).
- With 5% ReNuva SL-A70 (Formulas #4–6):
  - All systems containing 5% ReNuva SL-A70 and 0.5% salicylic acid were stable (no crystals) at room temperature and under stress conditions, even when polyol levels were reduced and distributed between glycerin, butylene glycol, and dipropylene glycol.
- ReNuva SL-A70 enables ethanol-free, crystal-free solubilization of 0.5% salicylic acid, providing clear, stable solutions suitable for pore-care formats such as pads, toners, and essences.

## 2. Antimicrobial Activity vs. *P. acnes* (Pore Hygiene Support)

### Design

- Three simple aqueous systems were tested:
- Final pH values ranged from ~5.1–6.6 in SL-A70-containing formulas.
- Each system underwent a microbial challenge with *P. acnes* and was monitored over time.

Phase	Trade Name	240813A	241219	240813B
A	Water	98.00	97.00	96.00
	1,2 Hexanediol	2.00	2.00	2.00
	ReNuva SL-A70	-	1.00	2.00
Final pH (25 °C, direct)		9.51	5.07	6.62
Challenge test – acne bacteria		TNTC	ND	ND

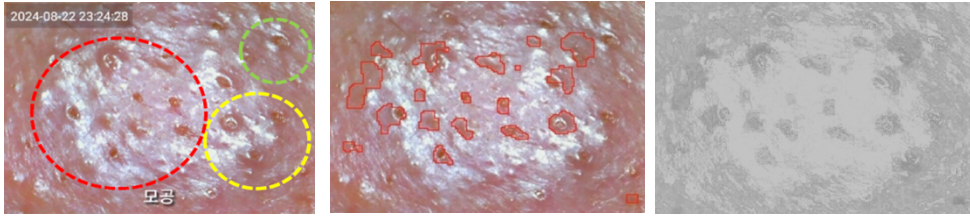
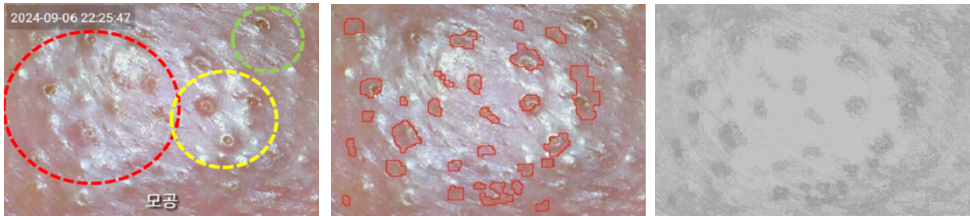
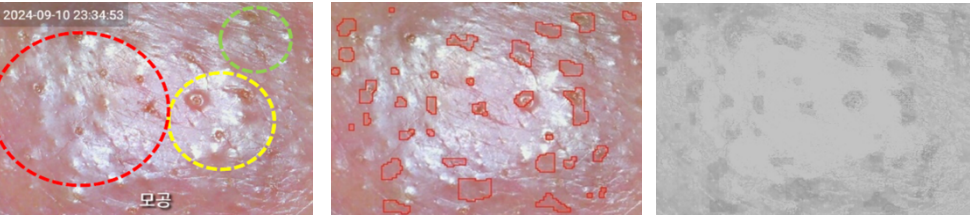
### Key Finding

- Control (no SL-A70): *P. acnes* growth remained TNTC (too numerous to count).
- Formulas containing  $\geq 1\%$  ReNuva SL-A70 showed no detectable *P. acnes* from Day 1 (ND).
- ReNuva SL-A70 at 1–2% provides rapid, effective suppression of *P. acnes* in a simple aqueous system, supporting its role in maintaining a cleaner pore environment and reducing acne-causing bacteria.

### 3. Pore-Tightening / Clinical Observation

#### Design

High-magnification skin images utilizing an APM-300 skin diagnostic device were captured before use, after 15 days, and after 19 days of using an ReNuva SL-A70-containing pore pad (3% SL-A70).

Time	Images	Key Findings
Initial		Enlarged pores with visible white sebum plugs and rough, congested texture.
Day 15		Noticeable reduction in visible sebum plugs; pores appear cleaner and less dilated.
Day 19		Further improvement with tighter pore appearance and smoother surface topography.

#### Study Conclusions

Across solubility, antimicrobial, and clinical imaging data, ReNuva SL-A70 functions as a multifunctional pore-care glycolipid. It keeps salicylic acid stably solubilized in mild, ethanol-free systems, disrupts *P. acnes* growth at low use levels, and supports visible pore-clearing and tightening over time—making it a strong core active for modern pore-cleansing and acne-care formulations.

#### Mechanism of Action (Proposed)

Low CMC micelles in pores: ReNuva SL-A70 has a very low critical micelle concentration (~20 mg/L), forming nano-micelles that can penetrate into pores. These micelles encapsulate oxidized sebum, residues, and lipid-soluble actives such as salicylic acid.

Surface-tension reduction: ReNuva SL-A70 reduces surface tension of water from ~72.8 mN/m down to ~30 mN/m, weakening the interface between sebum plugs and the skin surface and promoting easier removal of pore debris.

Mild, water-soluble Glycolipid: Unlike many surfactants, ReNuva SL-A70 is water-soluble and emollient, designed to minimize irritation and support hydration while still delivering deep cleansing.