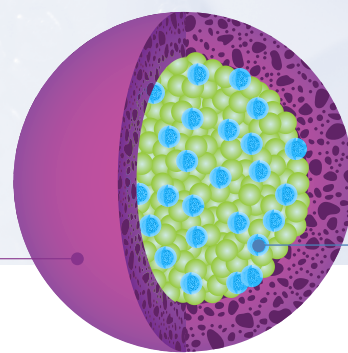


MultiSal[®] Salicylic Acid (MS SA)

Technology to deliver pharmaceutical-grade salicylic acid.

Salicylic acid (SA) is a beta-hydroxy acid best known as a key ingredient in many skincare products for the treatment of dermatitis, acne, psoriasis, calluses, and more.¹ SA works as a keratoic, comedolytic, and bacteriostatic agent, causing the cells of the epidermis to shed more readily, opening clogged pores and neutralizing the bacteria within.²

Salicylic acid is poorly soluble in water (2g/L at 20°C) and generally requires alcohol or harsh surfactants to solubilize it.



Shell **Core**
Sub-micron spheres

Figure 1: The structure of MS SA. The shell breaks down to release sub-micron spheres.



Figure 3: MS SA is effective in reducing blemishes. Before treatment (A), there are quite a few blemishes. After treatment (B), there are much fewer.

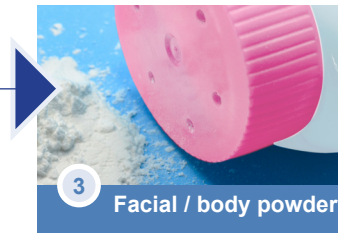


UNIQUE FEATURES

- 1 **GREATER COMPATIBILITY**
MultiSal[®] increases the compatibility of SA and makes it easier to formulate with. It is ready for incorporation into various anhydrous bases, such as alkaline natural soap bars. As an encapsulated system, the pH of the product doesn't change.
- 2 **ENHANCED EFFICACY**
The design provides superior adhesion to the skin from a wash-off. With this deposition, the slow release makes it more effective and suitable for sensitive skin.
- 3 **UNIQUE DOSAGE FORM**
MS SA is a ready-to-go dosage form. It can be easily mixed with other powders to form market-ready products. The product is ready for OTC or Rx formulation.

HOW THE TECHNOLOGY HELPS YOU

This multi-layer technology is based on double encapsulation of SA (Figure 1). The SA is contained in sub-micron spheres (0.1-2 microns in diameter) which are then re-encapsulated into larger microspheres (30-50 microns in diameter). The wall of the microsphere ruptures when the product is rubbed onto the skin when in the presence of water. At this point, the sub-micron spheres are released onto the skin.



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SUPERIOR SKIN DEPOSITION

Traditional rinse-off products deposit only 2-5% of salicylic acid onto the skin, wasting over 95%. MultiSal® technology significantly enhances the deposition of SA in a rinse-off. Deposition of SA was determined by clinical testing (Figure 4).

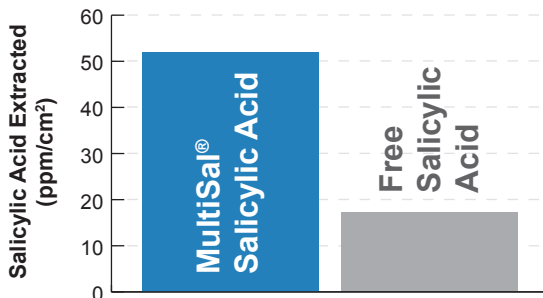


Figure 4: MS SA deposits significantly more SA. An extraction cup was used to extract SA from the skin. This process was repeated several times until most free SA was extracted from the skin. HPLC analysis was used to quantify the amount of SA extracted.

TIME RELEASE TECHNOLOGY

MultiSal® technology extends the release of the SA onto the skin. It exposes the skin to small amounts of acid over a longer period of time, rather than one large amount at once. This unique feature allows higher levels of SA to remain on the skin for several hours (Figure 5), for better efficacy and acne-fighting power without irritation.

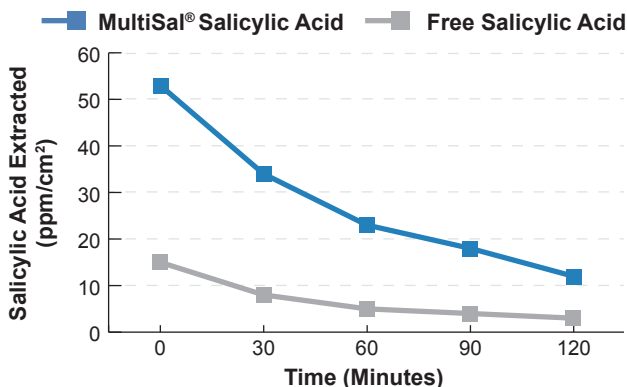


Figure 5: MS SA sustains the release of the SA longer than the free SA.

ENHANCED EFFICACY

An important benefit of the MultiSal® technology is enhanced efficacy from a rinse-off application. The cationic charge of the shell's surface provides superior adhesion onto the skin. This benefit makes it a valuable technology for products that are rinsed off the skin shortly after application.

FORMULATION

Ingredients	(W/W %)
MultiSal® Salicylic Acid	5.0
Kaolin	95.0

OTC limits are set at 2% for topical preparations expected to be left on the face, and 3% for those expected to be washed off, such as acne cleansers or shampoo. 17-27% is allowed for wart removal.

TECHNICAL DATA

Appearance @ 20°C	Free flowing powder
Applications	Suitable for anhydrous applications such as soap bars, on-the-go sticks, body powders
Color	Off-white
pH (1 % solution)	30 ± 3
Shelf Life (months)	36
Usage Level (wt%)	Cosmetic: Up to 1.67 OTC: 1.67-6.67 Rx: Over 6.67
Storage (°C)	Closed container at 12-32° with <45% RH

References

- Madan, RK; Levitt, J. (April 2014). "A review of toxicity from topical salicylic acid preparations". J Am Acad Dermatol. 70 (4): 788-92.
- Bosund, I; Erichsen, I; Molin, N. (1960-10-01). "The Bacteriostatic Action of Benzoic and Salicylic Acids." Physiologia Plantarum. 13 (4): 800-811. doi: 10.1111/i.1399.1960.tb08103.x. ISSN 1399-3054.