

# Salicylic Acid: A Multifunctional Cosmetic Ingredient

Salicylic acid occurs naturally in various plants including, but not limited to, black cohosh, blue flag, American pennyroyal, cassie, coca, dog's grass, glory lily, marigold, seal island cotton, plantain, rue, wintergreen, ylang ylang and willow bark. Willow bark has been used by the ancients to relieve pain and fever. Only later it was found that Willow bark contains salicin which is degraded to salicylic acid after ingestion.



Willow bark contains salicin

Although salicin, salicylic acid and other similar salicylates can be obtained from plants by steam distillation or by making hot water extracts, salicylic acid has been produced by chemical synthesis for more than 150 years! - Since then both salicylic acid and its famous derivative, acetylsalicylic acid (Aspirin), are produced synthetically for reasons of simplicity, purity and cost effectiveness.

Salicylic acid is a aromatic acid. It is moderately soluble in hot water, glycerin, alcohol, acetone, ether, and in fats or oils. As salicylic acid is an acid, its solubility in water can be increased by adding sodium phosphate, borax, alkali acetates or citrates.

## Use of Salicylic Acid in Cosmetics

Over the last several decades salicylic acid has been introduced in a large variety of cosmetic products and also OTC (over the counter) drug products based on its different properties and effects on the skin. These effects have been extensively been studied as evidenced by dozens of both laboratory and clinical studies. In fact, salicylic acid might be one of the most studied active ingredients in the cosmetic industry.

The table below shows the main properties and effects of salicylic acid when used topically. Salicylic acid may also be used internally, but this will not be discussed here.

## Effects of Salicylic Acid on the Skin

- Keratolytic (exfoliation of skin cells)
- Moisturizing
- Facilitates skin penetration of other active ingredients
- Skin & hair conditioning effects
- Acidulant (acidifying effect)
- Anti-acneic
- Anti-dandruff effects
- Anti-fungal
- Anti-inflammatory
- Analgetic
- UV-absorbing
- Anti-pruritic (anti-itching)

## Keratolytic Effect

One of the major properties of salicylic acid is its ability to remove skin cells of the most upper layer of the skin, the stratum corneum. This keratolytic effect is dependent on the concentration of salicylic acid used in a cream. For example, at a concentration of 10 - 15% salicylic acid shows a keratolytic effect already after 2 or 3 days. At 5% and 1% desquamation of skin cells is seen after 7 and 10 days, respectively.

Hence, salicylic acid is widely used as major ingredient for peelings or other exfoliant or abrasive skin treatments. Such peeling products contain salicylic acid usually at concentrations between 0.5 - 3%. Whereas the upper limit of 20% of is applied only in dermatological (prescription) products, the use of salicylic acid at this level has also been recommended for face masks. For anti-warts products salicylic acid is usually used between 12 - 40%.

Besides removing old cells and horny debris from the skin, keratolysis has also the advantage that it facilitates the penetration of other active ingredients into the skin. Salicylic acid is therefore often added to skin care products that contain active ingredients in order to increase their absorption and efficacy.

## Anti-Acne Effect

Due to its keratolytic effect salicylic acid has become a main ingredient to treat acne. Salicylic acid is approved for non-prescription anti-acne products at concentrations from 0.5 - 2%. Besides keratolysis, the acidifying and anti-inflammatory properties of salicylic acid are also believed to be responsible for the good anti-acne effect of salicylic acid.

## Additional Uses

Salicylic acid has also been proposed to have anti-fungus activity, though the fungistatic activity seems to be low as stand-alone ingredient. Since salicylic acid, however, can increase the efficacy of other more potent anti-fungus agents, it is often added to anti-fungus creams as "booster".

Due to its effectiveness as keratolytic agent, and its anti-itching properties, the use of salicylic acid in anti-dandruff products is well established. The Advisory Review Panel recommended that salicylic acid at 2 - 3% be placed in Category I for dandruff treatment. Similarly, in 1991 FDA has approved salicylic acid for the control of dandruff, seborrheic dermatitis and psoriasis.

Besides all these various effects salicylic acid has also been found to be able to absorb ultraviolet radiation. As a consequence, it should be kept away from direct sunlight which gives a pink color. Although the anti-inflammatory and analgetic effects of salicylic acid are not as potent as those of acetylsalicylic acid (Aspirin), it still shows significant effects and is therefore widely used in anti-inflammatory creams and ointments.

## Precautions

To avoid excess peeling and/or irritation of the skin salicylic acid should be used with caution when using together with additional exfoliants such as abrasive soaps or cleansers, alcohol-containing products, or other topical acne or peeling products that contain e.g. benzoyl peroxide, resorcinol, sulfur, or tretinoin. In addition, soaps or cosmetics that dry the skin may also increase exfoliation and consequently skin irritation.

Salicylic acid can be purchased at [www.makingcosmetics.com](http://www.makingcosmetics.com)

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## Sources:

DiSalvo R. 2002 Salicylic acid. The chemistry and manufacture of cosmetics. Volume III. Edited by M.L. Schlossman