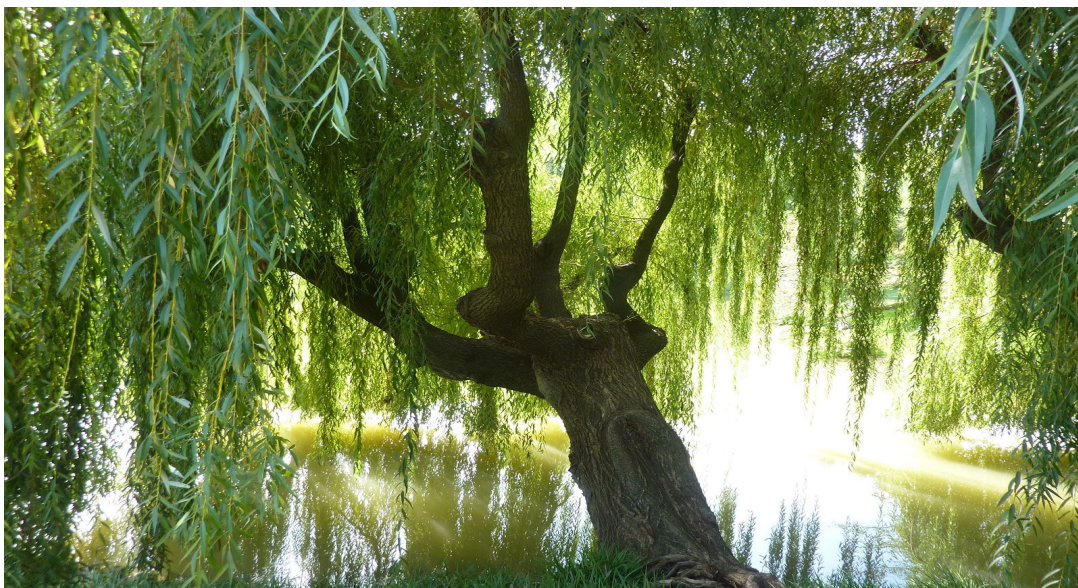


ABS White Willow Bark Extract Powder



standardized for salicylates
natural alternative to salicylic acid
 problem skin solution
 reduces redness + alleviates irritation + antimicrobial
 antioxidant protection
 and exfoliating properties
efficacious in a variety of applications

BACKGROUND

The White Willow (*Salix alba*) tree is a large tree that is native to North America, Asia and Central and Southern Europe. It is typically found near streams and rivers, where it can root near a constant water source. The tree is tall and slender and flowers each spring first with tiny yellow flowers, which are followed by long thin green leaves. There over 300 species of willow trees growing globally, yet only a few can be used medicinally. The White Willow belongs to the Salicaceae family. Other species that possess medicinal properties are the purple willow (*S.Purpurea*), violet willow (*S.daphnoides*), and crack willow (*S. fragilis*).

SCIENCE

White Willow is an ancient remedy that has been used to treat pain by Chinese physicians since 500 B.C. It has also been used in ancient Egyptian and Greek medicine. Hippocrates recommended chewing on the leaf to alleviate pain. Evidence of the use of White Willow as a medicinal herb also exists in Europe and the Americas. In the mid-1700's White Willow was used in England as a malaria remedy. In the Americas, the Cherokee, Blackfoot, and Iroquois Indians created a tea from the bark of the White Willow to relieve headaches, fever, and general aches and pains. Then in 1828, German and French chemists were able to isolate the principal active component, salicin, a glucoside of Salicylic acid, from the bark of the White Willow. Upon ingestion into the human body, salicin is hydrolyzed to release salicylic acid in the stomach. Toward the end of the nineteenth century salicylic acid was converted into the synthetic compound, acetylsalicylic acid, the active ingredient used to make aspirin.

Code Number: 10229

INCI Name: Salix Alba (Willow)
Bark Extract

INCI Status: Approved

REACH Status: Complies

CAS Number: 84082-82-6

EINECS Number: 282-029-0

Origin: Botanical

Processing:

GMO Free

No Ethoxylation

No Irradiation

No Sulphonation

Additives:

Preservatives: None

Antioxidants: None

Other additives: None

Solvents Used: N/A

Appearance: White to Off-White, Free
Flowing Powder

Soluble/ Miscible: Water/ Anhydrous

Ecological Information:

86.05% Biodegradability

Microbial Count: <100 CFU/g,
No Pathogens

Suggested Use Levels: 1.0 - 10.0%

Suggested Applications: Exfoliation,
Problem Skin, Antimicrobial,
Increases Cellular Renewal,
Antioxidant

Benefits of ABS White Willow Bark Extract Powder:

- Natural Salicylic Acid Alternative
- Standardized for 53.0 - 65.0% Salicylates
- Antimicrobial Action
- Promotes an Increased Cellular Renewal
- Excellent Antioxidant Protection
- Ideal for Problem Skin Applications

ABS White Willow Bark Extract Powder

Today, willow bark extract is still used as an herbal remedy, which acts as an anti-inflammatory and analgesic agent. In the cosmetic and personal care industries, willow bark extracts are employed as a natural source of salicylic acid. As reported by the Society of Investigative Dermatology (Washington 1996: Bennet, Scholz, et al.) willow bark extract provides the benefits of salicylic acid such as exfoliation, and anti-microbial action, without any of the typically associated irritation. The natural salicylates found in white willow bark provide UV protection and help decrease irritation. Additionally, white willow is useful in increasing the rate of cellular renewal, ensuring that dull, dead skin cells are exfoliated thus decreasing the likelihood of dry and/ or problem skin.

In its standardized form White Willow Bark Extract provides consistent levels of salicylic acid allowing its use as an active ingredient. Unfortunately, in commercially available extracts the salicylic acid levels rarely exceed 10%, making it difficult to formulate products with sufficient quantities in emulsion systems, and impossible to formulate in anhydrous systems.

BENEFITS

ABS White Willow Bark Extract Powder is standardized for 53-65% natural salicylates and provides formulators with the perfect alternative to synthetic salicylic acid products. This product is ideal for reducing inflammation and associated redness, plus, it acts as an efficacious antimicrobial. This water-soluble powder promotes seamless incorporation into a variety of formulas promoting all of the benefits associated with salicylic acid without the typical irritation!

ABS White Willow Bark Extract Powder boosts the power of a formula with standardized activity to create a clear, smooth, and youthful looking aesthetic.

EFFICACY

ABS White Willow Bark Extract Powder was evaluated for its ability to accelerate cell renewal by means of a traditional Dansyl Chloride protocol. A 5% Dansyl Chloride was prepared by dispersing Dansyl Chloride 95% (Sigma) in petrolatum. Approximately 0.2 g of the ointment was applied to three 2cm x 2cm locations on the volar forearm of 12 (M/F) subjects between the ages of 19 and 43. The material was allowed to remain in place for 24 hours at which time any excess ointment was removed. Two products were tested, with the remaining untreated site serving as the biological control. The products were applied in a randomized fashion to the designated area once a day. The sites were then examined daily under ultraviolet light (SL-3660 Long Wave Ultra Violet, Black Light Eastern Corp., Westbury, Long Island, NY) for fluorescence. The test was continued until no fluorescence was detectable at any site. The values listed reflect the average time for each product.

The results indicate that **ABS White Willow Bark Extract Powder** is capable of increasing cellular renewal by 27% when compared to the untreated biological control.

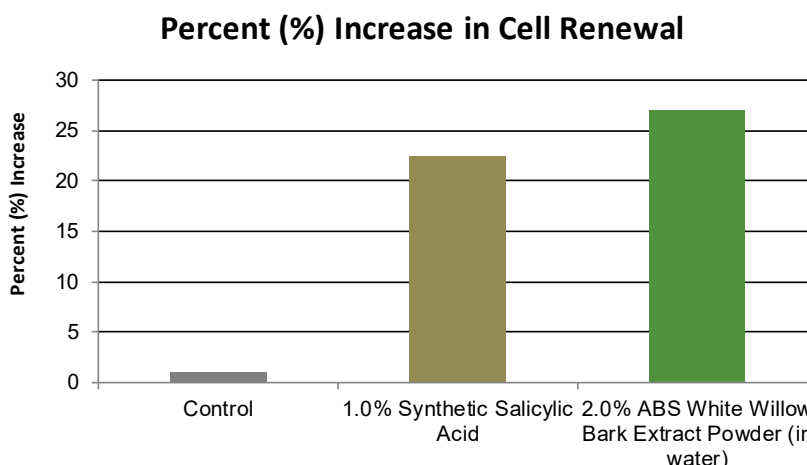


Figure 1. ABS White Willow Bark Extract Powder Increases cellular renewal rate faster than the untreated control and synthetic material in comparison tests

ABS White Willow Bark Extract Powder

Reactive oxygen species (ROS) are generated by normal cellular processes, environmental stresses, and UV irradiation. ROS are detrimental to cellular structures and functional molecules (i.e DNA, proteins, lipids) as they act as strong oxidizing agents or free radicals. The oxygen radical absorbance capacity (ORAC) assay is a standard method used to assess antioxidant capacity of physiological fluids, foods, beverages, and natural products. The assay quantitatively measures a sample's ability to quench free radicals that have the potential to react with and damage cellular components.

Oxygen Radical Absorbance Capacity (ORAC) assay was conducted to assess the antioxidant capacity of **ABS White Willow Bark Extract Powder**. The antioxidant protection of the sample can be calculated by comparing it to a set of known standards. Trolox®, a water soluble vitamin E analog, with known antioxidant capabilities is used in this ORAC assay as the standard for measuring the antioxidant capacity of unknown substances. Trolox® equivalency is used as the benchmark for antioxidant capacity of mixtures since it is difficult to measure individual components. **ABS White Willow Bark Extract Powder** exhibited antioxidant activity comparable to 200µM Trolox®. The antioxidant capacity of **ABS White Willow Bark Extract Powder** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent.

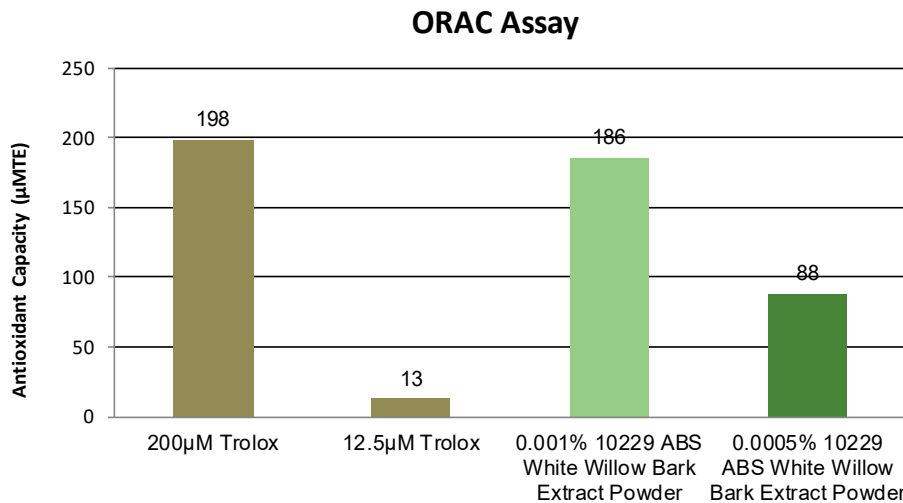


Figure 2. Antioxidant capacity of ABS White Willow Bark Extract Powder in comparison to Trolox®

An *in-vivo* study was conducted over a period of four weeks to evaluate the effect on skin density of **ABS White Willow Bark Extract Powder**. 10 M/F subjects between the ages of 23-45 participated in the study. Results indicate that this material is capable of significantly improving skin density compared to the control.

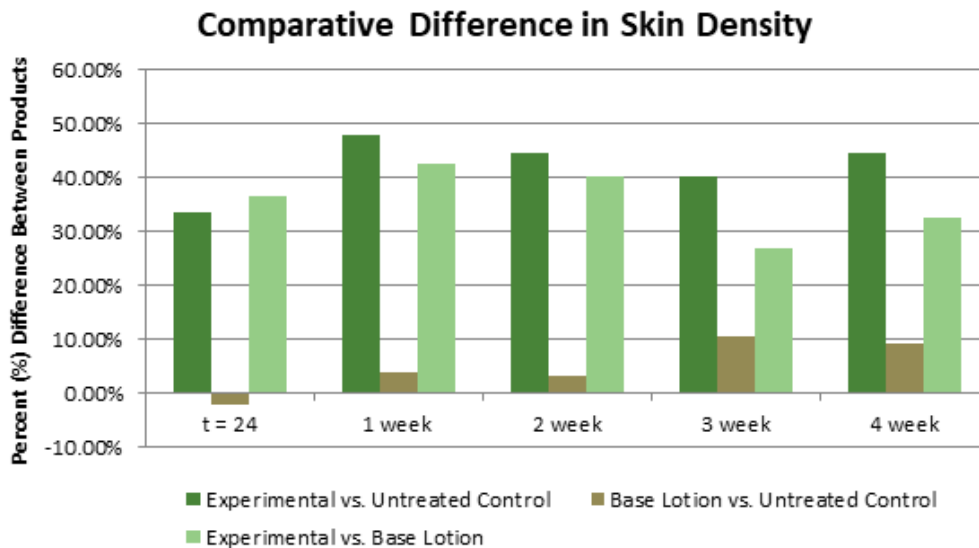


Figure 3. High Resolution Skin Imaging Results Measuring Skin Density

ABS White Willow Bark Extract Powder

ABS White Willow Bark Extract Powder was combined with water and EDTA to obtain a 3% final concentration. The following titers of microorganisms were added separately to these solutions, and quality control testing was done on the following days. Each 28-day test was repeated 3 times consecutively on the same test solution (for a total of 84 days).

3.0% ABS White Willow Bark Extract Powder

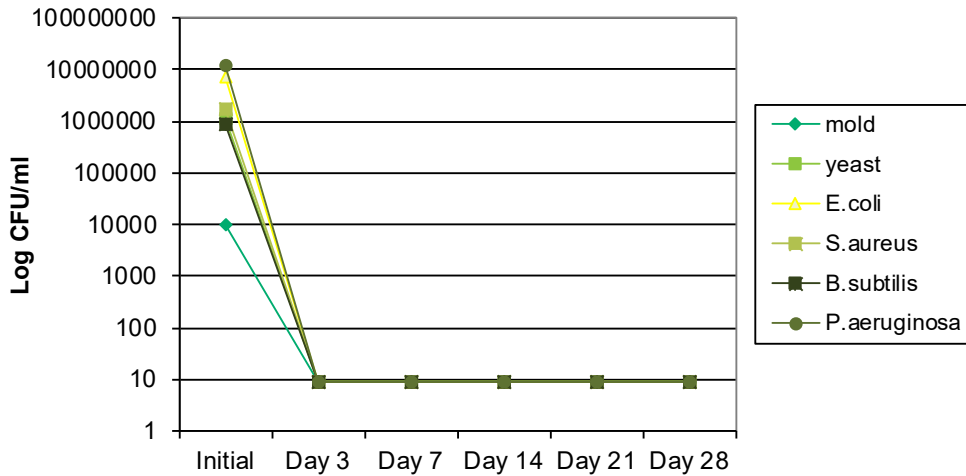


Figure 4. 3.0% ABS White Willow Bark Extract Powder inoculum with microorganisms

3.0% ABS White Willow Bark Extract Powder

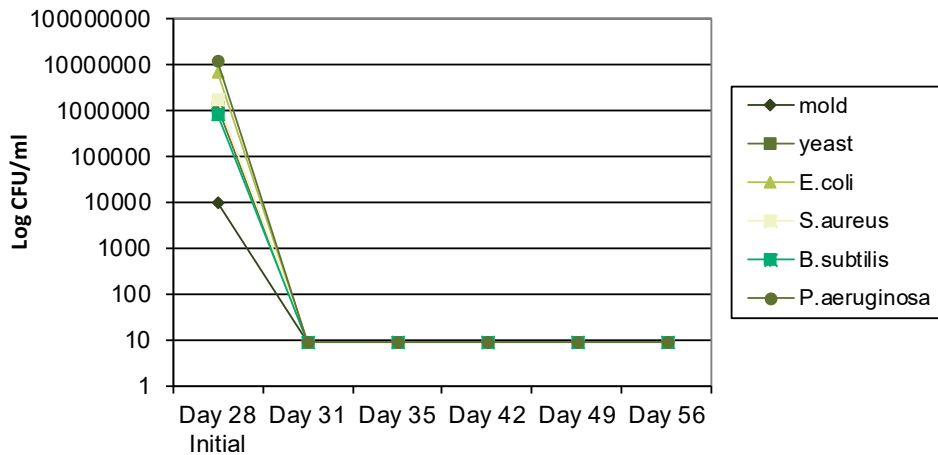


Figure 5. 3.0% ABS White Willow Bark Extract Powder re-inoculum with microorganisms

ABS White Willow Bark Extract Powder

Interleukin-6 is a proinflammatory cytokine known to play an active role in inflammation, immunology, bone metabolism, reproduction, arthritis, neoplasia, and aging. IL-6 signals through the nuclear factor-kappa B (NF- κ B) pathway that results in the transcription of inflammatory mediators, including matrix metalloproteinase-1 (MMP-1). MMP's are responsible for breaking down the extracellular matrix and collagen in the skin leading to wrinkles, fine lines, and loss of skin elasticity. Reducing the level of IL-6 and other inflammatory mediators is believed to slow down degradation of the skin matrix and, possibly, stimulate its replenishment. Interleukin-6 ELISA was conducted to assess the changes in IL-6 levels in **ABS White Willow Bark Extract Powder**-treated in vitro cultured human dermal fibroblasts.

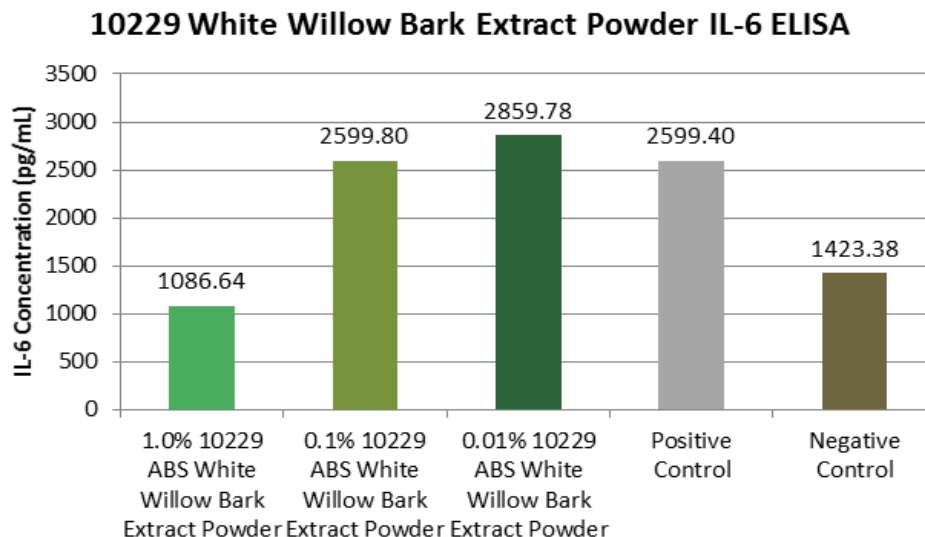


Figure 6. ABS White Willow Bark Extract Powder-treated fibroblasts IL-6 concentrations

DISCUSSION

As shown in figure 6, **ABS White Willow Bark Extract Powder** exhibited anti-inflammatory effects on LPS-treated fibroblasts. As expected, the changes in IL-6 production using **ABS White Willow Bark Extract Powder** appears to be dose dependent. This decrease in IL-6 production indicates a reduced inflammatory environment which could decrease the signs of aging and reduce the formation of fine lines and wrinkles. For these reasons, we can assume **ABS White Willow Bark Extract Powder** is suitable for cosmetic applications designed to provide soothing and anti-aging properties.