

ACB Yerba Santa Glycoprotein PF



topical + botanical
 Glycoprotein Ferment
 cellular viability, antioxidant
 nutrient rich
 richness + bio-molecules

BACKGROUND

In the late 18th century, Native Americans living in the southwestern US and northern Mexico introduced Yerba Santa to Spanish settlers who colonized the area. Spanish priests, impressed by its medicinal properties, gave the plant its current name, meaning 'holy weed'. Commonly known as Mountain Balm, Sacred Herb, Bear's Weed, Gum Plant or Consumptive Weed, this Native American medicinal plant has been used as an herbal remedy for centuries.

Yerba Santa (*Eriodictyon californicum*) is an evergreen native to California and Oregon but is found in Northern Mexico as well. It is a perennial, woody shrub with a height range from 2 to 9 feet tall with dark green, leathery, lance-shaped leaves covered with shiny resin.¹ Clusters of six to ten trumpet-shaped white, blue or purple flowers can be found growing from the top of the plant.

As for medicinal use, Yerba Santa leaves are harvested after flowering, typically summer into fall, when leaves begin to be tacky but are still green. The taste of the leaves is balsamic and the flowers and leaves smell pleasantly aromatic on a warm day.² Yerba Santa's unique taste is often used to disguise bitter-tasting medicines such as quinine.³ Traditionally, a tea, tincture, or syrup is made from dried leaves and used as a remedy for a variety of respiratory ailments, for example, colds, asthma, pleurisy, pneumonia and tuberculosis. It is known to function as an expectorant to treat coughs and congestion as well as causing dilated bronchial tubes which can effectively ease asthma and allergy attacks.

SCIENCE

Yerba Santa is comprised of mucopolysaccharides and glycoproteins that functions to coat the mucous membrane, holding the aqueous component in contact with the cells, thus allowing it to increase hydration and lubricity. Due to its richness in compounds such as mucopolysaccharides and glycoproteins,

Code Number: 20342PF

INCI Name: Lactobacillus/Eriodictyon Californicum Ferment Extract

INCI Status: Conforms

REACH Status: Complies

CAS Number: 68990-14-7

EINECS Number: 273-580-8

Origin: Botanical

Processing:

GMO Free

No Ethoxylation

No Irradiation

No Sulphonation

Additives:

Preservatives: None

Antioxidants: None

Other additives: None

Solvents Used: Water

Appearance: Clear Viscous Liquid

Soluble/ Miscible: Water Soluble

Ecological Information:

89.75% Biodegradability

Microbial Count: <100 opg,

No Pathogens

Suggested Use Levels: 1.00 - 5.00%

Suggested Applications:

Moisturization, Enhance Epidermal Slip, Antioxidant, Increase Cellular Viability

Benefits of ACB Yerba Santa Glycoprotein PF

- Enhances Aesthetics of Final Formulas
- Intense Moisturizing Benefits
- Hydration and Lubricity
- Improves Barrier Function
- Antioxidant Protection

ACB Yerba Santa Glycoprotein PF

Yerba Santa functions well to counteract excessive drying of the mucous membranes in the respiratory tract.² Yerba Santa, an exceptional member of the family Hydrophyllaceae (Waterleaf) that also contains Phacelia and Baby Blue Eyes. Most members of this group grow in cool, moist environments. However, Yerba Santa has adapted to the Mediterranean climate of the western USA which can be characterized by wet, mild winters and hot, dry summers. With its tough, resinous leaves, it is able to hold and conserve water more effectively than other plants, it does this in order to assimilate with an environment in which bush flourishes; dry, mountainous slopes, sparse of vegetation at altitudes of up to 4,000 feet.⁴

It is believed the flavonoid, eriodictyol, contributes to the expectorant properties of Yerba Santa. Many Native American tribes dried and smoked the leaves as a treatment for asthma and lung congestion. Historically, sticky Yerba Santa leaves were used to seal skin wounds before sterile bandages were widely available. Often, a poultice of leaves was applied to painful joints and bruises for relief.

BENEFITS

By fermenting the leaves of the plant with the bacteria *Lactobacillus lactis*, we are able to breakdown many of the complex bio-molecules found naturally in the plant, which lead to the isolation of beneficial components such as the natural glycoproteins. Yerba Santa is capable of achieving a moisturizing effect via hydrogen bonding of water by its glycoprotein components. **ACB Yerba Santa Glycoprotein PF** imparts moisturization and soothing properties, making suitable for skin and hair care formulations.

EFFICACY DATA

At concentrations exceeding 0.1%, the antioxidant activity is too intense to measure, resulting in over-saturation of the signal. This over-saturation produces results that exceed those of the standard curve. Therefore, lower concentrations were tested to ensure an accurate result. The antioxidant capacity of **ACB Yerba Santa Glycoprotein PF** increased as the concentration increased. As a result we can assure that its ability to minimize oxidative stress is dose dependent. We can confirm that this unique ingredient is capable of providing antioxidant benefits when added to cosmetic applications.

ORAC Assay

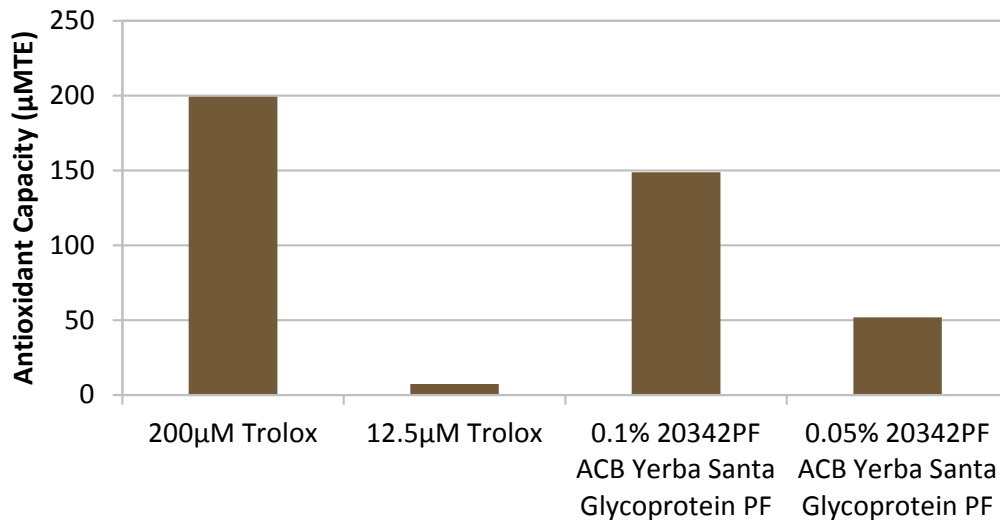


Figure 1. Antioxidant capacities.

ACB Yerba Santa Glycoprotein PF

Viability Assay

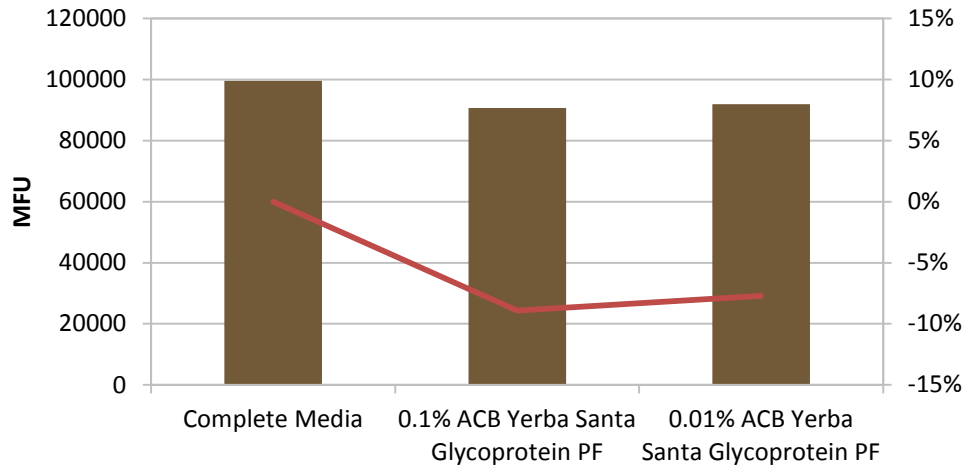
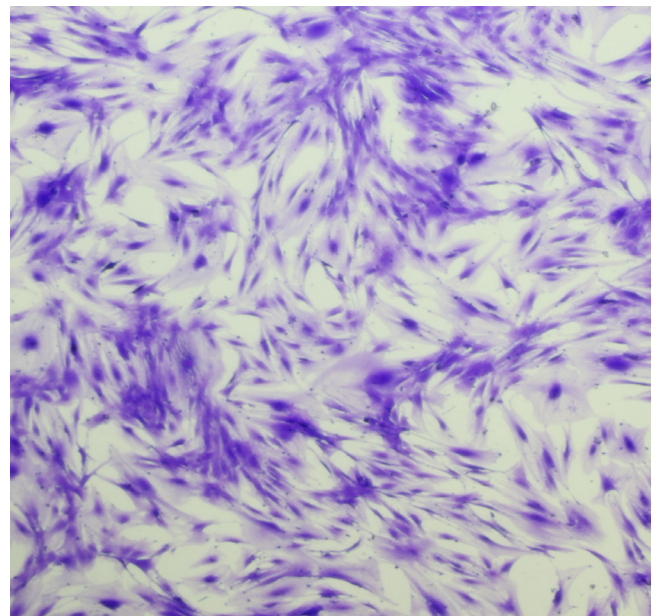
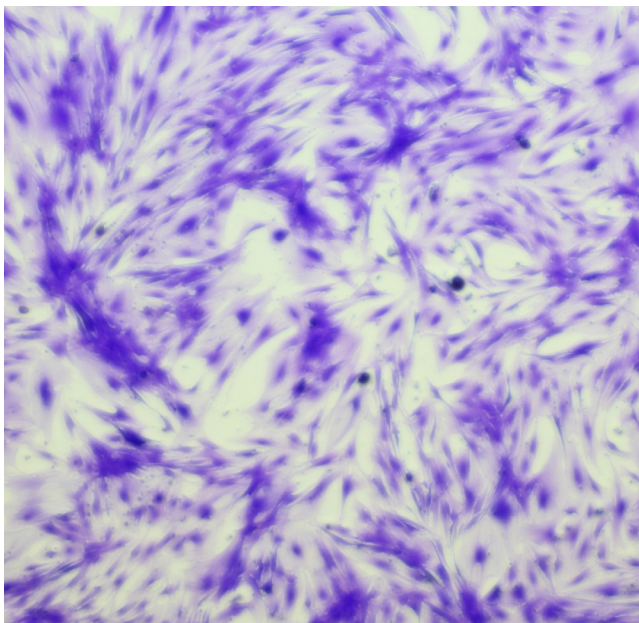


Figure 2. Cellular Metabolism of **ACB Yerba Santa Glycoprotein PF**- treated fibroblasts expressed in terms of percent of control.

In this study, **ACB Yerba Santa Glycoprotein PF** was tested to evaluate its effects on the viability of normal human dermal fibroblasts (NDHF). At concentrations of both 0.1% and 0.01%, **ACB Yerba Santa Glycoprotein PF**, nor the preservatives contained therein exhibited any inhibition of cell viability. It can therefore be concluded that at normal use concentrations, **ACB Yerba Santa Glycoprotein PF** is not cytotoxic. The data obtained from this study met criteria as a valid assay and the controls performed as anticipated.



As seen above in the microscopic cellular images, **ACB Yerba Santa Glycoprotein PF** had no significant effect on cellular viability. Additionally, no effect on cellular metabolism was witnessed either.

ACB Yerba Santa Glycoprotein PF

ACB Yerba Santa Glycoprotein PF was tested in order to quantify a new anti-pollution standard concerning common pollutants that are $>2.5\mu\text{m}$ in size. **ACB Yerba Santa Glycoprotein PF** was applied to the skin and then contaminated with a premeasured amount of activated charcoal ($>2.5\mu\text{m}$ size particles). It was then washed using a controlled amount of water in order to quantify **ACB Yerba Santa Glycoprotein PF's** ability to inhibit these particles from remaining on the skin. These results were compared against an untreated control and can be seen below, translated from a histogram denoting color change (lower is better, indicates skin tone).

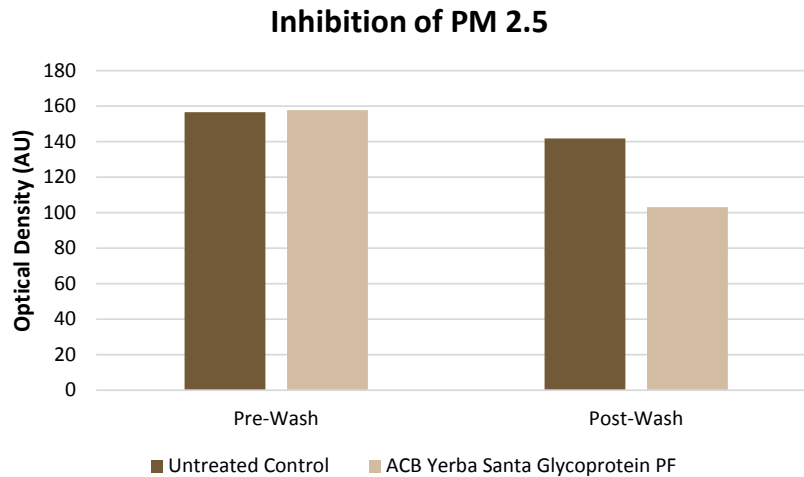


Figure 3. Ability to inhibit accumulation of particles $>2.5\mu\text{m}$ in size on the skin.

It can be clearly seen in Figure 3 that **ACB Yerba Santa Glycoprotein PF** is able to effectively prevent the deposition of invasive PM 2.5 particles into the skins fine lines and wrinkles. While in the untreated control group, it is shown that these particles are able to easily penetrate these lines, and remain there even after thorough washing.

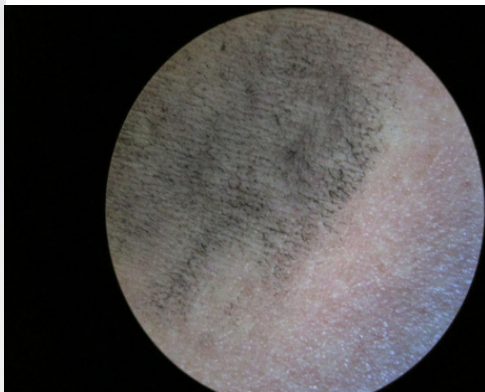


Figure 4. **ACB Yerba Santa Glycoprotein PF** pre-wash.

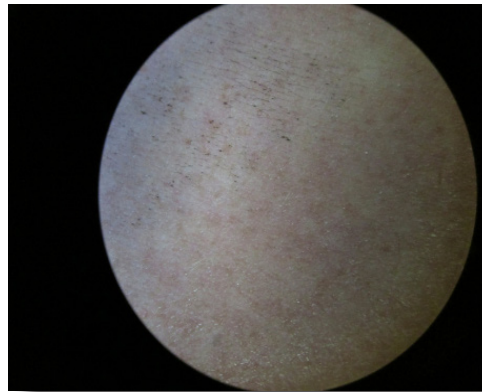


Figure 5. **ACB Yerba Santa Glycoprotein PF** post-wash.

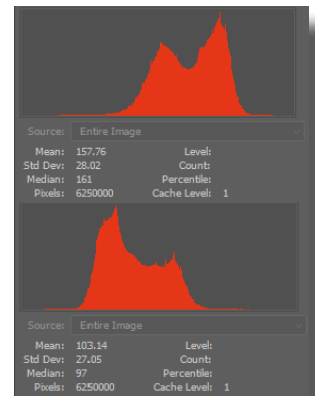


Figure 6. **ACB Yerba Santa Glycoprotein PF** Histograms.



Figure 7. Untreated control pre-wash.

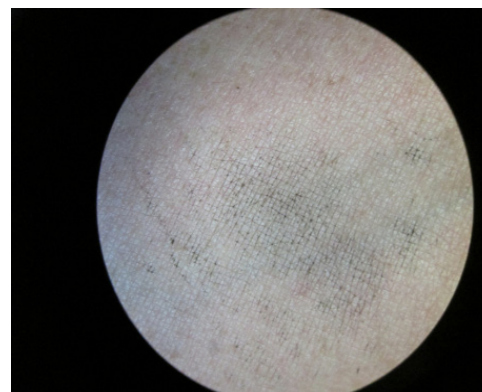


Figure 8. Untreated control post-wash.

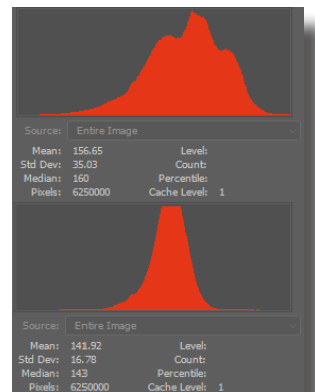


Figure 9. Untreated Histograms.

ACB Yerba Santa Glycoprotein PF

Improvement in Moisturization

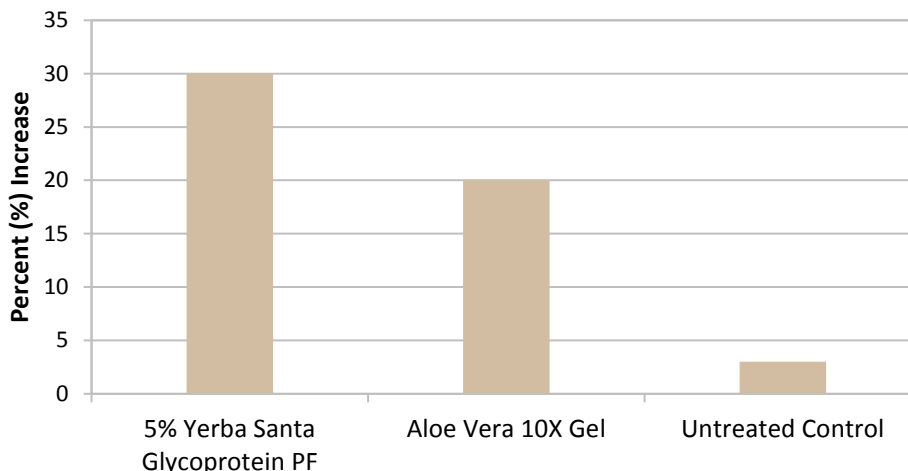


Figure 10. Improvement in Moisturization when using **ACB Yerba Santa Glycoprotein PF**.

Yerba Santa is capable of achieving a moisturizing effect via hydrogen bonding of water by its glycoprotein components. **ACB Yerba Santa Glycoprotein PF** imparts moisturization and soothing properties, for skin and hair

References

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- 2) Reichelt et al. 2010. Journal of Agricultural and Food Chemistry. Bisprenylated Benzoic Acid Derivatives from Yerba Santa (Eriodictyon spp.) Using Sensory-Guided Fractionation. 58(3): 1850-1859
- 3) Liu et al. 1992. Journal of Natural Products. Isolation of Potential Cancer Chemopreventive Agents Eriodictyon californicum. 55(3): 357-363
- 4) Ley et al. 2005. Journal of Agricultural and Food Chemistry. Evaluation of Bitter Masking Flavanones from Herba Santa (Eriodictyon californicum). 53(15): 6061-6066