

# AC Biopolymer Chia PF



tired of oily skin?  
take control! **sebum control!**  
film former + antioxidant protection  
perfect for problem skin

## BACKGROUND

Tired of oily skin? The clogged pores, the over-drying, the constant upkeep? The key to a low maintenance cosmetic regimen is eliminating the root of these time consuming problems. There are three common ways products address sebum<sup>1</sup>: 1) Strip the skin with alcohol, resulting in a rebound effect that causes the skin to go into sebum producing overdrive, 2) Powder absorption, resulting in a less oily aesthetic, but clumped make up and clogged pores, yuck! 3) Biochemically blocking the formation of sebum on the skin, leaving the skin dried and unattractive.

Our skin and scalp naturally produce sebum which is known to clog pores and cause build-up on our face and in our hair. Excess oil causes hair to lack luster and skin to appear greasy. Sebum also causes the color of foundation and other make-up to shift over time. The best way to combat these problems is by controlling the production of oil<sup>2</sup>, not by ridding the skin of sebum. Sebum provides the skin with a protective barrier, functioning as a film former to seal in moisture.

## SCIENCE

**AC Biopolymer Chia PF** is a modified protein with a lipid moiety that disrupts the surface tension of sebum on the skin by naturally binding to excess sebum. The product combines the properties of oil absorbency in a water-dispersible polymer helping reduce the appearance of sebum on the skin and simultaneously preventing dry skin. **AC Biopolymer Chia PF** contains a water soluble backbone that acts as a film former which causes the polymer to plate out on the skin. The alkyl sulfonate moieties change the contact angle of the sebum that is present on the skin. This change forces the sebum to exist as distinct droplets instead of as a film. The inclusion of chia provides conditioning and moisture retention benefits to keep the skin from becoming overly dry.

**Code Number: 21005PF**

**INCI Name:** Coconut Acid & Salvia  
Hispanica Seed Extract

**INCI Status:** Conforms

**REACH Status:** Complies

**CAS Number:** 61788-47-4 & 93384-40-8

**EINECS Number:** 262-978-7 & 297-250-8

**Origin:** Botanical

**Processing:**

GMO Free

No Ethoxylation

No Irradiation

No Sulphonation

**Additives:**

Natural Antimicrobial: Leuconostoc/  
Radish Root Ferment Filtrate

Preservatives: None

Antioxidants: None

Other additives: None

**Solvents Used:** Water

**Appearance:** Opaque Liquid

**Soluble/ Miscible:** Water Soluble

**Microbial Count:** <100 CFU/g,  
No Pathogens

**Suggested Use Levels:** 0.5 - 5.0%

**Suggested Applications:**

Sebum Control, Problem Skin,  
Film Former

## Benefits of AC Biopolymer Chia PF:

- Sebum Control
- Alternative Approach for Oily Skin
- Ideal for Problem Skin
- Film Former

# AC Biopolymer Chia PF

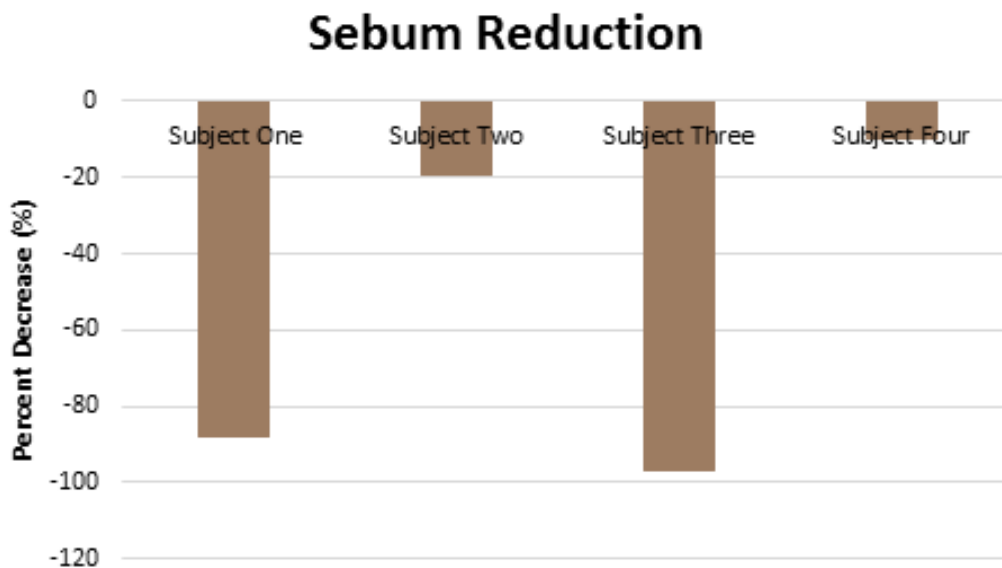
## BENEFITS

**AC Biopolymer Chia PF** is a game changer; this product capitalizes on the health benefits of chia protein while a sebum controlling agent changes the contact angle of the sebum on the skin. **AC Biopolymer Chia PF** is a modified protein with a lipid moiety that disrupts the surface tension of sebum on the skin by naturally binding to excess sebum. **AC Biopolymer Chia PF** can be used as an ingredient in various cosmetic and personal care products for sebum control and enhancing brand differentiation.

## EFFICACY DATA

This modified protein with a lipid moiety disrupts the surface tension of sebum on the skin by naturally binding to excess sebum. The product combines the properties of oil absorbency in a water-dispersible polymer helping reduce the appearance of sebum on the skin and simultaneously preventing dry skin. Additionally, the product contains a water soluble backbone that acts as a film former which causes the polymer to plate out on the skin. The alkyl sulfonate moieties change the contact angle of the sebum that is present on the skin. This change forces the sebum to exist as distinct droplets instead of as a film.

An *in-vivo* study was conducted to evaluate the ability of **AC Biopolymer Chia PF** to reduce facial sebum when incorporated into a mass market liquid foundation. Results indicate that this material is capable of significantly decreasing sebum, a common problem, over time. As evidenced in the Figure 1, **AC Biopolymer Chia PF** was effective at decreasing sebum for all participants. The percent decrease exhibited was relative to both the subject's self-assessment and the base sebum reading. **AC Biopolymer Chia PF** can be used as a means to mattify without dehydrating the skin to offer a smooth, sebum free all day complexion.

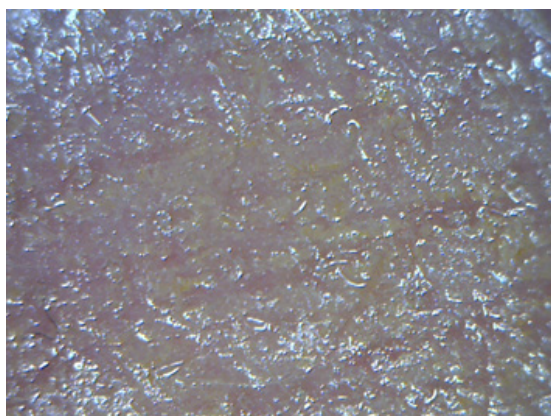


**Figure 1.** Reduction in Sebum over an 8 hour period.

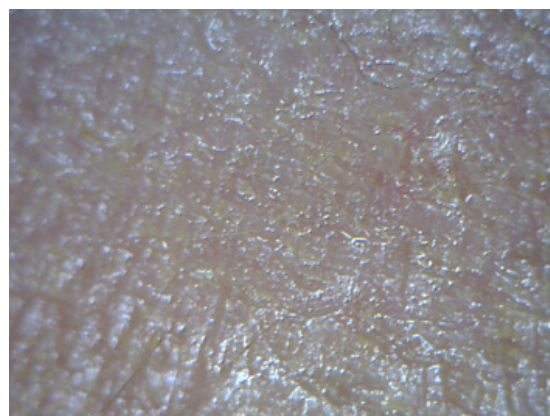
# AC Biopolymer Chia PF

An *in-vivo* study was conducted to evaluate the ability of **AC Biopolymer Chia PF** to reduce color shift in a mass market liquid foundation. Results indicate that this material is capable of significantly decreasing foundation color shift over time. Color shift is a common issue which occurs when foundation oxidizes on the skin and alters the color of the foundation throughout the day. This is caused by the interaction of facial sebum and foundation.

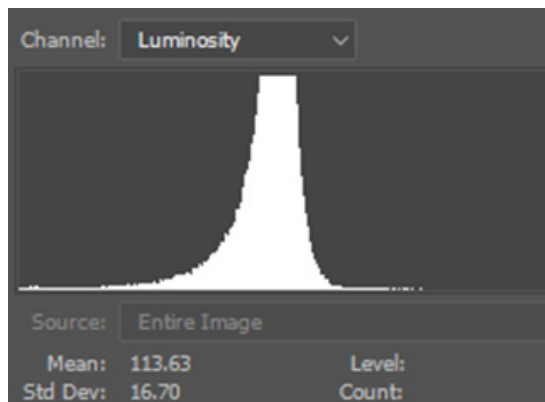
Figures 2 and 3 depict the comparison of the control forehead at eight hour wear time to the experimental forehead at 8 hour wear time. In the control photo, it is clear that the color has settled into fine lines, gathered, and oxidized to a slightly darker shade. The experimental side elicits a non-settled foundation, reduced visible sebum, and even color on the surface. The histograms depicted in Figures 4 and 5, in turn, quantify the photos based on color change. Over an eight hour wear period, the color is more evenly distributed and present compared to the control. **AC Biopolymer Chia PF** controls facial sebum, the factor in color shift, ensuring the foundation stays true to color throughout the wear time.



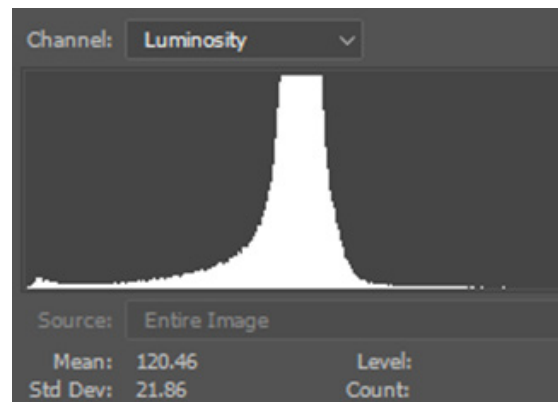
**Figure 2.** Control forehead at 8 hours wear time (Subject 2).



**Figure 3.** Experimental forehead at 8 hours wear time (Subject 2).



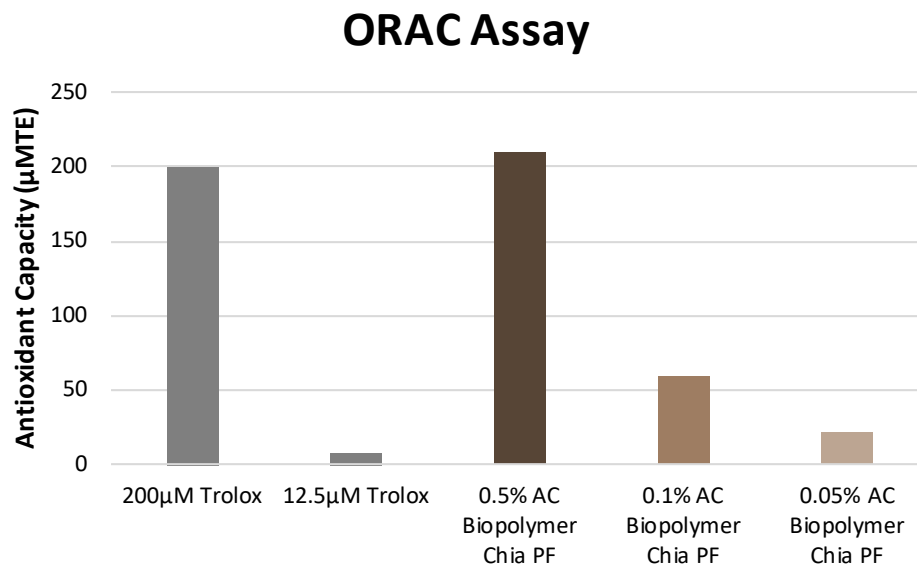
**Figure 4.** Histogram Control forehead at 8 hours wear time (Subject 2).



**Figure 5.** Histogram Experimental forehead at 8 hours wear time (Subject 2).

# AC Biopolymer Chia PF

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. As seen in Figure 7, the antioxidant capacity of **AC Biopolymer Chia PF** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent.



**Figure 6.** Antioxidant Capabilities.

As shown in Figure 6, **AC Biopolymer Chia PF** exhibited greater antioxidant activity than 300µM Trolox®. The antioxidant capacity of **AC Biopolymer Chia PF** increased as the concentration increased. As a result, we can assure that its ability to minimize oxidative stress is dose dependent. Maximizing the antioxidant capacity on a cellular level allows for ROS to be dealt with at a rate that provides protection from cellular damage.

Our pollution protection assay was conducted to assess the ability of **AC Biopolymer Chia PF** to provide immediate protection from carbon air pollution. The test material consisted of 2.0% **AC Biopolymer Chia PF** in a Cetaphil Moisturizing for All Skin Types. For added perspective, images of an untreated test site and a site treated with Cetaphil Moisturizing for All Skin Types were recorded.

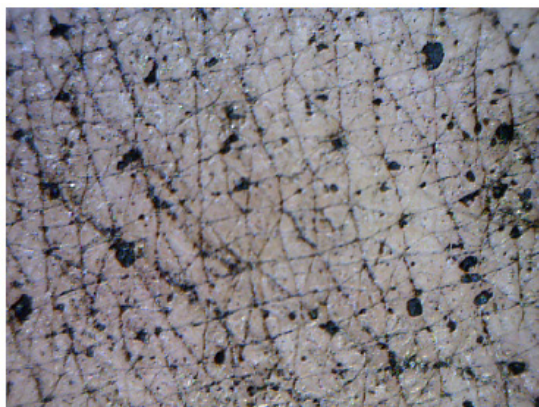
All subjects were asked to apply 2 mg of each test material, experimental, control, and untreated on their volar forearms. Lotions were allowed to dry completely before the addition of 5 mg of micronized charcoal. The micronized charcoal used has a particle size of 2.5 microns (PM 2.5) or less that mimics the small particulates found in polluted air. Each treatment area was washed five times using deionized water. Images were taken pre- and post-wash using a dissecting microscope.

Color analysis was conducted on the images and results depicted in optical density values and pigmentation histograms. Images were inverted and standard coloration values recorded and assigned absorbance units. The lower the mean optical density value the better protection against carbon particle embedment or PM 2.5 inhibition.

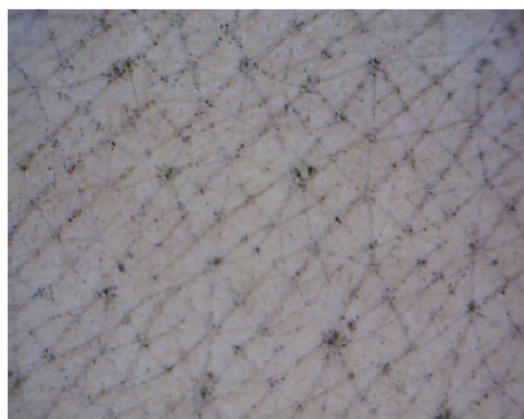
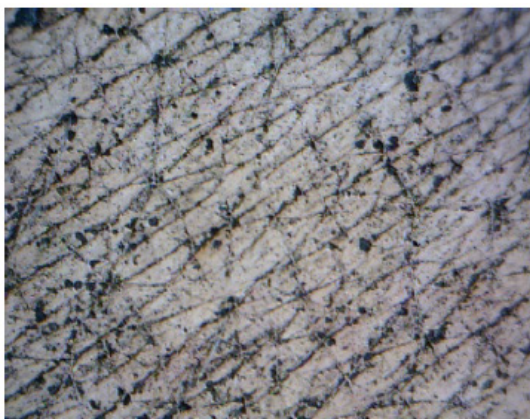


# AC Biopolymer Chia PF

It can be clearly seen in Figure 7 that **AC Biopolymer Chia PF** is able to effectively prevent the deposition of invasive PM 2.5 particles into the skin's 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. Therefore, **AC Biopolymer Chia PF** was successful at reducing adhesion of pollution particles that can lead to skin aging and dullness.



**Figure 7.** AC Biopolymer Chia PF Images. Pre-wash (left) and Post-wash (right).



**Figure 8.** Untreated Images. Pre-wash (left) and Post-wash (right).

References:

- 1) Abramovits, W., Gonzalez-Serva, A. 2000. *Dermatologic Clinics. Sebum, Cosmetics, and Skin Care.* 18(4):617-20
- 2) Cheng et al. 2009. *Journal of Cosmetic Science. Moisturizing and anti-sebum secretion effects of cosmetic application on human facial skin.* 60:7-14