

AC Dermal Respiratory Factor Advanced PF



Global, Metabolic
Stimulant
 enhances cell health
 at every level
 promotes collagen synthesis
 yeast derivative
 soothing formula
 perfect for wound healing

BACKGROUND

A global, metabolic stimulant, **AC Dermal Respiratory Factor Advanced PF** provides wound healing properties while promoting collagen synthesis. This offers a material truly capable of increasing cellular metabolism at every level while also having the ability to reduce inflammation and rejuvenate the complexion.

Commercially, Live Yeast Cell Derivatives (LYCD) has been used for several distinct purposes, pointing to the overall utility of this material in relationship to the treatment of living organisms. The first widespread use of LYCD began far from the Cosmetic arena. American Home Products utilized LYCD as the active in the well-known anti-hemorrhoidal product, Preparation H®. Legend has it that some adventurous fashion models brought about the crossover into cosmetics. Having begun to manifest one of the most visible symptoms of sleep deprivation, the models began to dab LYCD containing creams on the bags under their eyes. As would be expected the swelling subsided, the practice spread by word of mouth, and a core Cosmetic raw material was born.

In North America, South America, and Europe LYCD is primarily used to stimulate oxygen consumption, combat irritation, or as, what could probably be best termed, a cosmetic potentiator.

Code Number: 20219PF

INCI Name: Water & Saccharomyces
 Lysate Extract

INCI Status: Conforms

REACH Status: Complies

CAS Number: 7732-18-5 & 8013-01-02

EINECS Number: 231-791-2 & 232-387-9

Origin: Yeast

Processing:

GMO Free

No Ethoxylation

No Irradiation

No Sulphonation

Additives:

Natural Antimicrobial:

Lactobacillus Ferment

Preservatives: None

Antioxidants: None

Other additives: None

Solvents Used: Water

Appearance: Hazy Yellowish Liquid

Soluble/ Miscible: Water Soluble

Ecological Information:

90.7% Biodegradability

Microbial Count: < 100CFU/g,

No Pathogens

Suggested Use Levels: 0.5 - 5.0%

Suggested Applications: Antioxidant,
 Wound Healing, Collagen Synthesis

Benefits of AC Dermal Respiratory Factor Advanced PF:

- Global Metabolic Stimulant
- Efficacious Soothing Benefits
- Promotes Wound Healing
- Stimulates Collagen Production

AC Dermal Respiratory Factor Advanced PF

In Asia, LYCD is primarily used to increase the translucency of skin. Translucency is especially important for whitening applications. The idea being that if skin is more translucent it is much easier to appreciate the evenness of skin-tone achieved with whitening products. Many major cosmetic companies such as Pacific, Shiseido, Max Factor, Avon, Coreana, and Kanebo all utilize yeast extracts as a core raw material in their skin care products.

Over 600 species of yeast exist with the most well known yeast being *Saccharomyces cerevisiae*. *Saccharomyces cerevisiae* better known as bakers or brewer's yeast, is cherished for its fermentation abilities. Within the past 30-40 years the wonders of yeast have finally been recognized. Since yeast cells are very similar to human cells in composition and structure, they make for a perfect palate for research scientists.

Like a human cell, a yeast cell is a true eukaryote. It has a nucleus that contains the nucleoli and chromosomes, which are separated from the cytoplasm by a nuclear membrane. Yeast cells have 17 chromosomes, while human cells have 23 chromosomes, but their structures are very similar. Yeast also has two genders and reproduces with cells that are similar to humans' means of fertilization. In 1996, the yeast cell became the first living organism to have a completely mapped genome.

In 1896, German chemist Eduard Büchner discovered that the fermentation enzymes found in yeast cells would remain active even after extraction from the cells as long as they were not boiled. This discovery soon paved way for the biochemical process of fermentation as well as the rising of bread in the food industry.

SCIENCE

The mechanism by which LYCD reduces irritation has only recently become clear with the increased focus on the field of Heat Shock Proteins (HSP). When cells are subject to stress, be it physical or emotional, they produce a class of proteins that either duplicate functions disabled by the stress, or protect the cell against additional stress. It is speculated that one or more of the components of LYCD is actually a HSP. Given the similarity between yeast and human cells it is probable that when applied the HSP(s) help to reduce, or reverse the actual stress presented to the human cell.

BENEFITS

A global, metabolic stimulant, **AC Dermal Respiratory Factor Advanced PF** promotes wound healing properties while increasing collagen synthesis, truly increasing cellular metabolism at every level while also having the ability to reduce inflammation.

Utilizing the work of Dr. George Sperti and the more recent working knowledge of the yeast cell, we have developed a yeast derived extract for topical application, **AC Dermal Respiratory Factor Advanced PF**. Produced by prompting live yeast cells to secrete synergistically active compounds, by striking the yeast cells with specific wavelengths of UV radiation, we then isolate and extract the active. This process utilizes biofermentation and various filtration techniques, such as tangential flow filtration, resulting in an extraction that is responsible for an increase in such phenomena as enhanced cellular respiration, cellular proliferation and improved cellular metabolism.

Due to their efficacious soothing properties, and metabolic enhancing benefits, LYCD are widely used in the cosmetic and personal care industries. LYCD is produced when live yeast cells are exposed to stress, such as UV radiation. This yields a material which has shown to stimulate cellular metabolism by promoting the increase of cellular energy, while also helping minimize irritation.

When added to cosmetic applications, **AC Dermal Respiratory Factor Advanced PF** is capable of soothing the skin and enhancing cellular function. As an added benefit, this product can also help optimize keratinization to further stimulate the health of the skin and/or scalp. Help your skin breathe easy and reap the benefits of a glowing, youthful aesthetic.

EFFICACY

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 **AC Dermal Respiratory Factor Advanced PF**. As shown in Figure 1, **AC Dermal Respiratory Factor Advanced PF** exhibited antioxidant activity comparable to 100µM Trolox®. The antioxidant capacity of **AC Dermal Respiratory Factor Advanced PF** increased as the concentration increased, as a result we can assure that its ability to minimize oxidative stress is dose dependent.

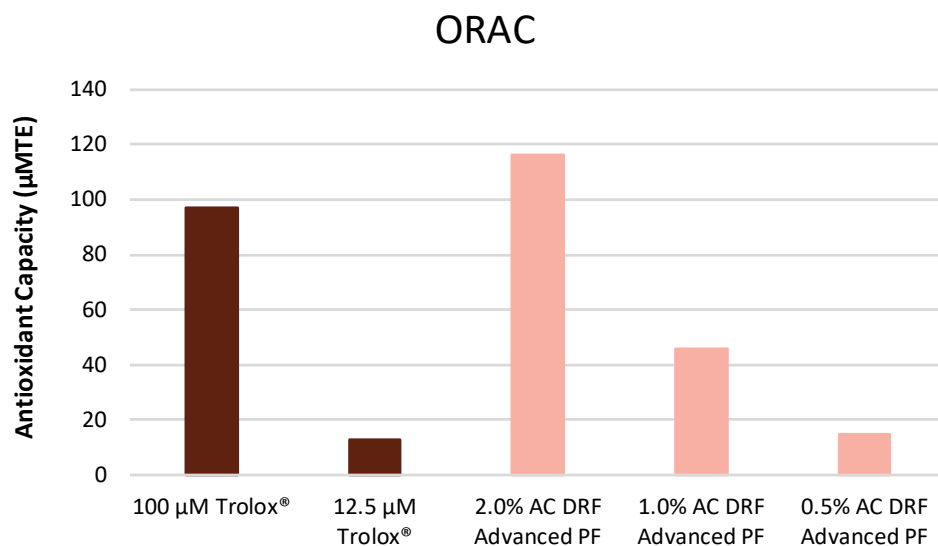


Figure 1. Antioxidant capacity.

An *in-vivo* study was conducted over four weeks to evaluate the effect on skin density of **AC Dermal Respiratory Factor Advanced PF**. 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.

Ultrasound skin imaging is based on measuring the acoustic response after an acoustic pulse is sent into the skin. The energy of the acoustic pulse is low and will not affect the skin in any way. When the acoustic pulse is emitted and hits different areas of the skin, part of the pulse will be reflected and part will be transmitted further into the skin. The reflected signal travels back and is picked up by the ultrasound transducer. After processing the signal, a cross-sectional image appears on the screen. This image represents an intensity, or amplitude, analysis of the signals.

Following initial measurements, all subjects were asked to apply 2 mg of each test material on their volar forearms. Measurements were taken immediately after application of test materials and then weekly for 4 weeks. The test material consisted of 2% **AC Dermal Respiratory Factor Advanced PF** in a base lotion. As evidenced in a 4 week efficacy study of AC Dermal Respiratory Factor Advanced PF on skin, skin density was improved by 9.50% after one week and by 17.39% after 4 weeks when compared to the untreated control. **AC Dermal Respiratory Factor Advanced PF** has a strong positive effect on skin's density when used at recommended use levels.

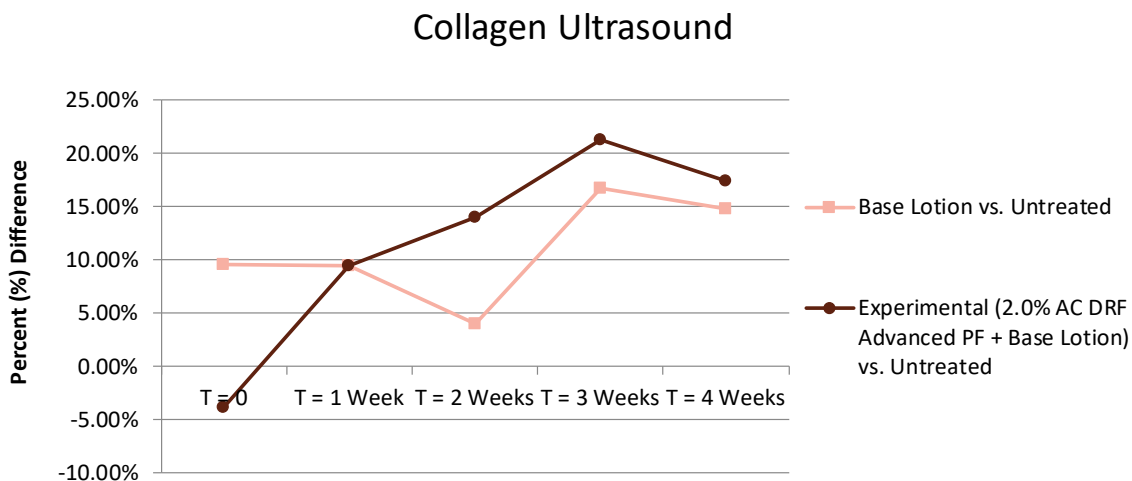


Figure 2. Ultrasound results.

An *in-vitro* study was conducted to measure the synthesis of hyaluronic acid utilizing **AC Dermal Respiratory Factor Advanced PF**. Hyaluronic acid is capable of improving epidermal elasticity by maintaining the water content of the intercellular matrix of epidermal tissue. An ELISA assay was used to measure the synthesis of hyaluronic acid by cultures of human keratinocytes. The keratinocytes were treated with **AC Dermal Respiratory Factor Advanced PF** at 0.5% and 1%. The results indicate that **AC Dermal Respiratory Factor Advanced PF** is capable of increasing the percent concentration of hyaluronic acid by approximately 42% in comparison to the control. Therefore, **AC Dermal Respiratory Factor Advanced PF** may be useful for retaining epidermal moisture.

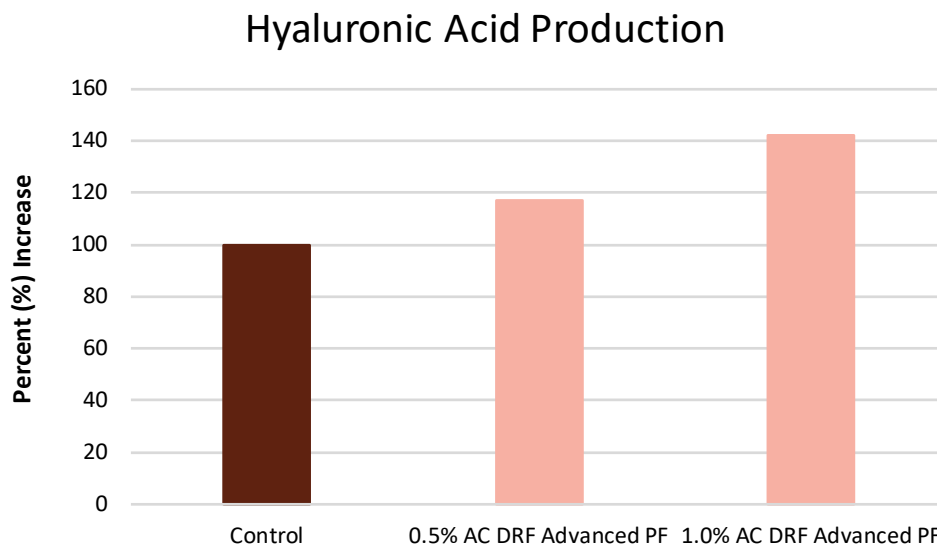


Figure 3. Hyaluronic acid production.

AC Dermal Respiratory Factor Advanced PF

An *in-vivo* study was conducted over a period of three weeks to evaluate the moisturization benefits of **AC Dermal Respiratory Factor Advanced PF**. 10 M/F subjects between the ages of 23-45 participated in the study. Results indicate that this material is capable of significantly increasing moisturization compared to the control.

A Dermalab Corneometer was used to measure the moisture levels on the subject's volar forearms. The Corneometer is an instrument that measures the amount of water within the skin. The presence of moisture in the skin improves conductance therefore results in higher readings than dry skin. Therefore, the higher the levels of moisture, the higher the readings from the Corneometer will be. Baseline moisturization readings were taken on day one of the study.

Following initial measurements, all subjects were asked to apply 2 mg of each test material on their volar forearms. Measurements were taken immediately after application of test materials and then weekly for 4 weeks. The test material consisted of 2.0% **AC Dermal Respiratory Factor Advanced PF** in a base lotion.

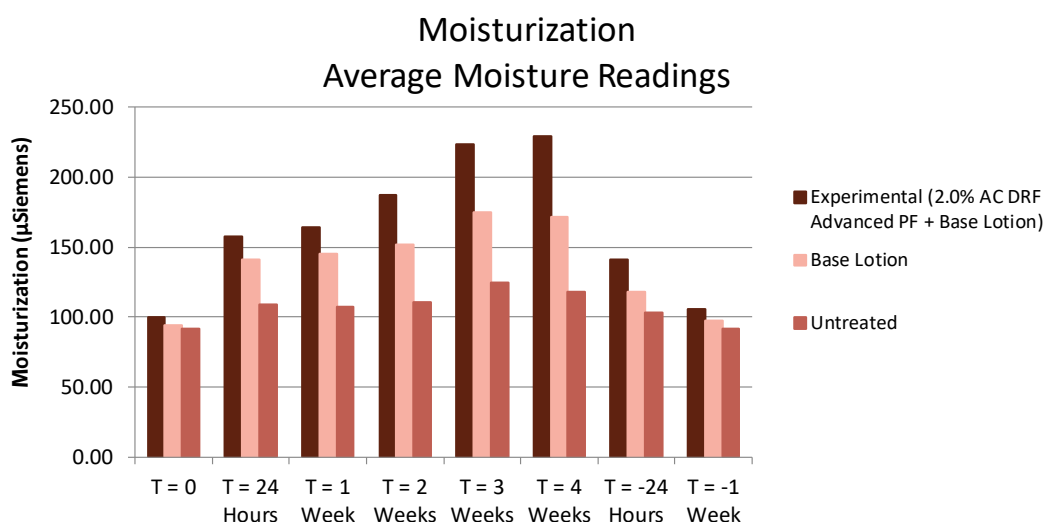


Figure 4. Average increase in moisturization per test site.

An *in-vivo* study was conducted over a period of four weeks to evaluate the ability of **AC Dermal Respiratory Factor Advanced PF** to enhance barrier function through the reduction in Transepidermal Water Loss (TEWL). Results indicate that this material is capable of efficiently reducing TEWL which allows moisture retention. 10 volunteers M/F between the ages of 23 and 45 and who were known to be free of any skin pathologies participated in this study.

A Dermalab Combo was used to measure TEWL on the subject's volar forearms. The instrument consists of a probe that is based upon the vapor gradient with an open chamber. This open chamber design maintains the free natural evaporation from the skin without interfering with the environment over the measurement area. Baseline TEWL readings were taken on day one of the study.

Following initial measurements, all subjects were asked to apply 2 milligrams of each test material on their volar forearms. Measurements were taken immediately after application of the test materials and then weekly for four weeks. The test material consisted of 2.0% **AC Dermal Respiratory Factor Advanced PF** in a base lotion. When compared to the base cream **AC Dermal Respiratory Factor Advanced PF** was shown to decrease transepidermal water loss by 29.24% and by 50.00% when compared to the untreated control after four weeks. Results indicate that **AC Dermal Respiratory Factor Advanced PF** is capable of reducing TEWL.

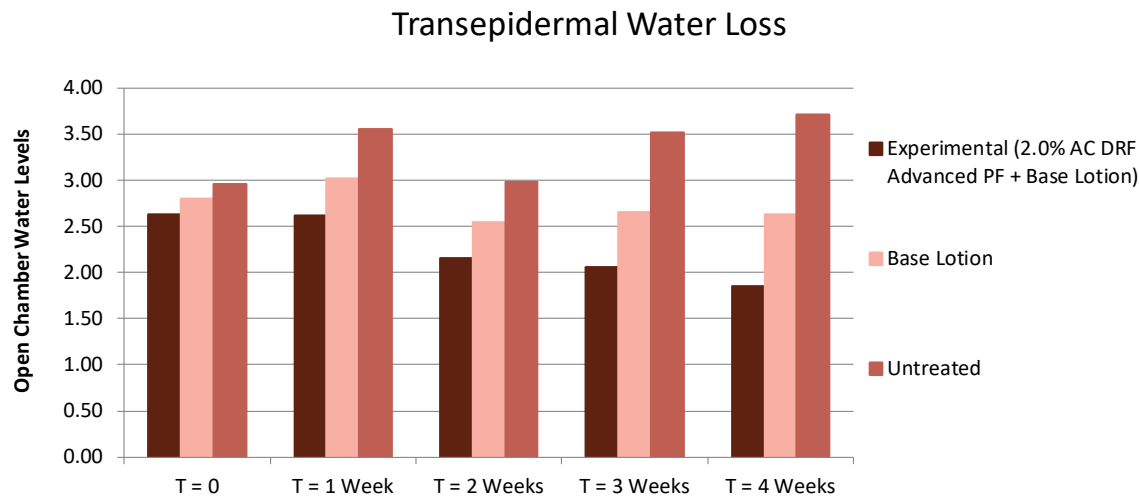


Figure 5. TEWL measurements taken at individual test sites.

An *in-vitro* study was conducted to assess the wound healing properties of **AC Dermal Respiratory Factor Advanced PF**. Wounded tissue begins a complex and structured series of events in order to repair the damaged region. Some of these events include upregulation of angiogenic factors causing increased vascularization, increased deposition of extracellular matrix, and increased cell proliferation. The wound healing process begins as cells polarize toward the wound, initiate protrusion, migrate, and close the wound area. These processes reflect the behavior of individual cells as well as the entire tissue complex.

AC Dermal Respiratory Factor Advanced PF at a 5.0% concentration was able to increase cell migration and wound healing compared to our negative control. **AC Dermal Respiratory Factor Advanced PF** was able to increase cell migration and close the scratch at a rate comparable to the positive control. The mechanisms of the cells in the *in-vitro* scratch assay mimic the mechanisms seen in *in-vivo* wound healing therefore we can be assured that our results are translatable outside the laboratory. **AC Dermal Respiratory Factor Advanced PF** was designed to increase cellular respiration, metabolism, and collagen synthesis. With the present study, we can also be confident that this product has healing abilities and cell proliferation properties.

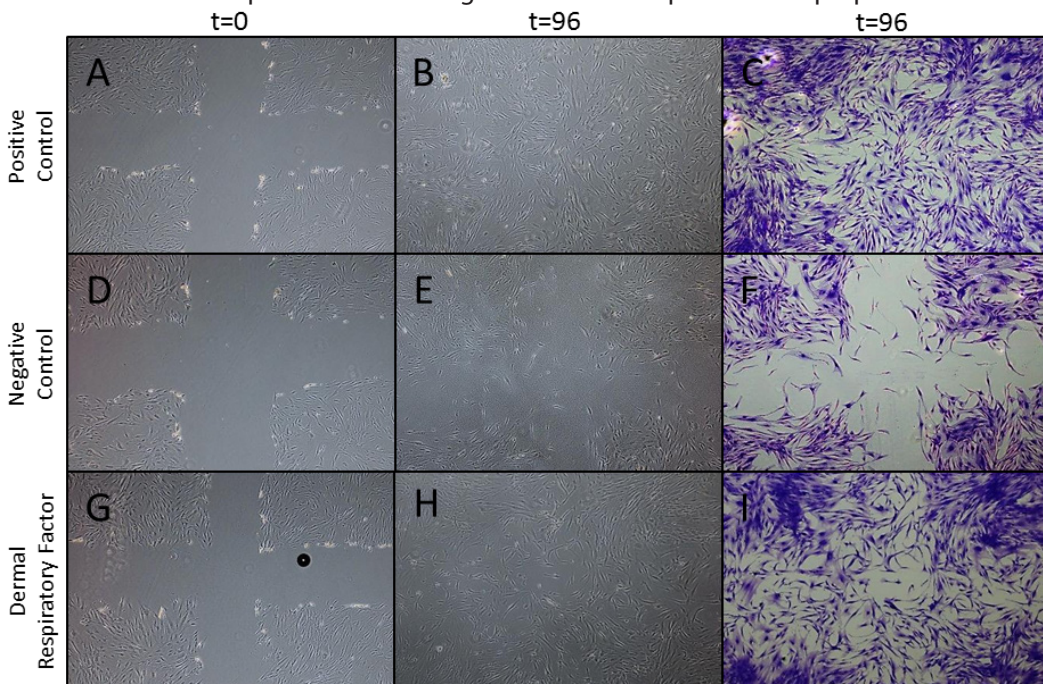


Figure 6. Images at t=0 hours (A, D, G) and t=96 hours (B, E, H) for **AC Dermal Respiratory Factor Advanced PF**, positive control, and negative control. At experiment completion (t=96 hours), cells were fixed in paraformaldehyde and stained with crystal violet (C, F, I).

AC Dermal Respiratory Factor Advanced PF

A *in-vivo* protocol was developed to evaluate the ability of AC Dermal Respiratory Factor Advanced PF to reduce the discomfort produced by over-exposure to UV radiation. Twenty panelists (m/f 27-45) were asked to evaluate two lotions containing either **AC Dermal Respiratory Factor Advanced PF** (2.8% w/w) or Benzocaine (0.5% w/w). The panelists were asked to apply the products immediately following overexposure to the light and to record their immediate perception as well as their perception after two hours. The product was evaluated for reduction in erythema and reduction in sunburn pain. The results were graded on a scale of 1 to 5 with 5 being complete reduction. Application continued for 1 week, with the product being applied twice per day.

Increase in Soothing Benefits

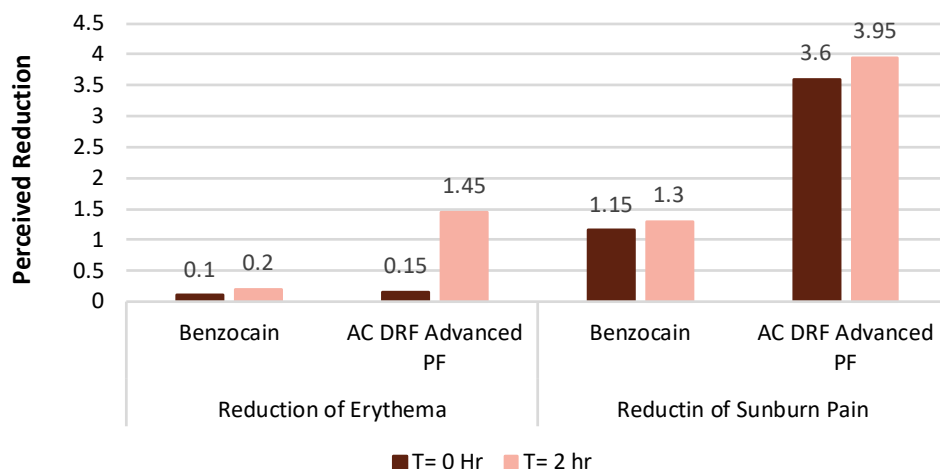


Figure 7. Comparison in the reduction of erythema and sunburn pain.

Topical application of **AC Dermal Respiratory Factor Advanced PF** is capable of producing consumer perceivable reductions in erythema and discomfort resulting from overexposure to light. It was also noted among those panelists complying with the one-week application period that there was a marked reduction in skin peeling to areas where lotion containing **AC Dermal Respiratory Factor Advanced PF** was applied.