



# Arbor Organics

## **NOP Organic Agave Ferment Code: A40002**

As global warming and ozone layer depletion increase in severity, skin needs extra protection from environmental dangers. The agave plant has expertly adapted to its harsh desert climate by developing an extraordinarily efficient water storage system and by stabilizing its cell membranes against stressors that may otherwise destroy it. **NOP Organic Agave Ferment** utilizes the agave's defense mechanisms and effectively moisturizes the skin, reduces sunburn pain, and stimulates collagen synthesis.



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Trade Name:	NOP Organic Agave Ferment
Code:	A40002
INCI:	Saccharomyces/Agave Americana Leaf Ferment Filtrate
Status:	Conforms
Suggested Use Level:	1 - 10%
Suggested Applications:	Environmental Protection, Collagen Synthesis, Sunburn Relief, Moisturization

Ozone layer depletion, heat-induced injuries and severe UV damage to human skin: these are only three of a countless number of consequences caused by global warming. Factors such as these have resulted in an urgent need for skincare products that offer an extra layer of protection against a precarious environment. When searching for a natural plant source to bolster skin defenses against the perils of global warming, one should look no further than agave. The succulent plant utilizes an extraordinary defense system to protect itself while thriving in harsh desert conditions that grow more callous as global warming steadily advances. Arbor Organics' **NOP Organic Agave Ferment** incorporates the mechanisms employed by the agave in a Certified Organic ingredient to protect the skin from damage caused by increasingly intense and harmful surroundings.

Depletion of the ozone layer is an instant and hazardous environmental factor that directly results in harm to the skin. This gaseous layer is concentrated in the stratosphere, and it protects the earth from UV radiation by filtering out UV-B rays. This filtration is vital to human health, because UV-B radiation damages plants and animals' DNA, which can lead to skin cancer, eye disease, and suppression of the immune system.<sup>1</sup> As the earth continually grows warmer due to greenhouse gases trapping heat near the earth's surface, the stratosphere receives less heat distribution, yielding lower temperatures in the ozone layer and accelerating ozone depletion.<sup>2</sup> The agave's remarkable ability to shield itself from environmental stressors such as these makes it an ideal natural defender against the sun and extreme heat.

Through natural selection, organisms have learned to adapt to unfavorable conditions to survive in their environment. The agave has had to develop a tolerance to extreme temperature fluctuations. Generally speaking, to live in the desert organisms need to withstand searing heat from the sun during the day, and bone chilling temperatures at night. Desert-dwelling plants and animals face particularly arid conditions with a very limited water supply. The agave has adapted to thrive in such circumstances. It is resistant to fire, which is advantageous when living in hot and dry climates where other plants are prone to starting brush fires. The agave needs little moisture to survive and can withstand long periods of drought.<sup>4</sup> It is understood that the carbohydrates in the agave are capable of binding to water thus store it for later use.

Carbohydrates are often used in personal care products to increase hydration. Sugars are hygroscopic so they are capable of drawing moisture close to the skin where it is needed most.

Agave nectar contains high levels of fructose and glucose and also contains sucrose and polyfructosans.<sup>5</sup> In cosmetics, these sugars help to lock in moisture the same way they frugally store water reserves for the agave.

Fructose is also imperative in stabilizing cell membranes against environmental stressors. It has the ability to prevent hemolysis, while helping to maintain the integrity of cell membranes. Fructose directly influences the ion channel activity of cell membranes, restricting or increasing the flow of particular ions into and out of cells as needed. By maintaining the correct balance of ions and stabilizing the membrane itself, fructose protects cells from dangers that may otherwise destroy them, including but not limited to damage caused extreme sun exposure.<sup>6</sup>

The most common consequence of increased exposure to UV rays is of course sunburn, which is exemplified by erythema, pain and depending on the severity, blistering. **NOP Organic Agave Ferment** significantly reduces erythema and sunburn pain when applied to the skin. subjects were asked to evaluate two lotions containing either **NOP Organic Agave Ferment** (2.8% w/w) or Benzocaine (0.5% w/w), to apply the products immediately following overexposure to the sun and to record their immediate perceptions as well as their perception after two hours. Studies have shown that **NOP Organic Agave Ferment** is capable of immediately reducing sunburn pain, and subjects tested reported a continued reduction of pain over the course of several hours compared to benzocaine. **NOP Organic Agave Ferment** was also reported to reduce erythema after two hours where as benzocaine had little effect. Clearly this indicates that the product is effective for comforting sunburned skin.

Improvement in Sunburn Pain & Erythema

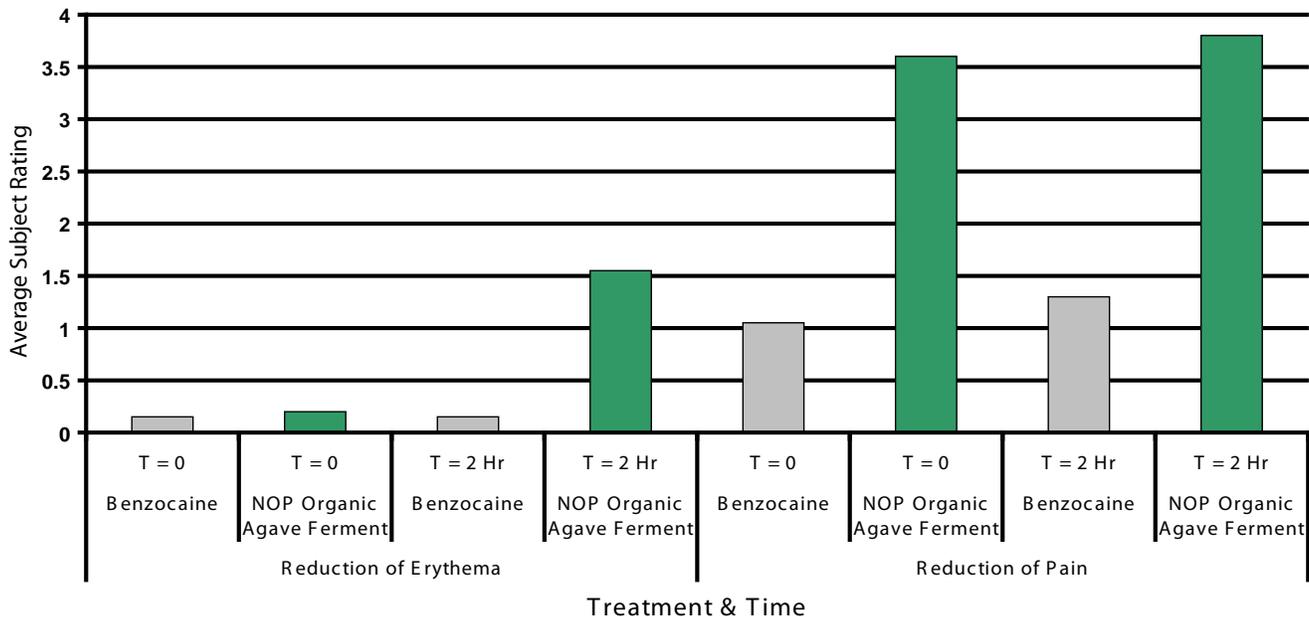


Table 2: Average Subject Ratings for Sunburn Pain & Erythema.

In terms of anti-aging benefits, **NOP Organic Agave Ferment** can also help maintain healthy skin by increasing collagen I synthesis. Collagen I is a major component of the dermis and provides structure and elasticity to the skin. When compared to the untreated control, **NOP Organic Agave Ferment** increased collagen I synthesis by 172%, resulting in healthier skin thus creating a stronger barrier of protection against UV damage.

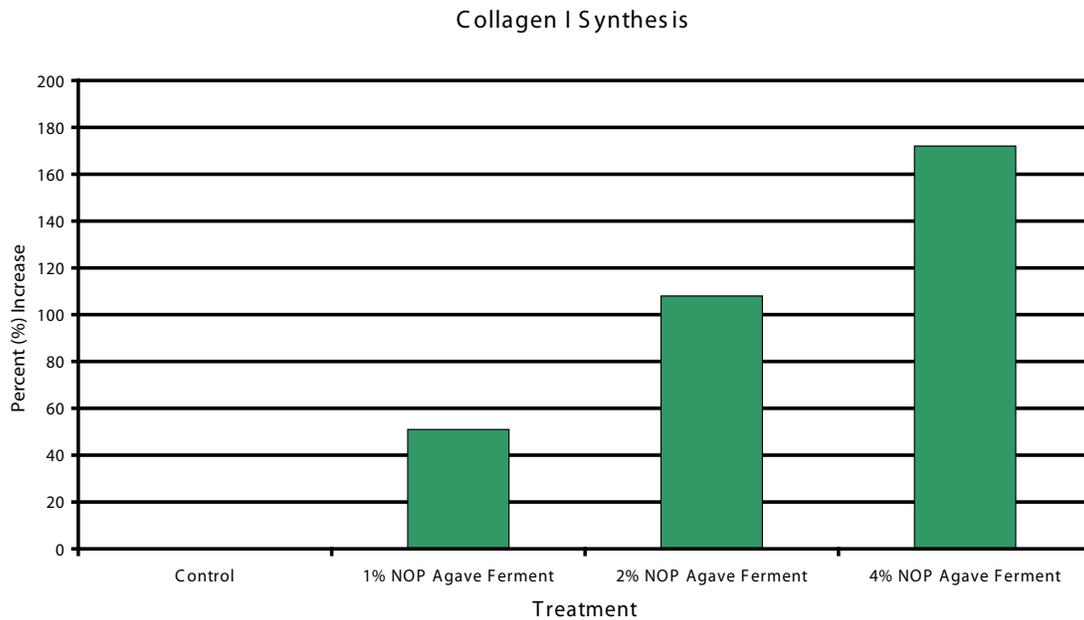


Table 1: Results for Increase in Type 1 Collagen Production.

**NOP Organic Agave Ferment** capitalizes on the moisture binding properties of agave nectar to maximize epidermal hydration while stimulating collagen synthesis for optimal anti-aging benefits. Between these benefits and the ability to stabilize cell membranes, we can help to overcome the wide array of environmental factors that are a detriment to the health and beauty of our skin.

References:

1. "Global Warming, the Ozone Layer, and Acid Rain". West Wales ECO Centre. <http://www.ecocentre.org.uk/global-warming.html>. 1996.
2. "Earth's Protection Shield is Being Destroyed-Ozone Depletion and Global Warming". Environmental Support Solutions. <http://www.ess-home.com/news/global-warming/ozone-depletion.asp>.
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5. Bhatia, I.S. and Srinivasan, M. "The Carbohydrates of Agave vera cruz Mill." Biochemical Journal. 55(2): 286-289. September 1953.
6. Galzigna, L., et al. "Some Effects of Fructose-1,6-Disphosphate on Rat Myocardial Tissue Related to a Membrane-Stabilizing Action". Cell Biochemistry and Function. 7: 91-96. 1989.