

# Effect of a new botanical extract based on the red algae, *Pikea robusta*, on *in vivo* reduction of surfactant-induced skin irritation.

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## Introduction

Through millions of years of evolution, organisms have developed various biochemical mechanisms to combat environmental pollutants and insure cell vitality.

Today, we exist under a constant barrage of damaging elements. Some are external and environmental; some are internal and result from natural metabolic processes. These processes result in the formation of dangerous free radical species that attack and destroy the cells of our bodies each and every day. Recently, interest has been paid to one such reactive oxygen species, nitric oxide, which is produced as a byproduct of enzymatic synthesis.

Nitric oxide ( $NO\bullet$ ) is directly related to the instigation of skin inflammation. It has been shown that a natural extract from the sea alga *Pikea robusta*, when tested *in vitro* is able to reduce the concentration of  $NO\bullet$  in cultured human keratinocytes. At 1%, the addition of the sea algae extract to a cell culture reduces the concentration of nitric oxide, a leading proponent of subclinical irritation, by nearly 80%.

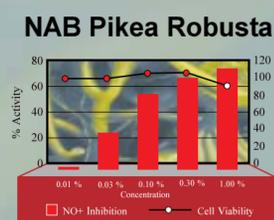
## Product Description

An extract of the sea algae species *Pikea robusta* (**NAB Pikea Robusta**) has been shown to inhibit the formation of the free radical nitric oxide. The exact mechanism of action is unknown at this time but studies have been performed to demonstrate the extract's efficacy. This particular algae was chosen because of its resiliency. Research has shown that air pollution plays a far greater role in the polluting of bodies of water than originally thought. Reactive nitrogen species, produced as a result of powerplant emissions, industrial smokestacks and vehicle exhaust, fall from the atmosphere onto the surface of bays, lakes and oceans with falling rain. *Pikea robusta*, one of the most abundant and widely found algae of all the red alga, has found a way to counteract the damaging effects of these reactive nitrogens and thrive.

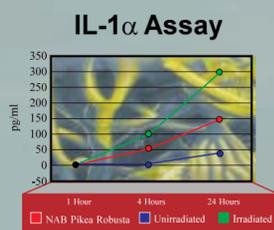
## Technical Data

*In vitro* testing has been conducted to assess the ability of this extract to **inhibit production of nitric oxide**. To induce  $NO\bullet$  production, keratinocyte cultures were treated with  $\gamma$ -interferon for 48 hours in the presence of aminoguanidine, a selective inhibitor of nitric oxide, or dilutions of the extract. After the treatment period, an aliquot of the culture medium was derivitized with the Greiss reagent.

The relative amounts of  $NO\bullet$  produced by the cells were determined by measuring the absorbance at 540 nm using a microplate reader. Viability of the cell cultures was also assessed throughout the duration of the study. The tests showed that the extract at a low concentration (0.03%) was found to inhibit  $NO\bullet$  production by approximately 25%. At a concentration of 1.00%, the extract reduced  $NO\bullet$  production by greater than 65% with minimal affect on cell viability. Results are shown below.



An **Interleukin-1 $\alpha$  (IL-1 $\alpha$ ) endpoint** was performed using the MatTek EpiDerm skin model. **NAB Pikea Robusta** extract was applied to the culture and irradiated for 2 hours at 1.6 mw/cm<sup>2</sup>. The media was extracted from the tissue culture and assayed for IL-1 $\alpha$  content. IL-1 $\alpha$  is the cytokine produced by keratinocytes in response to injury. It is a mediator of skin inflammation associated with skin irritation.

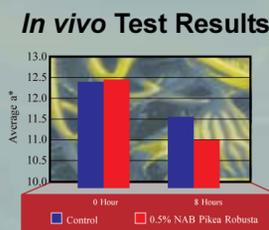


As can be seen from the previous graph, the level of IL-1 $\alpha$  in the culture is significantly reduced with the application of **NAB Pikea Robusta**.

The *in vitro* data prompted us to conduct an in-house, *in vivo* anti-irritation evaluation using 15 participants with healthy skin. Sites on the volar forearms were irritated for 4 hours using 5% SLS in an open cup. **NAB Pikea Robusta** was applied to the test sites at 0.5% and evaluations were made at baseline, 1 hour, 2 hours, 4 hours, and 8 hours. The following photographs show before and after results for 2 of the participants. Based on our in-house screening, we are running a complete, *in vivo* anti-irritation study using Laser Doppler velocimetry to monitor the degree of irritation.



*In vivo* test results from in-house panel study. Fifteen participants aged 18-65, all healthy. Irritation on volar forearms; 5% SLS applied for 4 hours using closed cups. Baseline and 8 hour average  $a^*$  (redness) readings shown taken using a Minolta (CR-300) Chromameter.



## Conclusion

Nature offers us a bounty of cosmetic actives that we are just beginning to discover. It has been demonstrated that a natural extract derived from red algae has the ability to reduce free radicals associated with skin irritation. As seen in the data presented, **NAB Pikea Robusta** is capable of providing protective affects against stresses from the environment, both internal and external. This extract helps to inhibit the production of  $NO\bullet$ , in turn, reducing the inflammatory response in the skin and thereby potentially reducing subclinical irritation and tissue damage.

## Applications

- **Hair care products** -- conditioners, leave-in treatments
- **Skin care products** -- aftershave & post depilatory treatment, environmental protection cream
- **Sun care products** -- post - sun care creams, soothing gels
- **Make-up formulations** -- treatment foundations & lip care

## Typical Properties

- **Proposed INCI Name** -- Water & Pikea Robusta (Red Algae) Extract
- **Appearance** -- Clear to hazy orange liquid
- **pH** - 2.5 -- 4.5
- **Use levels** -- 0.1-- 1.0 %



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