

What is Ectoine

- Ectoine is a small molecule used by organisms that thrive in extreme conditions such as deserts, salt lakes, arctic ice, the deep sea and hot springs.
- Ectoine is synthesized in bacteria by the gene products of *ectA*, *ectB*, and *ectC*.
- Ectoine is used in medical, biotechnological, and cosmetic products.

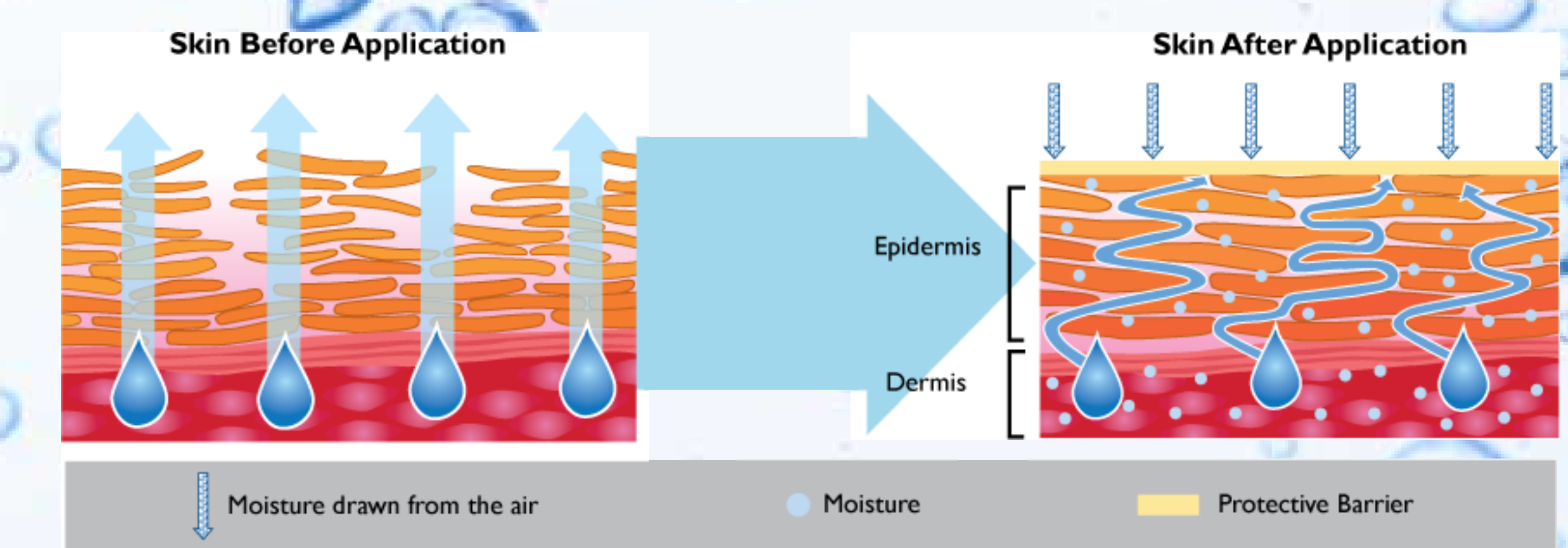
Benefits of using Algae versus Bacteria for Production of Ectoine

Our algae already contains two out of the three genes needed for the biosynthesis of Ectoine. The idea is to use the CRISPR method to introduce the third gene (*ectA*) to *Chlamydomonas Reinhardtii*, which will then jump start the production of our molecule.

- The current production of Ectoine uses bacteria as its source for producing the molecule. An Ectoine-producing Algae has the potential to replace current industrial producers of ectoine. The benefits of using Algae instead of bacteria to produce Ectoine are
- Higher expression yields of the genes that synthesize our molecule = Higher Production of Ectoine
 - Simplification of culturing procedure vs that of bacteria

What is CRISPR

CRISPR is part of the bacterial immune system, which is used to defend against invading viruses by cutting the foreign DNA the virus inserts in an effort to take over the cell. This newly found technology has been in recent years used by researchers for modifying, disabling and inserting genes in the genomes of various organisms.



Benefits of Ectoine in Human Skin

- Protects the skin from stress-factors
- Regenerates environmentally stressed skin
- Prevents UV-induced skin damage on cellular level
- Reduces wrinkles and lines
- Strengthens and protects the skin's self defense
- Repairs and reinforces broken skin barrier
- Increases skin hydration with long-term effect
- Smooths rough and scaly skin

Sources:

- > www.duo.uio.no
Expression for the bacterial *ectA* gene in the Chloroplast of *Chlamydomonas Reinhardtii*
- > www.bitop.de
- > www.ncbi.org
- > www.addgene.org
- > www.yourgenome.org
- > naturalwayblog.com (algae image)

