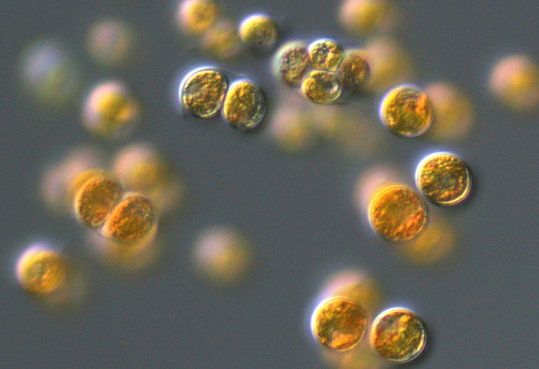
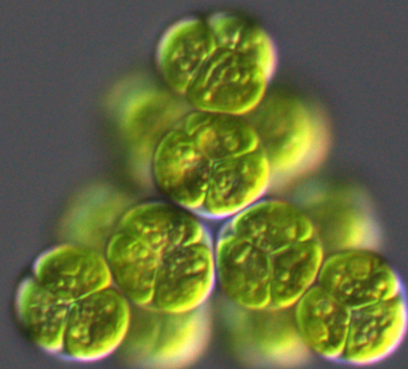


THE CCCRYO COLLECTION MICROFLORA FROM EXTREME HABITATS FOR COSMETIC PRODUCTS



Permafrost Algae

One quarter of our earth's ice-free land area is permafrost, ground with soil temperatures in the deep below the freezing point throughout the whole year. Microalgae growing on this habitat thrive well at 0 °C and below during winter-time like Snow Algae, but they also have adapted well to the higher soil surface temperatures prevailing during summer. These microalgae with such a well adapted metabolism usually grow best at temperatures around 10 °C, but at the same time they are extremely robust against many kinds of environmental influences, like high (UV-)radiation, desiccation and salt stress.

These so-called **Permafrost Algae** have evolved adaptations against **dehydration** by means of **extracellular polysaccharides** (EPS, gels). Many of them produce **highly active antioxidants**, such as astaxanthin and vitamin E. Others produce **UV-absorbing substances (MAAs, mycosporin-like amino acids)**, which can reduce UV-A and UV-B irradiation and minimize cell damage to the human skin. Due to their robustness regarding nutrients, light and temperature demands, they are **especially suitable for a mass cultivation**.

Services

- Our CCCryo biobank offers more than 500 strains of algae, mosses and cyanobacteria for your exclusive use
- We prospect new bioresources according to market trends and your ideas
- In joint R&D projects we accompany you with your product development from the natural bioresource to the final cosmetics
- We supply pure microalgal biomass cultivated under GMP conditions including microbiological quality control
- We perform pigment and fatty acid analyses by HPLC (DAD) and gas chromatography (GC-FID)
- We cryopreserve and backup your valuable production strains at the Fraunhofer IZI-BB cryobank CCCryo at Potsdam (near Berlin)

Contact

Dr. Thomas Leya
Head of Extremophile Research & Biobank CCCryo Unit
Fraunhofer Institute for Cell Therapy and Immunology
Bioanalytics and Bioprocesses Branch IZI-BB
Am Muehlenberg 13 | 14476 Potsdam-Golm | Germany
Phone +49 331 58187-304 | Fax +49 331 58187-199
thomas.leya@izi-bb.fraunhofer.de
www.izi-bb.fraunhofer.de | www.cccryo.fraunhofer.de



Snow Algae

Since Aristotle explorers were mystified by red and green coloured snow fields on glaciers in the high alpine mountains and polar regions. Today we know that this phenomenon called Red Snow is caused by microalgae that are perfectly adapted to these cold and freezing environment, some of the most challenging habitats on earth.

These so-called **Snow Algae**, like other microalgae, are the ancestors of higher plants and likewise gain their energy from sunlight. At freezing temperatures, the algae are exposed to **dehydration, osmotic stress and UV light**, but they have developed strategies to fight these different stresses by unique adaptations of their cell morphology and metabolism. These strategies include **ice-binding/ice-structuring proteins** (IBP, ISP) with **antifreeze properties** (AFP), different **antioxidants** for scavenging reactive oxygen species (ROS) and other **snow algae specific enzymes**.

Snow Algae and their metabolites already caught the attention of the cosmetics industry and their components are promising, novel ingredients for different cosmetics products. **Some of our snow algal metabolites can be found in cosmetics on the market worldwide already.**

Desert Blue-Green Algae

Blue-Green Algae (cyanobacteria) have developed mechanisms to cope with high levels of sunlight and UV radiation. This is especially true for species from desert regions with little natural irradiation protection from clouds, shrubs or trees.

Our research unveils their exceptional capabilities to cope with such light-related stresses. Desert cyanobacteria are able to grow well under extreme UV- and sunlight, also coping with high blue light levels and thus, they are **excellent sources for respective antioxidants and protective compounds** for the cosmetics industry. Furthermore, an additional range of **exciting pigments** in different shades of **blue, violet, and pink** complete the colour palette of **orange** and **red** shades from Snow and Permafrost Algae.



Permafrost Mosses

Next to Snow, Permafrost and Desert Algae, our strain collection CCCryo also comprises Polar Mosses, the oldest land-plants on our earth.

Approximately 450 million years ago mosses evolved from green algae to cover rocks, trees and soils from alpine to desert regions. Mosses are organisms, evolutionarily just having climbed from water onto land. Naturally they still have the ability to **store and retain water to fight dehydration**. Additionally they produce **yellow-coloured flavonoids** with **antioxidant activity**. **Flavours** such as limonene or pinene are also described.

