

## Carotenoids bioproduction by two psychrophilic microalgae: *Sphaerocystis sp.* and *Pleurastrum sp.*

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### Abstract

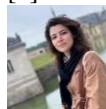
Among the valuable compounds derived from microalgae, carotenoids are the most studied. Carotenoids in plants, algae, and some photosynthetic bacteria and yeasts are responsible for their red, orange, and yellow pigmentation. Indeed, natural carotenoids receive significant interest because they are potent antioxidants and can protect against certain diseases such as cancer. Therefore, carotenoids derived from microalgae are valued for their diverse applications in food, feed, cosmetic, and pharmaceutical industries.

In recent decades, the carotenoids industry has searched for sources other than *Haematococcus pluvialis* microalga. This mesophilic microalga (temperature growth between 25°- 28° C) represents the most abundant source of natural astaxanthin, a well-known antioxidant and one of the most expensive carotenoids on the market. However, few studies have been conducted on extremophilic microalgae strains that can produce valuable carotenoids at low temperatures and light. The cultivation of microalgae requires artificial lighting to mimic natural sunlight. These lights consume a substantial electricity input. In addition, maintaining the ideal temperature and climate for microalgae growth involves heating or cooling systems, which further contribute to energy consumption. In regions where energy costs are high or renewable sources are limited, the cost of energy consumption can become prohibitive. Hence, studies were performed to find microalgae strains that are more tolerant or adapted. In this context, psychrophilic microalgae represent potent candidates because they are well-adapted to harsh environments in cold-climate regions. Moreover, these photosynthetic organisms cause red, orange, yellow, or brown pigmentations when snow fields are subject to extensive irradiation, high temperature, and low nutrient availability (melting season).

This project is devoted to optimizing carotenoid bioaccumulation by two selected psychrophilic strains *Sphaerocystis sp.* and *Pleurastrum sp.* Both are successfully acclimated to our laboratory conditions for the growth and accumulation of carotenoids. The culture was carried out through two stages (green and red), where parameters such as temperature, lighting, and nutritional medium were carefully monitored. Therefore, the first interesting results of culture pigmentation, cell stages transitioning, and pigment content of Chlorophyll *a*, Chlorophyll *b*, and total carotenoids are presented in this work.

### References

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