THE WET PRESERVATION OF PORPHYRIDIUM PURPUREUM

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Introduction and aim

It is often impossible in practice to process micro-algae immediately after their cultivation and harvest. This study, therefore, aimed to identify appropriate storage conditions for the wet preservation of *Porphyridium purpureum.*

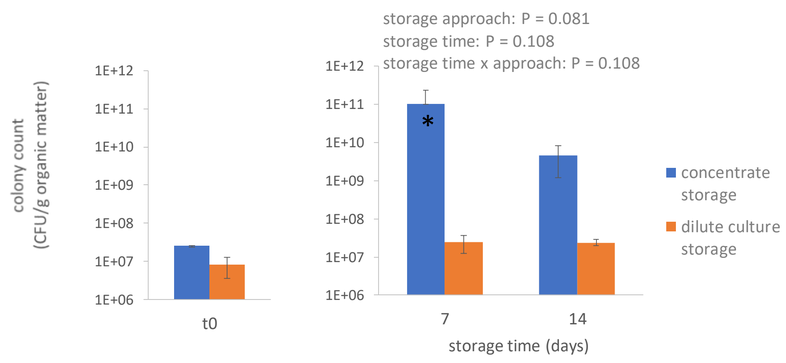
Materials & methods

Algae were stored either as a concentrate (5-6% dry matter) or as a dilute culture at 4°C, 8°C, or 20°C for 14 days and their quality was monitored.

Results

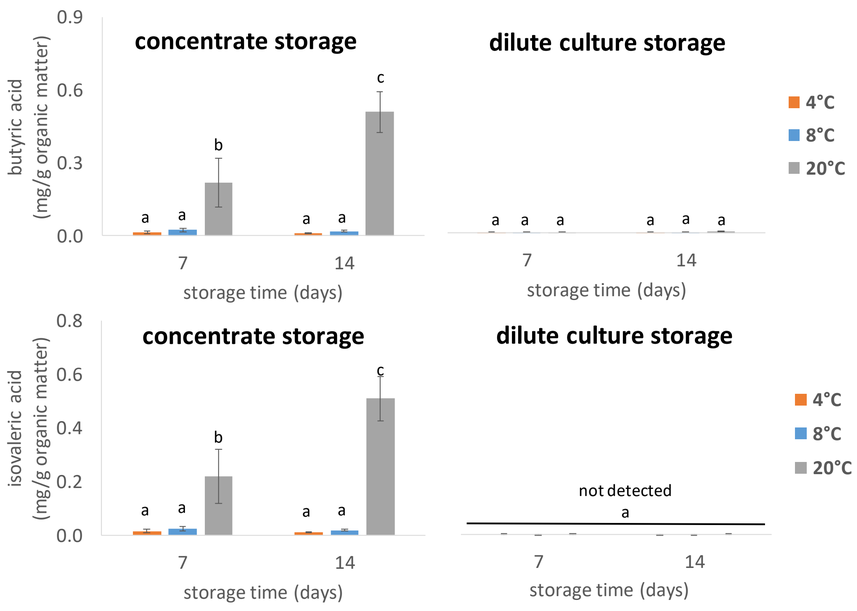
Total microbial count

At the start (t_0), concentrate storage and dilute culture storage concentrates had similar number of colony forming units (CFU) per gram organic matter. When stored concentrates were analyzed (without t_0 data), a trend for higher microbial numbers was observed after concentrate storage than after dilute culture storage.



Short-chain fatty acids

Acetic acid and propionic acid (not shown below) were always the main short-chain fatty acids (SCFA), followed by butyric acid and isovaleric acid. Higher SCFA levels were observed with increasing storage time, increasing storage temperature, and after concentrate storage. Propionic, butyric, and isovaleric acid have an unpleasant odor.



B-phycoerythrin

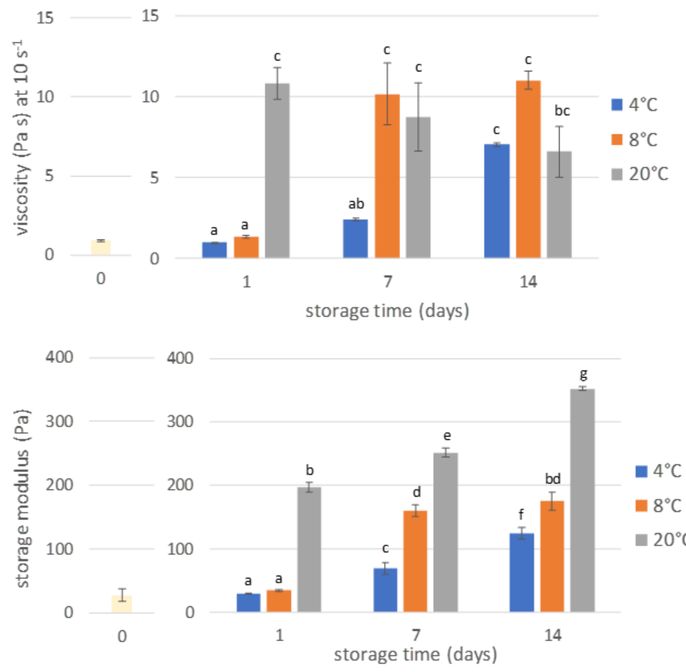
On average, B-PE levels were (slightly) higher after concentrate storage than after dilute culture storage, probably due to respiration losses of organic matter during concentrate storage.

Conclusion

Concentrate storage entailed adverse effects on algae quality and processability. Microbial numbers tended to be higher for concentrate storage and the concentrations of smelly volatile components were clearly higher than for dilute culture storage. Gel formation occurred fast when concentrates were not cooled during storage. A solid-like behavior of a concentrate seriously hinders its processability and concentrates will no longer be able to be pumped.

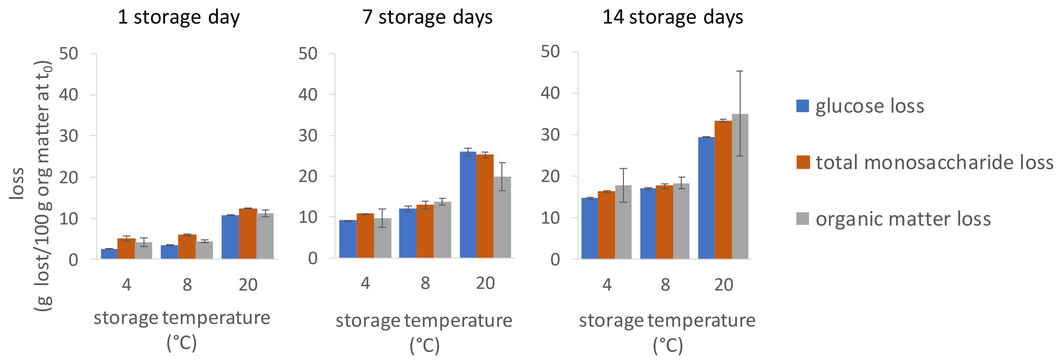
Rheology

The main restriction of concentrate storage was the rapid viscosity increase (figure below) and formation of a weak gel structure complicating the later processing of the concentrates. A gel-like behavior was observed quickly as demonstrated below by the storage modulus plot for concentrate storage.



Organic matter losses

The total amount of organic matter changed surprisingly fast during concentrate storage, especially at 20°C. Almost all loss of organic matter can be attributed to the breakdown of carbohydrates, which in turn is almost entirely due to the loss of glucose.



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