

Can Nostoc Commune photosynthesize under cryogenic?

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Abstract

Nostoc commune, a type of cyanobacteria, is known to be resistant to drought. As a result of experimenting by comparing frozen Nostoc commune with raw Nostoc commune, it was discovered that it has low temperature tolerance and allows light-dependent gas in and out.

Introduction

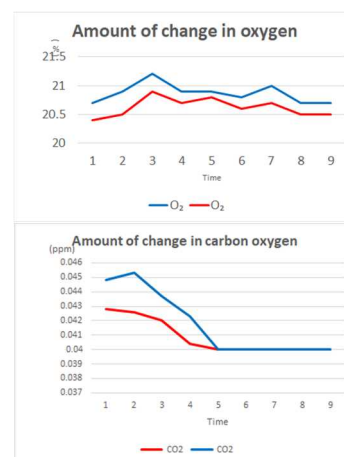
From the drought resistance of Nostoc commune, we focused on the possibility of low temperature resistance. Looking ahead to terraforming We conducted an experiment to investigate life activity after treating Nostoc commune at an extremely low temperature.

Theory and Experiment

- Experiment I Measure the respiratory quotient of Nostoc commune using a sooting as shown in the figure.
- Experiment II Investigate the color change of the BTB solution using Nostoc commune in the frozen boiled, and normal temperature conditions. Check the generated gas.
- Experiment III Cultivate Nostoc commune using an oxygen meter and a carbon dioxide meter in a closed container and check the concentration change.

Results

- Experiment I No respiratory quotient was required. The generation of gases other than CO₂ was confirmed.
- Experiment II It was confirmed that gas was generated from Nostoc commune. CO₂ is absorbed because the BTB solution becomes transparent I couldn't judge whether it was collected.
- Experiment III Frozen Nostoc commune also absorbs carbon dioxide and emits oxygen when given light.



Consideration

When light is given to frozen Nostoc commune, it absorbs carbon dioxide and emits oxygen. We are doing photosynthesis.

Conclusion

Nostoc commune frozen at -80°C for about 1 day can be photosynthesized by returning it to room temperature and giving it light and water.

References

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Acid-base indicator Bromothymol blue color and molecular structure

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Keywords

Nostoc commune, Terraforming, Cyanobacteria, Photosynthesis