Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 06, Issue: 04 (JULY-AUG, 2026)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Oxygen Oasis: Harnessing Green Algae Culture to Sustain Future Generations

*Dr. Rakhi Das
Assistant Professor, Dept.of Aquaculture, Sanjeev Agrawal Global Educational University, Bhopal, M.P, India
*Corresponding Author's email: rakhi.d@sageuniversity.edu.in

Green algae are a distinct group of photo oxidative microorganisms belonging to the kingdom Protista. In general, most of the species are aquatic in nature, although specific species can sustain in distinct environments such as soil, snow or tree bark. Mainly green algae carry chlorophyll and other pigments that help them to photosynthesis. Green algae cells can be cellular and multicellular in nature. Green algae manifest divergent reproductive strategies for their expansion. In aquaculture, green algae function as effective roles for continuous up gradation of aquatic ecosystems including primary producers, forming the base of the food chain, produce food and habitat for a multiple of organisms. At present, green algae supposed to be the oxygen producer and carbon sequencer of the earth. Besides these functions, green algae served as food supplements, bio fuels, wastewater treatment and model organisms in scientific research.

Culturing of green algae could play an important role in our biodiversity by following way:
Photosynthetic Oxygen Production: Green algae are capable in photosynthesis, transforming carbon dioxide through the exertion of chlorophyll. A vast scale cultivation of green algae could therefore generate to oxygen production, helping like equaliser for consumption of oxygen by humans and other organisms.
Carbon Sequestration: Our living planet now suffers a chronic disease namely globalization and this activity initiate the increasing of carbon dioxide level in our earth atmosphere. A mass production of green algae can solve the problem by stripping of carbon dioxide from the atmosphere or water during photosynthesis. Culture of green algae assist mitigates climate change by reducing carbon dioxide, a greenhouse gas from the environment.
Upgrade the health of Aquatic Ecosystem: Yielding green algae in fully aquatic environments can boost up the health of ecosystems by supplying oxygen for aquatic organisms namely fish and invertebrates. Implication of green algae culture can be especially advantageous in such areas where oxygen levels are low due to pollution or eutrophication.
Renewable Energy Production: Culture of green algae for production of biofuel through process like biodiesel production or anaerobic digestion is now an unique matter for replacement of fossil fuel. Utilization of bio fuels can deduct the carbon emission and mitigate climate change, inherently providing effective function on increasing oxygen levels in the atmosphere.

Ocean to Orbit: Algae Provide Life Support

Some algae of earths can able to absorb the carbon dioxide and can convert it into oxygen, In 2019, the German Aerospace Center send a photo bioreactor device to the international space station where microalgae *Chlorella vulgaris* provide oxygen to the astronauts by transform carbon dioxide into oxygen. Generally Chlorella vulgaris is the suitable species for convert carbon dioxide into oxygen. The cells are only a few micrometers across, occupy very little

space or water and can double their yield in roughly eight hours. Since spacecraft cannot carry enough oxygen tanks and foods for years long journeys. This specific characteristic helps to make its successful journey from earth to space.

Conclusion

In conclusion, green algae culture holds promise as an effective producer to oxygen production for future generations and can save our earth from green house effect and desertification. Sustainable utilization of aquatic resources for culture of various algae not only ensures the oxygen availability it can boost up the health of our aquatic ecosystem which is necessary for long term sustainability.

References

1. Live Science. "Algae 'Bioreactor' on Space Station Could Make Oxygen, Food for Astronauts." 2019. https://www.livescience.com/65432-space-station-algae-bioreactor.html
2. Space.com. "Algae 'Bioreactor' on Space Station Could Make Oxygen, Food for Astronauts." 2019. https://www.space.com/space-station-algae-experiment-fresh-air.html
3. Detrell, G. "Chlorella Vulgaris Photobioreactor for Oxygen and Food Production on a Moon Base—Potential and Challenges." Frontiers in Astronomy and Space Sciences, 8:700579, 2021. https://www.frontiersin.org/journals/astronomy-and-space-sciences/articles/10.3389/fspas.2021.700579/full
4. Futurism. "The ISS Now Has an 'Algae Bioreactor' Generating Oxygen and Food." 2019. https://futurism.com/the-byte/iss-algae-bioreactor-oxygen-food
5. Zaara Biotech. "Algae in Space: Bioregenerative Life Support Systems." 2024. https://zaarabiotech.com/algae-in-space-bioregenerative-life-support-systems/
6. National Center for Biotechnology Information. "Investigating the Growth of Algae Under Low Atmospheric Pressures for Potential Food and Oxygen Production on Mars." https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8633435/
7. National Center for Biotechnology Information. "On the Way to Mars—Flagellated Algae in Bioregenerative Life Support Systems Under Microgravity Conditions." https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6960400/
8. Tech Explorist. "A New Study Reveals How Phytoplankton Produce Oxygen." 2023. https://www.techexplorist.com/new-study-reveals-phytoplankton-produce-oxygen/61143/
9. Scripps Institution of Oceanography. "Phenomenal Phytoplankton: Scientists Uncover Cellular Process Behind Oxygen Production." 2023. https://scripps.ucsd.edu/news/phenomenal-phytoplankton-scientists-uncover-cellular-process-behind-oxygen-production
10. Copernicus Marine Service (CMEMS). "Oxygen Reservoir." https://marine.copernicus.eu/explainers/why-ocean-important/oxygen-reservoir
11. NOAA Ocean Service. "How Much Oxygen Comes from the Ocean?" https://oceanservice.noaa.gov/facts/ocean-oxygen.html
12. EarthSky. "How Much Do Oceans Add to World's Oxygen?" 2015. https://earthsky.org/earth/how-much-do-oceans-add-to-worlds-oxygen/
13. Eos (American Geophysical Union). "World's Biggest Oxygen Producers Living in Swirling Ocean Waters." 2021. https://eos.org/research-spotlights/worlds-biggest-oxygen-producers-living-in-swirling-ocean-waters
14. Springer. "Coupled Plankton–Oxygen Dynamics Under Ocean Warming." Bulletin of Mathematical Biology. https://link.springer.com/10.1007/s11538-015-0126-0