

SPIRULINA CULTIVATION FOR MAKING PROFITABLE AND HEALTHY LIVELIHOODS

Article Id: AL202132

A. Velmurugan

Tamilnadu Dr. J. Jayalalithaa Fisheries University, Nagapattinam, Tamil Nadu, India

Email: velmurugan13061999@gmail.com

Spirulina is multicellular and filamentous blue-green microalgae that can be consumed by humans and animals. The researchers called “Wonder Gift of Nature and The Future Nutritional Food” for human beings. Spirulina contains 55 to 70 percent of protein and rich in all the nutrients needed for daily growth. So, spirulina cultivation is gaining popularity among the people as a lucrative business.

Culture methods

Mother or pure culture

Healthy mother algae should be determining a good quality output and high yield. So mother algae to be obtained from Algae research centres, fisheries colleges and certified farmers only. Because it's necessary to avoiding contamination or mix with other microalgae.

Commonly grown spirulina species

- Arthrospira planters
- Arthrospira maxima
- Arthrospira fusiformis

Grow-out culture

The raceways flow-through system should be the best method of spirulina cultivation for commercial purposes. In this system, water is constantly circulating so that the nutrients in the water get to algae and prevent the algae from setting to the bottom of the tank. It's economically made profitable; the size should not less than 20×2×0.5m. Especially the depth should not be more or less than 0.5m. Then filling of water by using 40micron mesh cloths for preventing other algae contaminations. Then added with the recommended amount of

medium (chemical solutions) in tanks. After applying medium, the mother algae to be added to tanks. The ratio of mother algae in tanks 1:100litres of water.And cell volume >25000cells /ml.

Fertilizer management

The most commonly used growth medium of spirulina cultivation is ZARROUK'S Medium. The preparation of Zarrouk's medium is required for following chemicals.

Table 1

S.No	Constituents	Amounts /litre.
1	Sodium bicarbonate (NaNO ₃)	18gms
2	Sodium nitrate (NaNO ₃)	2.5gms
3	Potassium phosphate di basic (K ₂ HPO ₄)	0.5gms
4	Potassium sulphate (K ₂ SO ₄)	1.0gms
5	Sodium chloride (NaCl)	1.0gms
6	Calcium chloride(CaCl ₂)	0.04gms
7	Ethylene diamine tetra aceticacid disodium salt (Na ₂ -EDTA)	0.08gmd
8	Magnesium sulphate (MgSO ₄)	0.2gms
9	Ferrous sulphate (FeSO ₄)	0.01gms
10	A5 metal solution	1ml

. Table 2

S.No	A5 metal solution	Amounts/Litres
1	Boric acid (H ₃ BO ₃)	2.86gms
2	Ammonium molybdate [(NH ₄) ₆ MO]	0.02gms
3	Manganese chloride (MnCl ₂)	1.8gms
4	Copper sulphate (CuSO ₄)	0.08gms
5	Zinc sulphate (ZnSO ₄)	0.22gms

Growth factors

Agitation- it's done every 2-3hrs regularly in a day time.

Salinity- the healthy ranges between 15 to 20ppt.

Ph - the best ph ranges between 10.5 to 11. As below 10.5 pHs is a risk of contaminated with other microalgae and ph over 11 it undergoes chemical changes.

Temperature - optimal temperature ranges from 30 to 35°C

Transparency - must be monitored every day. Because it is used to calculate algae density in tanks. The best ranges of transparency 20 to 25cm.

Harvest and yield

The first harvest should be started in 15 to 20 days, then regularly harvest by day today. Harvesting takes in morning 6 to 8 am suitable time for high yield. Because the sunlight reaches the culture tank, the algae started in reproduction for cell fusion, so reduce in cell size. Every harvest should be added growth medium regularly. Yield up to 15kg for wet weight and 1kg for dry weight.

Table 3 Nutritional composition

	Nutrients	Amounts/grams
1	Protein	55 to 70g
2	Lipid	4 to 5g
3	Carbohydrates	15 to 18g
4	Chlorophyll	1 to 2g
5	Mixed carotenoid	350 to 450mg
6	Beta carotenoid	180 to 190mg
7	Calcium	400 to 600mg
8	Iron	50 to 100mg
9	Potassium	200 to 2000mg
10	Magnesium	200 to 300mg
11	Zinc	1 to 2.0mg
12	Vit.A	100 to 200mg
13	Vit.E	5.0 to 20mg
14	Vit.B1	1.5 to 4.0mg
15	Vit.B2	3.0 to 5.0mg
16	Vit.B6	0.5 to 0.7mg
17	Vit.B12	0.05 to 0.2mg

Conclusion

WHO (world health organization) also suggest that adding the daily diet will naturally boost the immune system of your body. Spirulina is contributed animal feed as Mainly on ornamental fish farming for increasing the colour pattern of fish. So proper training and

technology to the cultivation of such nutritious algae can be lead to make a good profit and improve the unemployed and rural livelihood opportunities in the society.

Reference

Habib, M. Ahsan B.; Parvin, Mashuda; Huntington, Tim C.; Hasan, Mohammad R. (2008). "A Review on Culture, Production and Use of Spirulina as Food dor Humans and Feeds for Domestic Animals and Fish" (PDF). Food and Agriculture Organization of The United Nations. Retrieved November 20, 2011.

Gerswin, ME; Belay, A (2007). Spirulina in human nutrition and health. CRC Press, USA.

Tokusoglu, O.; Unal, M.K. (2003). "Biomass Nutrient Profiles of Three Microalgae: Spirulina platensis, Chlorella vulgaris, and Isochrysis galbana". *Journal of Food Science*. 68 (4): 2003.

Belay, Amha (2008). Spirulina (Arthrospira): Production and Quality Assurance. Spirulina in Human Nutrition and Health, CRC Press. pp. 1–25. ISBN 9781420052572.

FAO and Google Wikipedia.