

SPIRULINA SUPERFOOD

1. INTRODUCTION

Spirulina is a microalga which is spiral-shaped that grows naturally in the wild in warm and fresh water lakes. It is blue - green algae. Dried spirulina contains approximately 60-70 % protein, Vitamin A, B, and K. There are multiple benefits of spirulina. It has powerful anti-oxidant, anti-cancer and anti-inflammatory properties. It is also effective against anaemia and controlling blood sugar. Owing to all these properties spirulina is considered as today's superfood.

2. PRODUCT AND ITS APPLICATION

It helps in healing wounds and lowers LDL cholesterol. It is used as a protein supplement for malnourished children and adults; it is used in cattle, poultry and marine feed; in health care sector; in medicine; in therapeutic preparations; and in sericulture and horticulture media. Since spirulina provides all the essential nutrition without excess calories and fats, those wanting to control obesity take spirulina tablets. Spirulina is extremely popular as a health food, without any side effects, and non-habit-forming.

2.1 Availability of know-how
CFTRI, Mysore, has developed the technical know-how.

3. DESIRED QUALIFICATION OF PROMOTER

Graduate from Life Sciences or allied disciplines. Having knowledge about marketing or possess marketing network.

4. INDUSTRY OUTLOOK AND TRENDS

Spirulina is considered as one of super food and food for future due to its excellent medicinal properties in view of commercial cultivation picking up in India, especially in Tamil Nadu, and due to high potential in domestic and export market, industrial out-look for this industry is very good and promising high growth trends.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY

The demand of spirulina powder is increasing in food and beverage industry as a food supplement salads, breakfast meals, dessert and many other food products like soft drinks because of its rich and higher nutritional values. European and Asia Pacific are the largest market of spirulina products as due to increasing demand of dietary supplements among health conscious and aging population. It is marketed by medical distributors in urban and semi-urban areas. It has been effectively promoted as a natural health and slimming food in the market.

6. RAW MATERIALS REQUIREMENT

As Spirulina is found in freshwater ponds and lakes so water from ponds to culture Spirulina. Materials like N.P.K fertilizers, super phosphate, and magnesium sulphate. These materials are easily available in Indian market.

7. MANUFACTURING PROCESS

The manufacturing consists of:

1) Cultivation 2) harvesting and 3) Processing

Selected strains of algae are used for cultivation in constant agitation of water. This is an important parameter in the cultivation of spirulina. Agitation of algae culture is necessary to keep nutrients evenly dispersed

and also to expose all the cells to sunlight. The algal biomass is carefully harvested using specially made filters to recover the biomass. The harvested biomass is dried using the cross flow drier.

The produce obtained is in the form of flakes. It is ground in the pulveriser to get the powder of the desired mesh size. To get an optimal yield, maintenance of required nutrient level, cell density, culture depth etc., are some of the critical parameters in the process of spirulina cultivation. The yield of spirulina is expressed as grams per cubic metre per day.

7.1 Quality specifications

Sr. No.	Particulars	Percentages
1	Moisture	3%
2	Protein	65%
3	Fat	7%
4	Crude fibre	9%
5	Carbohydrates	16%
6	Energy	346 K Cal / 100 grams
7	Mold and fungus	absent

- It should be free from any fermented odour, coliforms, salmonella and streptococci bacteria.

6.2 Pollution control measures.
Not necessary as there are no pollutants or effluents.

6.3 Energy conservative measures
Common measures will do.

6.4 Packaging
Spirulina is packed as capsules. Around 50 or 100 capsules are packed in a bottle and sold.

6.5 Manufacturing capacity
Cultivation - Three shifts, each of 8 hours duration.

Drying - one shift of 8 hours duration. The yield of wet biomass per annum would be around 200 metric tonnes which on drying will yield 10 tonnes of the dried product. The time period required for achieving full capacity utilisation is one year.

8. MANPOWER REQUIREMENT

The project will require production manager, Chemist, Skilled and unskilled workers, packaging workers, and other administrative staff.

9. IMPLEMENTATION SCHEDULE

The project can be implemented within three months by securing finance as no weighty equipments are used in the manufacturing process.

10. COST OF PROJECT

Sr. No.	Description	Rs. lakhs
1	Land	-
2	Building	35.00
3	Plant machinery	26.00
4	Laboratory equipment	5.00
5	Furniture and fixtures	5.00
6	Electrification and power connection	8.00
7	Machinery spares	4.00
8	Margin for working capital	5.61
	Total	88.61

11. MEANS OF FINANCE

Sr. No.	Particulars	Rs. (lakhs)
1	Promoter's contribution	22.1525
2	Bank Finance	66.4575
3	Total	88.61

12. WORKING CAPITAL CALCULATION PER MONTH

Sr. No.	Description	Rs. lakhs	Stock Period days	Promoter Margin	Margin Amt.	Bank Finance
1	Salaries and wages	3.17	30	1	3.17	0
2	Raw material and packaging material	4.78	30	0.5	2.39	2.39
3	Utilities	0.42	30	0.5	0.21	0.21
4	Creditors	-0.4	30	0.4	-0.16	-0.24
5	Total	7.97			5.61	2.36

12. LIST OF MACHINERY REQUIRED

Sr. No.	Particulars	Rs. lakhs
1	Paddle wheel and motors - 7 nos	3.00
2	Vibratory sieve - 2 no	2.50
3	Cross flow type tray dryer - 2 no	3.90
4	Pulveriser - 2 no	1.50
5	Packing machine	2.00
6	Water treatment plant	6.00
7	Effluent treatment plant	7.00
8	Total	26.00
9	Laboratory equipment	5.00
10	Grand total of machinery and equipment	31.00

MS SSP limited, Faridabad is one of the suppliers of drying of spirulina. There are a few other Chinese suppliers auxiliary machinery like pulveriser, etc.

13. PROFITABILITY CALCULATIONS

(Rs. Lakh)

Sr. No.	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
1	Sales/Gross income	157.5	180	202.5	202.5	202.5
2	Raw materials and other variable costs	11.62	13.28	14.94	14.94	14.94
3	Contribution	145.88	166.72	187.56	187.56	187.56
4	Overheads (except interest)	69.16	79.04	88.92	88.92	88.92
5	Profit before Interest, Depreciation & Tax	76.72	87.68	98.64	98.64	98.64

6	Interest on term loans (11%)	7.05	6.27	5.22	4.18	3.13
7	Profit before depreciation	69.67	81.41	93.42	94.46	95.51
8	Depreciation	5.18	5.92	6.66	6.66	6.66
9	Profit before tax (PBT)	64.49	75.49	86.76	87.8	88.85
10	Income Tax (30%)	19.347	22.647	26.028	26.34	26.655
	Profit After Tax	45.143	52.843	60.732	61.46	62.195

Underlying assumptions for probability calculation are:-

Raw material cost is taken at Rs. 8000 per MT of wet Bio - Mass. Sales price is assumed at Rs. 20,000 per MT. cost of power is taken at Rs. 8 per unit. Interest rate on long term loan is assumed at 11%.

14. BREAK-EVEN ANALYSIS

Cash Break-Even (as % of Targeted sales)

Sr. No.	Particulars	Value (Rs. In lakhs)
		Year-1
1	Sales Realization (SR)	225
2	Variable costs (VC)	16.6
3	Fixed costs (FC) incl. interest	98.8
4	BEP = $FC/SR-VC \times 100 =$	47.4%

Note: The BEP calculated above is % of respective year's targeted sales level and not of maximum/installed capacity.

16. STATUTORY/GOVERNMENT APPROVALS

Licence from Food & Drug Department will be required in addition to this other MSME related registration/ regulatory compliance will have to be obtained. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD & FORWARD LINKAGES

There are no specific backward - forward linkages opportunities offering techno - economic advantages or synergies.

18. TRAINING CENTRE AND COURSES:

Central Food Technologies and Research Institute (CFTRI), Mysore could be good institution for resourcing technology and receiving technical trainings.

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

Source:- Udyami Mitra/Sidbi