



***Spirulina is the  
world's first  
super-food***

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***XYZ's unique and  
proprietary  
cultivation  
methods are  
leading the way to  
scalable  
cultivation  
farming for pure,  
high quality, price  
competitive  
Spirulina***



# **XYZ ENTERPRISES LTD.**

Business Plan - August 2016

This document was prepared based on information and the best estimates available at the time of preparation. This document includes plans and forecasts however there is no guarantee to carry out all or part thereof.

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## EXECUTIVE SUMMARY

XYZ is a Spirulina farm located in the Springs Valley region of Israel. Spirulina is a micro-algae coveted for its high nutritional values and immunological qualities as well as its color. Spirulina is used today in many forms, including food additives to humans and livestock, natural coloring agents to the pharmaceutical industry, and potentially to a source for high-quality bio-diesel. The global demand for Spirulina is high, yet most product available today is of very low-quality and due to unsupervised farming may even contain toxic materials.

Established and operated by a unique team of experienced and talented individuals, XYZ has perfected a method for growing high quality, pure Spirulina in a cost-effective and systematic manner. The system is well-designed from the growing pools to the unique drying system which ensures that all the micro- and macro-nutrients of the wet Spirulina are kept in its dry state, and in an odorless form, while still ensuring low operational costs. This allows the company to sell the high quality product year-round at low-market prices, beating any competition while still remaining highly profitable.

The current farm size is 1,000 m<sup>2</sup>. Plans are to gradually enlarge the farm to 180,000m<sup>2</sup> enabling production of over 800 tons of Spirulina, and generating annual revenues of \$17M. A very high gross profit of +90% and operational profit of +75% ensures high profitability for the company.

Table 1: Six Year Pro-forma Profit & Loss (\$)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Revenues	499,896	2,729,885	6,324,240	11,700,313	13,808,689	20,964,645
Cost of Goods	243,154	383,339	668,751	865,798	1,239,447	1,471,286
Gross Profit	256,742	2,346,545	5,655,489	10,834,515	12,569,242	19,493,359
Gross Margin	51%	86%	89%	93%	91%	93%
General & Administrative (G&A) Expenses	210,000	213,000	290,100	622,800	738,750	749,100
Research & Development (R&D) Expenses	150,000	201,150	279,000	338,850	418,800	423,750
Marketing & Sales Expenses	154,745	399,220	947,108	1,421,800	1,833,328	2,633,422
Operating Profit (Loss)	-258,003	1,533,175	4,139,281	8,451,065	9,578,365	15,687,087
Financial Expenses	0	0	0	0	0	0
Profit (Loss) Before Tax	-258,003	1,533,175	4,139,281	8,451,065	9,578,365	15,687,087
Profit/Sales	0%	56%	65%	72%	69%	75%

To support expansion of the farm XYZ is seeking an investment of \$2M.

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# THE COMPANY

## COMPANY BACKGROUND

XYZ is a mass-producer and distributor of high-quality, cost-leading **Spirulina** – A micro-algae, with exceptionally high nutrition values and immune capabilities, that has been dubbed as "the food of the future". XYZ will scale-up and produce significant quantities of high-quality **Spirulina** at competitive prices by means of its unique and proprietary cultivation methods and carefully selected environmental conditions.

The company was founded by UUU, JJJ and AAA, all experienced and professional entrepreneurs.

## FUNDING TO DATE

Redacted

## PROGRESS TO DATE

In the two years since XYZ began operations it has achieved several major milestones, chiefly:

1. **Feasibility studies** - Our scientific and technical teams, along-side external scientists, conducted detailed studies to define optimal production conditions, identify suitable geographies, decide on cultivation methods, check drying alternatives, and calculate economics.
2. **Completed initial R&D phase** – The Company performed all required lab and field work, involving internal as well as affiliated scientists and experts, necessary for developing:
  - A comprehensive knowledge base, including unique cultivation methods
  - An innovative drying process
  - A proprietary assortment of Spirulina lines to enable constant production at varying conditions, using optimal nutrients mixtures for rapid Spirulina production.
3. **Planning** - Finalized and reviewed all construction specifications and cost of materials, based on the feasibility study, accumulated know-how and experience. The planning stage covers all production aspects such as siting of greenhouses, fresh water supply and additional infrastructure.
4. **Feasibility validation** (2,500m<sup>2</sup>) - Concluded two-year field trial with resulting production rates **significantly higher than the global benchmark**.
5. **Secured land and water resources** - Signed contracts for land and water usage are at the approval stage with the regulatory authorities. Water is acquired from a natural source with a suitable natural

## COMPANY VISION

TO LEAD CULTIVATION TECHNOLOGIES FOR THE PRODUCTION OF HIGH QUALITY SPIRULINA, IN MASS QUANTITIES AND BREAKTHROUGH PRICES, TURNING ISRAEL INTO A LEADER IN THE SPIRULINA FAST GROWING MARKETS

mineral content identified during the feasibility study. The location ensures optimal temperature and solar irradiation.

6. **Preliminary Setup at Kfar Ruppin** - establishing the Laboratory, Algae nursery, first 2 x 500m<sup>2</sup> covered pools for inoculum stocks, harvesting and drying systems. The company is in a process of validating a scientific study about the added benefits of Spirulina in broiler chicken-feed, in cooperation with Israel's largest animal feed mill
7. **Attained pre-orders for all production** - the company has secured an LOI of up to 4,000 tons of Spirulina annually to be used as chicken-feed once trials are validated.

## COMPANY MISSION

BUILDING SPIRULINA CULTIVATION FARMS WITH EMPHASIS ON PURITY, QUALITY, AFFORDABILITY AND CAPABILITY. OPTIMIZING THE ENTIRE PROCESS, TO REACH PRICES THAT WILL ALLOW US TO ACQUIRE SIGNIFICANT MARKET SHARES IN EXISTING MARKETS AND THE DEVELOPMENT OF NEW GLOBAL MARKETS.

## THE TEAM

### MANAGEMENT

XYZ's leading team brings vast experience and high credentials in management, sales, operations, algae cultivation, and nutrients marketing.



#### UUU - CEO, Co-Founder

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Business and Social entrepreneur. UUU founded and managed an international consulting company (XXX Global) specializing in reducing the risks of doing business. Uri led the development and execution of innovative integrated security systems for complex international sites.



#### JJJ - COO, Co-Founder

JJJ developed, managed and steered large and complex projects at the IDF and the Israeli Prime Minister's office. Previous to that he established a business of natural juices (TTT) and an international distribution network for nutritional supplements (NNN).



### AM MO – Sales and Marketing Director, Co-Founder

AM specializes in anticipation of market trends and conditions, and positioning businesses accordingly. He previously managed a medical supplies company in Australia, the Regional Medical Supply Company which was later sold to MMMM Ltd. In addition AM is an estate developer in the USA, and a developer of novel marketing methods to reshape consumer's behavior.

## RESEARCH AND OPERATIONS TEAM

### YYY – Senior Algae Culture Specialist

Founder of AAA LTD, international Algae experts. Manages Spirulina cultivation and research farm. Serves as a leading expert for aquaculture development at the Israeli Negev Desert Committee / Israeli Aquaculture Directory. Advisor for the introduction of Barramundi fish to the R&D Ramat Negev Institute. Developed and participated in Israel's organic fish culture R&D. Developed commercial projects in Serbia and Nigeria.

### CCC - Chief Biologist

Director of HHH, fish ponds, Yuval manages and consults micro-algae farms, algae growth solutions and fish ponds farms. Site manager at DDD ponds. Field biologist, algae GGG ACS Ltd. Production Manager, BBB.

## ADVISORY BOARD

The company has enlisted the top specialists in their field to serve as an advisory board, including:



### DDD

Managing Director Sustainable Business Development at RRR, Director of the RRR Fund; Advisor to the RRR Private Equity Fund, Advisor to the RRR Private Equity Fund, and more. DDD holds an M.Sc. In Chemical Physics from the Universities of Groningen and a B.Sc. from Tel Aviv University.



### SSS

Rural areas project manager specialist. Founder and managing director of "MMM", a market leader in community rural housing project design, development and construction. Director of Development of the WWW Company. Managed the construction of SSS community (the largest 1 project in rural Israel). Manages and consults to various Kibbutz companies.



HHH

Co-founder and President of PPP (profit amplification software). Retail, supply chain and business expert: Led more than 50 successful profit amplification programs in the service of leading retailers and CPG companies worldwide, delivering huge benefits and significantly improving the profitability of these respective customers.

## OWNERSHIP DISTRIBUTION

Redacted

## THE BUSINESS OPPORTUNITY

**Spirulina**, a one-celled, helix-shaped micro-algae has been found to contain exceptionally concentrated high levels of essential nutrients: 50%-60% proteins, all essential amino acids, vitamins, minerals and enzymes.

This tiny micro-organism comes as close as possible to providing everything the human body requires, and much more than any fruit, vegetable or meat can provide.<sup>1</sup> 1 kg of Spirulina has the same

nutrients found in about 1,000 kg of assorted vegetables. Studies have also shown that **Spirulina** has a continuing significant positive impact on human and animal health.<sup>2</sup>

Today **Spirulina** is used as a dietary supplement as well as a whole-food and is available as tablets, flakes, powder, fresh and frozen form. The growing awareness to Spirulina, its products and applications, in its integration in ever-growing number of industries, including: Nutrition supplements, pharmaceuticals, cosmetics, raw material for the food industry, premium ingredient of animal feed and pigments for food and pharmaceutical use.

Farming **Spirulina** is an art onto itself, and requires in-depth knowledge of biology and agriculture as well as optimum conditions. According to the European Commission's Joint Research Center: "*Micro-algae represent potential feedstock for food and feed. However, **the technology for the production of micro-algae is still immature**. Research and development has been done in recent years and continues on cultivation systems. **A leap in the development of micro-algae technology is required**; on a practical level, the scale of production needs to increase with a concomitant decrease in the cost of production.*"<sup>3</sup>

***There is a substantial business opportunity in mass-producing this super-algae in an economic manner, delivering a superb product at competitive prices.***

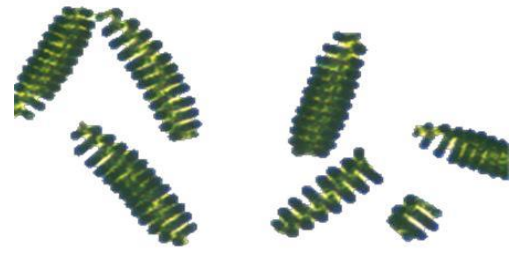


Figure 1: The Spirulina Algae

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<sup>1</sup> Spirulina contains vitamins B1 (thiamine), B2 (riboflavin), B3(nicotinamide), B6 (pyridoxine), B9 (folic acid), vitamin C, vitamin D, vitamin A, vitamin K1, vitamin k2. It's a source of potassium, calcium, chromium, copper, iron, magnesium, manganese, phosphorus, selenium, sodium, and zinc. It contains many pigments, including chlorophyll-a, xanthophyll, beta-carotene, echinenone, myxoxanthophyll, zeaxanthin, canthaxanthin, diatoxanthin, 3'-droxyechinenone, betacryptoxanthin and oscillaxanthin, plus the phycobiliproteins c-phycoyanin and allophycocyanin.

<sup>2</sup> A list of international organizations recognizing the benefits of Spirulina is available in appendix

<sup>3</sup> JRC Scientific and Policy Reports, "Microalgae-based products for the food and feed sector: an outlook for Europe", 2014



## THE XYZ SOLUTION

XYZ is a Spirulina farm in the Spring Valley region of Israel. Using cutting-edge techniques and methodologies, developed by the founders, the company is able to grow high-quality Spirulina at high speeds and low costs for mass-production. Unique and proprietary cultivation methods and carefully selected environmental conditions enable XYZ to scale-up and produce significant quantities of high-quality Spirulina at competitive prices.

The basis of XYZs' operations are an exclusive cluster of endemic Spirulina species, which have been developed for stability, purity, and that can thrive in a wide range of conditions. These feeding of the algae is performed based on exact parameters that minimize waste and allow optimal reproduction.

The XYZ farm is made out of 500 m<sup>2</sup> ponds, arranged and connected in order to allow for greatest ease of care and sharing of resources. Each pond is constantly monitored and any issue can be immediately handled by a professional team-member.

### HIGH YIELD RESULTS

The combination of methods, Spirulina species and perfect climate allows XYZ to generate high yields per m<sup>2</sup> of farmed property. Currently the company can produce 15 g of dry weight (DW) from each m<sup>2</sup> daily. This translates to approximately 2.5 tons of DW from each pond annually.

This yield is over 10% higher than the industry standard (Malaga) and is especially remarkable when taking into account the high quality of the Spirulina.

### HIGH QUALITY PRODUCT

XYZ's Spirulina is among the highest quality Spirulina available in the market. Its qualities are apparent in:

1. **Purity** – Spirulina is famous for its ability to absorb poisons and heavy metals from its surrounding. This important quality makes the growing of Spirulina in clean environments crucial. XYZ's Spirulina is grown in pristine conditions to assure a pure quality product that is safe or use and of the highest purity.
2. **High protein levels** – a lab report detailing the Spirulina nutrient contents is attached.
3. **Non-fragrant** – the company's drying process allows for the end product to remain almost odorless, removing the algae-smell of the dry Spirulina which inhibits its use in food stuffs and other products.



## PROPRIETARY UNIQUE DRYING PROCESS

The Spirulina algae is grown in pools of liquid. The process of drying it, to enable conversion into powder, freezing and storing, is a delicate time-consuming procedure. If performed incorrectly, the result may be dry Spirulina, but devoid of any nutritional value and unusable. XYZ has developed a proprietary drying process that allows generating high volumes of dry Spirulina, while maintaining all the unique nutritional qualities of the algae. An added positive side-effect of the drying process is the removal of any odor from the Spirulina, resulting in a dry odor-less powder that is easily transported and used.

## BENEFITS

The XYZ operations' benefits are numerous, chief among them are:

- **Year-round steady operations** – due to the climate conditions in the Bika'a region, the Spirulina farm enjoys a year-round hot climate which fosters fast growth and allows for a fast drying process. This is compared to many other locations around the world that cannot produce mass quantities 4-5 months a year.
- **Low turnover of pools** – the experienced team at XYZ has developed the capabilities to constantly farm Spirulina from a single pool without needing to replenish (i.e. clean it out, refill and start the process over) the pool periodically.
- **Experienced management** and scientific teams with outstanding credentials at their respective fields
- **Scalable and modular, replicable model**

## INTELLECTUAL PROPERTY

The company has several potential technologies and methods which are patentable, including the Spirulina breed, the growth process and the fast-drying process. The company has elected to maintain this intellectual property confidential at this time, but may pursue registering patents for this, and other, technologies at a future date.

## ROADMAP TO GROWTH

The company has three planned phases for expansion following investment:

- **Phase 1** (Year 1) – construction of a 30,000m<sup>2</sup> facility that will yield 150 tons of dry Spirulina annually. This phase will be modular and generate initial harvest within 3 months.

Map 1: Location of New for Farm Expansion



- **Phase 2** (Year 3) - scale-up operations to 100,000m<sup>2</sup>, increasing production and sales, using an optimized and replicable farm model.
- **Phase 3** - Additional 80,000m<sup>2</sup>, or more, will be added in the following years.

Future expansions may include setting up mega-farms outside of Israel as joint-ventures with other Spirulina manufacturers, or local customers; as well as selling pre-built farms to be installed in foreign markets.

# THE MARKET FOR SPIRULINA

## THE GLOBAL MICROALGAE MARKET

Out of an estimated number of 50.000 microalgae species, only 10 are commercially produced at the moment (**Spirulina**, *Cryptocodinium cohnii*, *Chlorella*, *Dunaliella salina*, *Ulkenia sp.*, *Haematococcus pluvialis*, *Schizochytrium*, *Aphanizomenon flos-aquae*, *Euglena* and *Odontella aurita*). In terms of volume, the three species *Chlorella*, *Spirulina* and *Cryptocodinium* contribute to the biggest volumes.

These Microalgae are used whole (i.e. without transformation) or to produce extracts of interest. About half of microalgae productions are dedicated to products with whole microalgae and the other half to production of extracts. The estimated market value of microalgae was approximately \$800 Million in 2010.<sup>4</sup>

## SPIRULINA USES AND MARKET PRICE

Since 1980, large-scale micro-algae production facilities were established in Asia, India, the USA, Israel and Australia. Traditionally, micro-algae such as *Spirulina* are directly sold as dietary supplements, without any kind of processing except drying. The development of these products is relatively mature and they are produced by a relatively large number of producers. Besides the sales of the whole dried algae, nowadays also specific high-value components from micro-algae are being produced

Nowadays there is a well-established global market for micro-algae based food and feed products, but microalgae also have other functions:

- **Nutrition supplements** - Taken by individuals as pills, powder, chips, fresh or frozen. Over the past decades, over 75% of the production volume of micro-algae was used in the health food market as dietary supplements
- **Raw material for the food industry** – the major use today of *Spirulina*, The growth rate of the functional foods category is 5-8 times higher than the annual growth of general food. *Spirulina* enables manufacturers to dramatically improve the nutrient values of their products without changing the taste, flavors, look or feel.
- **Pigments** - *Spirulina* is a well-known natural source for both food-coloring and pharmaceuticals color additives, such as the blue *Phycocyanin*.
- **Pharmaceuticals** and cosmetics – a rapidly growing market that uses refined algae extracts for natural and healthy additives to medicinal as well as cosmetic products (e.g. skin-care).
- **Premium ingredient of animal feed** – *Spirulina*'s nutritional qualities improve food conversion rates, reduce mortality rates and increase population in fish (up to 100% increase), poultry and other livestock.

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<sup>4</sup> University of Gothenburg, "Microalgae - A market analysis carried out as part of the Interreg KASK IVA project: Blue Biotechnology for Sustainable Innovations, 'Blue Bio'",2013

The market price for Spirulina is derived from its final form (e.g. fresh, dried) and the quality of the algae and ranges from \$12K/ton for use as animal feed to \$200K/ton for dried Spirulina for use as nutritional supplements.

## MARKET SIZE

Although the total production volume and market size of Spirulina in general are still relatively small, they have been characterized by high growth since 1999, along with the total market for micro-algae. In 1999, global production volumes of micro-algae were estimated at only 1,000 ton dry weight. This has increased to 5,000 ton dry weight by 2004, representing a \$1.25B market value,<sup>5</sup> and a 5-fold increase in five years.<sup>6</sup> In 2011, the total production volume has risen to 9,000 ton dry weight.<sup>7</sup>

Latest production estimates for total global production of Spirulina were 5,000 ton annually. However, these estimates were made in 2010 and demand has since driven production to higher levels.

The Spirulina market is not transparent, and as such its exact size is very hard to estimate. The majority of Spirulina growth is used by the grower's company (companies such as DIC) and are therefore not publicly reported. Based on research by the company into existing Spirulina farms and discussions with professionals in the field, it is estimated that annual global production is ~15,000 tons of Dry Spirulina. In addition, some 40,000 – 60,000 tons of semi-dry material are being produced in China, for local consumption as feed.

The market for Spirulina is far from reaching its full potential. Two major markets will be opened to Spirulina in the near future (5-10 years) as studies and methods to utilize Spirulina mature:

- **The market for animal feed** - alone has an enormous potential which is currently not materialized, due to high Spirulina market prices. The world broilers market (i.e. growers of poultry for consumption) consume 272 tons of chicken-feed annually.<sup>8</sup> As a 1% added ingredient for broilers feed, this represents an untapped market for 2.7 million tons of Spirulina annually.
- **Bio-fuel** – Bio-fuels are expected to come to age with the 2<sup>nd</sup> generation of fuels produced from non-food materials. According to a recent report from Allied Market Research, the global second generation biofuels market is estimated to grow at a CAGR of 49.4% over 2014 - 2020 and is expected to be valued at \$ 23.9 billion in 2020.<sup>9</sup> High volume of second generation biofuels will be produced from algae, including Spirulina, due to its oil content, resulting in high yield production.

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<sup>5</sup> Milledge, J., "Microalgae commercial potential for fuel, food and feed." 2012. FS&T Vol 26, Issue 1 (2012).  
<http://eprints.soton.ac.uk/336243/>

<sup>6</sup> Spolaore et al., "Commercial applications of microalgae." 2006. Journal of Bioscience and Bioengineering Volume 101, Issue 2, Pages 87–96

<sup>7</sup> Acien et al., "Photobioreactors for the production of microalgae." 2013. Rev Environ Sci Biotechnol (In publication)

<sup>8</sup> 2014 Alltech Global Feed Survey Results -  
<http://www.alltech.com/sites/default/files/alltechglobalfeedsummary2014.pdf>

<sup>9</sup> <http://www.alliedmarketresearch.com/second-generation-biofuels-market>

## TRENDS

- **Health functional food products "catching-on"** – foods that provide more than just nutrition, i.e. "super-foods" have been growing in popularity across the world. These include:
  - **Probiotic and prebiotic foods and beverages** which, according to market researcher Packaged Facts, commanded a global retail market of US \$15 billion in 2008, a 13% increase over 2007, with an estimated market of more than US \$22 billion by 2013.
  - **Nutraceuticals**, with a market that was estimated at \$160.6 billion in 2013 and increased to \$171.8 billion in 2014. The market is expected to reach \$241.1 billion by 2019, a compound annual growth rate (CAGR) of 7% from 2014 to 2019.<sup>10</sup>

## REGULATION

### USA

Two USA laws, both regulated by the FDA, are applicable on micro-algae based food and feed products once they are sold on the consumer market:

- The Federal Food, Drug and Cosmetic Act (FD&C) introduced in 1938 [152], which regulates all foods and food additives. According to this act, the legal status of a food substance depends on whether it is used in a conventional food, a dietary supplement or as ingredient in a dietary supplement product. For the FDA, any substance that is intentionally added to food is a food additive and is subject to premarket review and approval by FDA, unless the substance is generally recognized, among qualified experts, as safe (GRAS) under the conditions of its intended use. ***Spirulina is among the seven algae based GRAS food ingredients that have been reviewed by FDA.***
- The Dietary Supplement Health and Education Act (DSHEA) introduced in 1994, which amended the FD&C Act to cover dietary ingredients and supplements. This act provides a regulatory framework for dietary supplements and is more of a bureaucratic hurdle imposed on the manufacturer, packer, or distributor whose name appears on the label of a dietary supplement marketed in the USA.

### EUROPE





Three European regulations apply to the marketing of microalgae or its components: on food safety, on novel food and novel food ingredients, and on nutrition and health claims for food. Spirulina itself is not a novel food (as it was already on the market before 1997). However, new uses for Spirulina, such as for blue colorant, extracted from the algae and refined, may be considered a new product and thus falls under the Novel Food Law, and therefore require the company to apply to a national authority for authorization, and present a scientific information and safety assessment report.

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<sup>10</sup> BCC Research

## THE COMPETITION

There are many Spirulina growers around the globe. However, approximately 40% of all dry Spirulina originates in one of the following major growers:

Company	Locations	Description	Annual Production Volumes (tons)
	Japan, Thailand, Hainan Island, USA (via EarthRise CA)	Established in 1908 as a printing inks manufacturing and sales company, DIC main business is in mainstay organic pigments and synthetic resins solutions. DIC is a multinational corporate group with operations in more than 60 countries and territories. It is considered the largest Spirulina producer, constantly acquiring most many smaller producers.	> 1,000
	Hawaii	Incorporated in 1981, the publically traded Cyanotech develops and commercializes natural products from microalgae. The Company is currently producing microalgae products for the nutritional supplement and immunological diagnostics markets in addition to microalgae-based products and food coloring markets.	300-350
	US	Acquired by E.I.D.-Parry (India) Limited, the bio products and nutraceuticals division of the Murugappa Group, yet operates independently. Valensa is an international supplier of nutraceuticals ingredients, functional food and human nutrition with a broad range of offerings to the functional food and human nutrition marketplace. Valensa relies on technology in the areas of extraction.	300
	Australia	The only Spirulina Farm in Australasia. Grown in the pollution free environment and clear mineral water of the Northern Territory, Australian Spirulina is the only Spirulina grown in Australasia. Claiming to have high quality, pure products compared to any other competitor.	100

In addition there are many micro-farmers growing Spirulina in small quantities around the world.

Much of the current Spirulina available in the market originates in China and is considered a low quality product since it is grown in unpure conditions, dried in an expediate manner that removes much of its nutrient value and may even be dangerous to eat.

# BUSINESS STRATEGY

## PRICING

XYZ's breakthrough technology and methods enable extremely low production costs and establish our capability to offer our high quality Spirulina at a very competitive price. The following is the estimated average price of XYZ products, based on the target customer and sales channel in the near future.

Table 2: Price for Produced Spirulina

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Channel	Form	Price/kg (\$)					
Distributors	<b>Chips</b>	15	15	15	15	15	15
Distributors	<b>Frozen</b>	50	50	50	50	50	50
Phycocianin	<b>Powder</b>	10	10	10	10	10	10
Food Industry	<b>Chips</b>	10	10	10	10	10	10
Feed Industry	<b>Chips</b>	8	7	7	6	6	6
Direct	<b>Chips</b>	65	65	65	65	65	65
Direct	<b>Special</b>	70	70	70	70	70	70
Average Price/Total		27	21	22	22	22	19

XYZ will ensure a sales mix of all variants to create a strong foundation, while focusing on high-income channels, such as the direct channel, for growth.

## SALES CHANNELS

The company will employ a two-tiered approach to sales:

- **Channel sales** – the company will sell the majority of its products through local specialized distributors, including companies that provide raw materials to the cosmetics industry and/or supply materials to pharmaceuticals.
- **Direct** - the company will employ a sales team that will be responsible for securing sales of raw materials to large customers in relevant industries, such as animal feed additives or nutritional supplements.
- **Online** - The company will participate with joint-ventures with online e-commerce sites specializing in superfoods, to distribute its products under a private label.

## TARGET MARKET

XYZ is targeting the concentrations of food and feed companies in the European and North American markets. These markets have been chosen due to the higher awareness and demand by local consumers, as well as the potential of higher margins. In addition the logistics cost (in relation to the product's price) are negligible.



# FINANCIAL ANALYSIS

## SETUP COSTS

The basic building block of the Spirulina farm is a 500m<sup>2</sup> pond. These ponds are connected and monitored from a central location. The following table details the costs of constructing a single pond.

Table 3: Costs of constructing a Single Spirulina Pond

Item	Units	Quantity	Price (₪)	%	Cost (\$)
<b>Materials</b>					
Greenhouse frame including pool frame 500m <sup>2</sup>	frame	1	15,750	20%	3,938
Plastic cover for greenhouse tunnel	cover	1	3,487	4%	872
Plastic sheeting for pools including 50cm height	pool	675	35	30%	5,906
Paddle wheels	kit	2	7,400	19%	3,700
Monitoring System	unit	1	10,633	14%	2,658
Electricity	switch	1	3,500	5%	875
<b>Labor</b>					
Earth works and leveling	labor	1	2,800	4%	700
Drainage	labor	1	3,000	4%	750
<b>Total</b>				<b>100%</b>	<b>19,399</b>

There is a decreasing marginal cost of constructing the ponds when building large farms. The following table details the discount entailed in building large farms.

Table 4: Discount from Full Price of Single Pond when Constructing Large Ponds

Installation size (m <sup>2</sup> )	0-1,000	1,001-5,000	5,001-30,000	30,001-100,000	100,001 - up
Bulk installation discount	0%	15.00%	15%	20%	25%

New equipment needs are relational to the size of the farm, as follows:

Table 5: Cost of additional Equipment for New Farms

Additional Equipment	0-1,000	1,001-5,000	5,001-30,000	30,001-100,000	100,001 - up
Lab equipment	0	22,500	5,000	45,000	0
Harvesting-drying & packing	0	78,300	238,000	1,104,750	0
Generator	0	0	25,000	0	0
UV disinfection unit	0	11,250	11,250	67,500	0
Misc.	0	25,000	50,000	75,000	0
Design & inspection	0	7,500	30,000	114,000	0
<b>Total Additional Equipment Costs (\$)</b>	<b>0</b>	<b>144,550</b>	<b>359,250</b>	<b>1,406,250</b>	<b>0</b>

The Spirulina farm will be constructed in phases. The following table details the total costs of such expansion.

Table 6: Cost of Farm Expansion (5 year plan)

	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total
<b>Farm Size - operating (m<sup>2</sup>)</b>	<b>30,000</b>	<b>30,000</b>	<b>100,000</b>	<b>100,000</b>	<b>180,000</b>
<b>Farm under construction (m<sup>2</sup>)</b>	<b>29,000</b>	<b>0</b>	<b>70,000</b>	<b>0</b>	<b>80,000</b>
Number of new ponds	58	0	140	0	160
Pond installation costs	1,040,743	0	2,172,660	0	2,483,040
Additional equipment costs	503,800	0	1,406,250	0	0
<b>Total Cost</b>	<b>1,544,543</b>	<b>0</b>	<b>3,578,910</b>	<b>0</b>	<b>2,483,040</b>

## PRODUCTION COSTS

Production of Spirulina involves maintaining exact temperature and mineral levels of the ponds, as well as collecting and drying the micro-algae. The following table details the costs involved in maintain the farm at full capacity.

Table 7: Costs Involved in Producing Spirulina Based on Farm Size (\$)

	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total	Year 6 Total
<b>Farm Size - operating (m<sup>2</sup>)</b>	<b>30,000</b>	<b>30,000</b>	<b>100,000</b>	<b>100,000</b>	<b>180,000</b>	<b>180,000</b>
Number of operating units	60	60	200	200	360	360

<b>Operating Expenses</b>						
Salt, Bicarbonate, Fertilizers	1,143.1	4,425.0	10,878.1	14,750.0	22,125.0	26,550.0
Electricity	23,486.2	90,914.4	223,497.9	303,048.0	454,572.0	545,486.4
Drying and cooling energy costs	4,650.0	18,000.0	44,250.0	60,000.0	90,000.0	108,000.0
Misc.	3,875.0	15,000.0	36,875.0	50,000.0	75,000.0	90,000.0
Number of Operational Vehicles	1	1	1.75	2	2.5	3
Director of Algae Production's Vehicle	1	1	1	1	1	1
Total Vehicular Costs	30,000.0	30,000.0	41,250.0	45,000.0	52,500.0	60,000.0
<b>Total Operating Expenses</b>	<b>63,154.3</b>	<b>158,339.4</b>	<b>356,751.0</b>	<b>472,798.0</b>	<b>694,197.0</b>	<b>830,036.4</b>
<b>HR Roster</b>						
Site manager/Biologist	1	1	1	1	1.8	1.8
Director of Algae Production	1	1	1	1	1.0	1.0
Permanent workers	1.2	3	7.5	10	15	18
Summer workers 4 months	0.3	1.0	1.3	3.3	3.7	6.0
<b>Total Number of Employees</b>	<b>3.5</b>	<b>6</b>	<b>10.8</b>	<b>15.3</b>	<b>21.4</b>	<b>26.8</b>
<b>HR Costs</b>						
Site manager/Biologist	75,000	75,000	75,000	75,000	131,250	131,250
Director of Algae Production	78,000	78,000	78,000	78,000	78,000	78,000
Permanent workers	21,000	54,000	135,000	180,000	270,000	324,000
Summer workers 4 months	6,000	18,000	24,000	60,000	66,000	108,000
<b>Total Number of Employees</b>	<b>180,000</b>	<b>225,000</b>	<b>312,000</b>	<b>393,000</b>	<b>545,250</b>	<b>641,250</b>

As production ramps up, these costs translate into a decreasing cost for each kilogram of Spirulina produced, as follows:

Table 8: Cost of Producing 1 kg of Spirulina as a Factor of Farm Size

	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total	Year 6 Total
Farm Size - operating (m <sup>2</sup> )	30,000	30,000	100,000	100,000	180,000	180,000
Cost of Goods / kg	10.4	2.6	1.7	1.6	1.7	1.5

## REVENUES

An average pond can manufacture 15 grams of Spirulina every day when operating in maximum efficiency. Based on standing agreements, expected production and demand from suppliers, the company foresees the following distribution of sales by customer-type.

Table 9: Sales Distribution by Customer-type (% and actual kg)

		Distribution Mix						Actual Distribution (kg)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Channel	Form	% of sales						kg					
Distributors	Chips	39.1%	20.0%	18.6%	18%	17%	18%	9,000	30,000	71,000	100,000	120,000	180,000
Distributors	Frozen	13.0%	8.0%	12.0%	13%	13%	12%	3,000	12,000	46,000	70,000	90,000	120,000
Phycocyanin	Powder	17.4%	26.7%	34.8%	36%	39%	35%	4,000	40,000	133,000	200,000	275,000	350,000
Food Industry	Chips	0.0%	5.3%	4.2%	5%	6%	4%	0	8,000	16,000	25,000	40,000	40,000
Feed Industry	Chips	13.0%	26.7%	18.8%	17%	14%	23%	3,000	40,000	72,000	95,000	100,000	230,000
Direct	Chips	8.7%	6.7%	5.8%	5%	5%	4%	2,000	10,000	22,000	30,000	37,000	40,000
Direct	Special	8.7%	6.7%	5.8%	5%	5%	4%	2,000	10,000	22,000	30,000	38,000	40,000
Average Price/Total		100%	100%	100%	100%	100%	100%	23,000	150,000	382,000	550,000	700,000	1,000,000

This translates into the following revenues:

Table 10: Revenue Forecasts for First Five Years (\$,000s)

Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Distributors - chips	109	418	812	1,479	1,644	2,497
Distributors - frozen	121	539	1,754	3,450	4,111	6,242
Phycocyanin Powder	32	322	1,014	1,971	2,512	3,814
Food Industry - chips	0	59	122	246	365	555
Feed Industry - chips	19	223	357	562	548	832
Direct - chips	105	563	1,091	1,922	2,197	3,336
Direct - chips	113	607	1,174	2,070	2,430	3,689
Revenues (\$)	500	2,730	6,324	11,700	13,809	20,965

## PROFIT & LOSS

The following table details the expected operational profit and loss for the first six years of operation (not including investments for fixed assets). The company's gross profit margins are expected to exceed 95% with operational profit margin at 56%.

Table 11: Pro-forma Profit & Loss for First Six Years (\$)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Revenues	499,896	2,729,885	6,324,240	11,700,313	13,808,689	20,964,645
Cost of Goods	243,154	383,339	668,751	865,798	1,239,447	1,471,286
Gross Profit	256,742	2,346,545	5,655,489	10,834,515	12,569,242	19,493,359
Gross Margin	51%	86%	89%	93%	91%	93%
General & Administrative (G&A) Expenses	210,000	213,000	290,100	622,800	738,750	749,100
Research & Development (R&D) Expenses	150,000	201,150	279,000	338,850	418,800	423,750
Marketing & Sales Expenses	154,745	399,220	947,108	1,421,800	1,833,328	2,633,422
Operating Profit (Loss)	-258,003	1,533,175	4,139,281	8,451,065	9,578,365	15,687,087
Financial Expenses	0	0	0	0	0	0
Profit (Loss) Before Tax	-258,003	1,533,175	4,139,281	8,451,065	9,578,365	15,687,087
Profit/Sales	0%	56%	65%	72%	69%	75%

## CASH FLOW

Breakeven is expected in the first quarter of the second year of operations. The following table details the expected annual cash flow for the first five years of operations, a detailed cashflow analysis for the first year is provided in Appendix B.

Table 12: Annual Cash Flow (\$)

	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total	Year 6 Total
<b>Farm Size - operating (m<sup>2</sup>)</b>	<b>30,000</b>	<b>30,000</b>	<b>100,000</b>	<b>100,000</b>	<b>180,000</b>	<b>180,000</b>
<b>Incoming</b>						
Revenues	499,896	2,729,885	6,324,240	11,700,313	13,808,689	20,964,645
Investments & Loans	1,500,000	0	0	0	0	0
Total Incoming	1,999,896	2,729,885	6,324,240	11,700,313	13,808,689	20,964,645
<b>Outgoing</b>						
Investment in Fixed Assets	1,498,956	0	3,578,910	0	2,483,040	0
Cost of Goods	243,154	383,339	668,751	865,798	1,239,447	1,471,286
Operational Expenses	514,745	813,370	1,516,208	2,383,450	2,990,878	3,806,272
Financing Expenses	0	0	0	0	0	0
Total Outgoing	2,256,855	1,196,710	5,763,869	3,249,248	6,713,365	5,277,559
<b>Cashflow</b>	<b>-256,959</b>	<b>1,533,175</b>	<b>560,371</b>	<b>8,451,065</b>	<b>7,095,325</b>	<b>15,687,087</b>
<b>Accumulated Cashflow</b>	<b>-256,959</b>	<b>1,265,443</b>	<b>1,955,189</b>	<b>10,572,879</b>	<b>18,021,354</b>	<b>34,359,166</b>

## INVESTMENT SOUGHT

An investment of \$1.5M is needed to remain cash flow positive during the first year of operations.

## APPENDICES

### APPENDIX A - SPIRULINA CREDENTIALS - WORLD FOOD AND HEALTH ORGANIZATIONS



UN

Spirulina- was declared by the United Nations World Food Conference of 1974 as **The Best Food For The Future** <http://iimsam.org>



WHO

Spirulina represents an interesting food for multiple reasons, rich in iron and protein, and is able to be administered to children without any risk. **"We at WHO consider it a very suitable food"** - WHO, Geneva, Switzerland June 8Th, 1993.



USDA

"Spirulina, serves as a **nutritional supplement and food additive** and, also, as a feed component." (USDA Economic research service Wednesday, June 13, 2012)

Contains the **highest ratio of essential amino acids** in a natural, bioavailable form when compared to peas, beans, spinach, soy, whey or egg whites (USDA listings)



NASA

We propose [...] to develop a design for membrane-based photoreactors for Lunar and Mars exploration habitat LSS, for the cultivation of genetically modified strains of **Spirulina to scrub CO<sub>2</sub> and supply Astronauts with O<sub>2</sub>, protein, vitamins, and immunostimulators** (Novel concept for LSS Based on Advanced Micro algal Biotechnologies Feb 2006 )



FAO

There is a need for both national governments and inter-governmental organizations to re-evaluate **the potential of Spirulina to fulfill both their own food security needs** as well as a tool for their overseas development emergency response efforts" (FAO Report on Spirulina 2008)



FDA

"Spirulina is Generally Recognized As Safe. (GRAS) Under sections 201(s) and 409 of the Federal Food, Drug, and Cosmetic Act



IIMSAM

An open letter calls upon Member States, United Nations agencies and other intergovernmental organizations, as well as non-governmental organizations and the private sector, to encourage the production and use of Spirulina (General Assembly, 8 November 2005, Agenda Item 52)

## APPENDIX B – FIRST YEAR MONTHLY CASH FLOW ANALYSIS

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
<b>Farm Size - operating (m<sup>2</sup>)</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>10,000</b>	<b>10,000</b>	<b>10,000</b>	<b>10,000</b>	<b>30,000</b>
<b>Incoming</b>												
Revenues	0	8,619	8,619	8,619	43,095	43,095	43,095	43,095	43,095	86,189	86,189	86,189
Investments & Loans	1,500,000	0	0	0	0	0	0	0	0	0	0	0
<b>Total Incoming</b>	<b>1,500,000</b>	<b>8,619</b>	<b>8,619</b>	<b>8,619</b>	<b>43,095</b>	<b>43,095</b>	<b>43,095</b>	<b>43,095</b>	<b>43,095</b>	<b>86,189</b>	<b>86,189</b>	<b>86,189</b>
<b>Outgoing</b>												
Investment in Fixed Assets	38,798	65,956	65,956	144,550	0	82,445	82,445	164,889	164,889	164,889	164,889	359,250
Cost of Goods	17,106	18,606	18,606	20,032	20,032	18,532	18,532	20,315	20,315	20,315	20,315	30,445
Operational Expenses	35,500	35,931	39,681	40,931	42,655	42,655	42,655	44,155	44,155	46,309	46,309	53,809
Financing Expenses	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Outgoing</b>	<b>91,404</b>	<b>120,493</b>	<b>124,243</b>	<b>205,513</b>	<b>62,687</b>	<b>143,632</b>	<b>143,632</b>	<b>229,359</b>	<b>229,359</b>	<b>231,514</b>	<b>231,514</b>	<b>443,504</b>
<b>Cashflow</b>	<b>1,408,596</b>	<b>-111,874</b>	<b>-115,624</b>	<b>-196,895</b>	<b>-19,593</b>	<b>-100,537</b>	<b>-100,537</b>	<b>-186,265</b>	<b>-186,265</b>	<b>-145,325</b>	<b>-145,325</b>	<b>-357,315</b>
<b>Accumulated Cashflow</b>	<b>1,408,596</b>	<b>1,296,722</b>	<b>1,181,097</b>	<b>984,203</b>	<b>964,610</b>	<b>864,073</b>	<b>763,535</b>	<b>577,271</b>	<b>391,006</b>	<b>245,681</b>	<b>100,357</b>	<b>-256,959</b>