Acuicultura en Latinoamérica

Innovación y sostenibilidad para una acuicultura global

Medellín, Colombia | 24 al 27 septiembre

LAQUA 24 | VIII Conferencia Latinoamericana sobre el Cultivo de Peces Nativos | XI CCA Congreso Colombiano de Acuicultura

Organizado por

ACCUA | FEDEACUA Federación Colombiana de Acuicultores | Asociación Latinoamericana sobre el Cultivo de Peces Nativos | Universidad CES | Universidad de Antioquia, Facultad de Ciencias Agrarias | World Aquaculture Society, Latin American & Caribbean Chapter | World Aquaculture Society

Patrocinadores ORO

USSEC U.S. Soybean Export Council | US Soy Entrega Soluciones | Contegral | Finca, Siempre en el campo | 30 Pharvet

Apoyo institucional

ONUDI, Organización de las Naciones Unidas para el Desarrollo Industrial | AUNAP, Autoridad Nacional de Acuicultura y Pesca | Vecol

Was premier sponsors

Zeigler | Syaqua | Blue Genetics | Blue Aqua

laccWas | @LACC_WAS | LACC World Aquaculture Society

ECONOMIC FEASIBILITY OF SMALL-SCALE SPIRULINA FARMING IN BRAZIL

Michelle P. Vetorelli*, Janaína M. Kimpara, Laurindo Rodrigues, Wagner C. Valenti, Matheus D. Bacchi

*Faculdade de Ciências Agrárias, Universidade Federal da Grande Dourados, Dourados, Mato Grosso do Sul, Brasil
michellevetorelli@ufgd.edu.br

Aquatic systems are increasingly recognized as indispensable for enhancing the food and nutrition security of a growing and increasingly urbanized population. There is a growing preference for production methods that use less land and water while emitting low or zero CO2. Spirulina (a cyanobacterium) is a staple in many diets across the world, highlighting its potential as a sustainable food source. Despite Spirulina production occurring across all regions of Brazil, this data is notably absent from official statistical records, leaving the precise number of producers and their production volumes undisclosed. Consequently, domestic production falls short of meeting Brazil's demand, necessitating reliance on imports from other Spirulina-producing nations to supply health food stores. Currently, the production chain for microalgae farming is nonexistent in Brazil, emphasizing the importance of conducting a comprehensive analysis to facilitate the growth of this sector. Therefore, our research aimed to evaluate the establishment of an artisanal Spirulina production hypothetical farm in the southern region of Mato Grosso do Sul, located in the central-western region of Brazil.

The system used in the hypothetical study is a semi-continuous setup featuring raceway tanks within an open configuration. Water movement within the tanks is facilitated by rotating paddle wheels driven by a motor. Each module consists of two tanks measuring 3.5 meters in width, 25 meters in length, and 0.32 meters in height, with a total volume of 28 cubic meters. These tanks are inoculated with an algal solution during the exponential growth phase, initially comprising 10% of the total tank volume. The harvesting of algal biomass occurs daily, starting from the 12th day of cultivation, with the crop being filtered. Cultivation takes place indoors within an agricultural greenhouse, which is covered with transparent plastic to allow for natural lighting and maintain a consistent photoperiod. The culture medium employed for the analysis is Zarrouk. The average yield considered was 0.5 grams of dry Spirulina per liter of productive medium, achieved from 12 days after the algal inoculation began (0.5 g/L or 48 t/ha/year). An assessment of the initial investment in fixed assets was conducted, encompassing both the expunging capital (CAPEX) and implementation costs. A maintenance reserve of 3% per year of the total acquisition value was factored in for the upkeep of enhancements and equipment (Operational Expenditure [OPEX]). Depreciation was computed utilizing the straight-line method. A comprehensive review of operating costs and expenses was conducted to facilitate cash flow analysis over a 10-year timeframe. Following the determination of operating cash flow, key indicators were derived, including net present value (NPV), internal rate of return (IRR), modified internal rate of return (assuming reinvestment of 10% per annum of the FC value), as well as simple and discounted payback periods. The discount rate applied was the cost of equity (ke). The calculation of ke utilized the Capital Asset Pricing Model (CAPM) benchmarked against the USA. The adjusted CAPM formula is as follows:

The selling price ($19.34) was determined based on the local market for domestic products, primarily targeting natural produce markets. The product's sale in the region is positioned as a high-quality food item with an emphasis on traceability.

The production of Spirulina demonstrates economic viability with flexibility to accommodate various economic scenarios. These scenarios may include adjustments to discount rates, adaptation to consumer market trends, potential decreases in sales prices, increases in costs and expenses, as well as enhancements in fixed investments.

(Continued on next page)