

The Power of Algae:

ADVANCING AQUACULTURE WITH ALGAE-BASED INNOVATION

Aquaculture continues to face growing challenges that affect both *fish and farm profitability*. Societal pressure is also becoming more vocal about environmental impacts associated with the aquaculture industry.

Rainforest Algae Corp. provides technological solutions to address key challenges faced by aquaculture farm operations, including:

- Countering rising energy costs
- Dealing with solids in the water
- Improving biofiltration
- Improving tank oxygenation
- Improving removal of CO₂
- Improving pH control
- Improving digestibility through optimized feed solutions



HARNESSING THE POWER OF ALGAE

A primary focus of Rainforest Algae Corp is the development of a **state-of-the-art algae cultivation system**. Where there is a great deal of media attention related to the challenges of algae in water bodies, we believe that we need to work in alignment with nature and view this as an opportunity (the glass half full) rather than simply struggling against it.

We are actively cultivating algae. To date, the majority of algae that we have been producing is **food-grade spirulina**, a recognized **superfood** known for its nutritional benefits.

FISH HEALTH & THE BENEFITS OF SPIRULINA

Spirulina is packed with *protein—twice as much as chicken or beef*—and contains all the essential amino acids for easy digestion. It's 100% edible, making it a natural, efficient, and sustainable feed supplement for healthier fish. Adding spirulina (1-10% of total diet) to fish feed:



Improves growth rate and feed conversion ratios (FCR)



Boosts the fish immune system, reducing disease and mortality rates.



Enhances flesh and skin coloration, improving marketability

PHOTOBIOREACTOR MODELS AND SIZES

	Minnow – 2 L	Chinook – 10 L	Dolphin – 420 L
Beluga – 1 m³	Orca – 10 m³	Bowhead Whale – 100 m³	Blue Whale – 1000 m³



ALGAE CULTIVATION & WATER QUALITY IMPROVEMENT

Algae is the **fastest-growing plant on the planet**, with certain species doubling in mass within 24-48 hours. Beyond its role in feed production, algae plays a critical role in water **filtration and oxygenation**.

How algae cultivation improves aquaculture environments:



Absorbs CO₂

For every 1 tonne of algae biomass produced, 1.8 tonnes of CO₂ are removed



Balances pH levels, reducing acidity and improving water stability



Releases oxygen,

which is essential for fish health



Uses ammonia expelled by fish,

along with the by-products nitrites and nitrates, reducing waste buildup.



Minimizes reliance on antibiotic by reducing fish stress through cleaner, more natural water quality.

Based on a Rainforest Algae Corp. production platform of 225 m³ growth media, we project the potential for:

90 tonnes of CO₂ captured per year by algae growth

52 m³/hr (1,250 m³/day) system water flow rate

65 tonnes of oxygen per year produced by the algae

160 tonnes of algae biomass produced per year

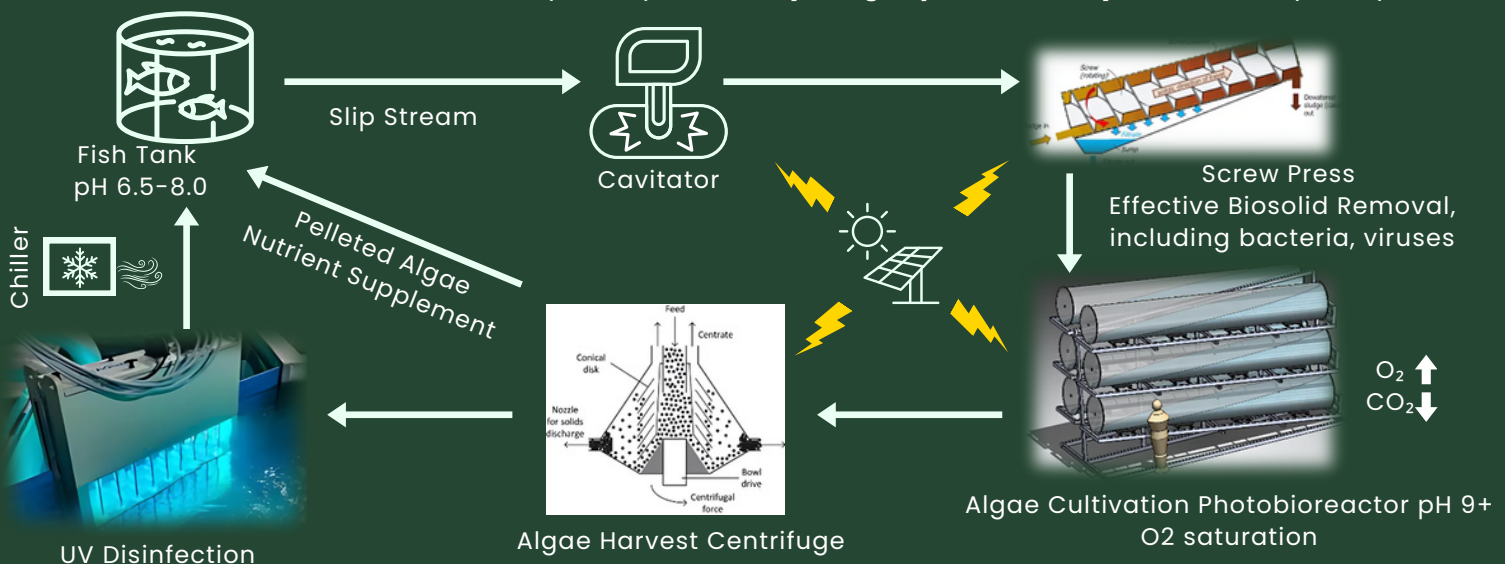
Rainforest Algae Corp. has developed a patented algae cultivation system utilizing photobioreactors (PBRs) to enhance gas exchange between water and air.

This solution enables the supersaturation of a gas (i.e. oxygen) in water while maintaining efficient gas exchange, including removing CO₂ and infusing additional O₂ from ambient air into the water.

DEALING WITH SOLIDS AND BIOFILTRATION

These would be dealt with in associated **bolt-on operations**. Water leaving the fish tanks passes through a cavitation system that significantly improves settling and removal of particulate (including solids) from the water.

Once particulate is removed, we are left with clarified water and nutrients suitable for cultivating algae. After algae has removed the nutrients, the algae would be harvested, and the clarified, high-pH, oxygenated water would be UV treated (although expected to require much less treatment), adjusted for temperature, and returned to the fish tank, helping to buffer the pH of the fish tank. This solution fits in very nicely with **Recycling Aquaculture System (RAS)** principles.



The Circular Economy System in Aquaculture with Rainforest Algae's Technology



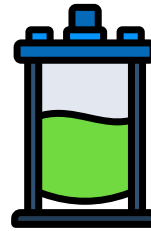
Waste Source

Fish produce solid waste (feces) and nutrient-rich wastewater containing nitrogen, phosphorus, and ammonia.



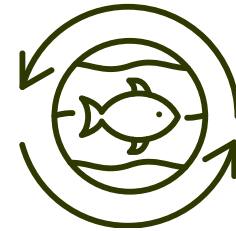
Collection and Pre-Treatment

Wastewater is filtered to separate solid waste (which can be used for composting/biofertilizer) from nutrient-rich water. The filtered water is directed to photobioreactors (PBRs).



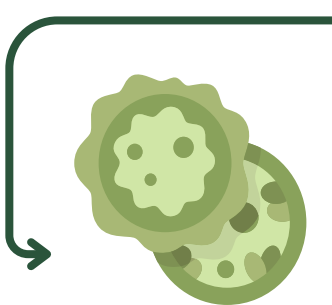
Algae Cultivation

Microalgae in PBRs absorb nutrients, purify water, produce oxygen, and capture CO₂. The clean water is prepared for recirculation.



Water Recirculation

Treated, oxygenated water flows back into the fish tanks, maintaining high water quality and reducing freshwater consumption.



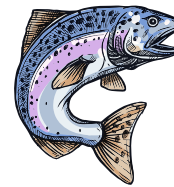
Biomass Harvesting

Microalgae biomass is harvested from PBRs using filtration or centrifugation. This biomass is nutrient-rich and ready for processing.



Product Development

The algae biomass is processed into nutrient-rich aquafeeds for a circular RAS feed cycle and valuable by-products like biofertilizers, biofuels, and more.



Fish Health & Growth

Fish thrive on improved water quality and algae-based diets, reducing antibiotic use and enhancing health.



Market Integration

Fish and algae-based products enter the market, delivering sustainable, high-quality solutions that support efficiency, cost savings, and eco-friendly practices.



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