



ALGAE HARVESTING

Continuous Chemical-Free Algae Harvesting



TECHNICAL DESCRIPTION EWS Algae

Background

Based on OriginOil's proprietary Electro Water Separation™ (EWS) technology, EWS Algae™ is an algae harvesting technology providing a low energy, chemical-free, continuous flow 'wet harvest' system to efficiently dewater, and concentrate the microalgae. EWS Algae systems can handle flow rates variable from 2 to 120 liters per minute (.5 to 40 GPM), with the ability to remove greater than 99% of the initial water volume at the harvesting stage.

EWS Algae systems will operate either continuously or intermittently on a wide variety of microalgae strains. The technology is extremely well suited for testing aimed at the development of commercial scale processes.

Features and Benefits

FEATURES	ADVANTAGES	BENEFITS
Processes algae water directly	No pre-concentrating or dewatering required	Capital and operating savings
Electrical pulsing process	No chemicals needed	Organically pure algae concentrate, process water
Low energy electromagnetic pulsing system	Total energy less than 0.7 kWh per cubic meter	Operating savings, consumables minimized
Integrated biomass concentrator	Ability to remove up to 99% of the water from the algae	Uniform intermediate feedstock
Sanitized concentrate	Greatly extended shelf life	Product can be easily shipped offsite for processing
High continuous throughput	Scalable and efficient	Minimized infrastructure
Skid or trailer mounted modules	Easy Installation	Mobile harvester fleet
Distributed architecture	Flexible topology	Easy to ramp up and reassign machines as needed



Process Overview

The EWS Algae is typically located on premises at the algae growth facility.

When ready for harvesting, the dilute microalgae culture is fed directly from the growth system into the EWS Algae without any prior pretreatment or concentration.

Each system is equipped with its own integrated control system that manages operational settings for flocculation and flotation of the algae cells and separation of the algae cells from the water.

As the raw algae passes through the EWS Algae, it is subjected to tuned electromagnetic pulses. The system operation consists of two stages:

- First stage: high-flow, low-energy, chemical-free flocculation.
- Second stage: flotation of flocculated algae to remove the biomass from the water phase, this process is able to remove more than 99% of initial water volume the water. (Optional devices are available to achieve higher solids concentration downstream from the EWS Algae.)

Product Specifications

Flow rates variable based upon operator controlled settings:

- Minimum flow rate of 2 - 12 LPG (0.5 - 3 GPM) – processing 18,000 liters per day in continuous harvest.
 - Sufficient for a 40,000 liter growth facility at 20% daily harvest, depending on algal strain, growth conditions, and growth methodology.

- Maximum flow rate of 120 LPM (40 GPM)– processing 180,000 liters per day in continuous harvest.
 - Sufficient for a 400,000 liter growth facility at 20% daily harvest, depending on algal strain, growth conditions, and growth methodology.
- Microalgae concentration: Wide flexibility from less than 125mg to as much as 3g/liter dry weight.
- Electrical requirements: 120/240 volts, 50/60 hertz.

Additional Product Features

- Remote support by OriginOil technicians (requires support contract).
- Tunable to a wide range of fresh and saltwater microalgae species.
- Mounted on a stainless steel table for ease of operation.
- Applicable to all growth platforms.

Higher Capacity Models

OriginOil has also shipped harvesting systems rated up to 285 liters per minute.

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