Algae Appliance Model 4

Powered by Single Step Extraction technology

Process and Equipment Description

Model 4 Algae Appliance™, is an entry-level, low-cost algae harvester providing a low energy, chemical-free, continuous flow 'wet harvest' system to efficiently dewater, rupture cell walls, and concentrate the microscopic algae harvest. The Model 4's flow rate is variable from 2 to 4 liters per minute (.5 to 1 GPM), with the potential to remove more than 99% of the initial water volume at the harvesting stage. The Model 4 will operate either continuously or intermittently for testing purposes on a wide variety of microalgae strains.

The system is extremely well suited for testing aimed at the development of commercial scale processes, in that it provides these features and benefits:

Features	Advantages	Benefits
Feed algae water directly from growth system	No pre-concentrating or dewatering required	Savings in capital and operating expenditures (CAPEX and OPEX)
Dewatering uses electromagnetic pulses and biomass concentrator	No added chemicals in process	Eliminates conflicts in downstream refining, processing or biomass usage
Low energy electromagnetic pulses to compromise algae cells	Total energy less than one kWh per cubic meter	Optionally ruptures cell walls to make cell contents available for downstream processes
Integrated biomass concentrator	Removes up to 99% of the water from the algae	Savings in OPEX by removing most of the water early in the process
High continuous throughput	Scalable and efficient	Reduced CAPEX and OPEX
Skid mounted modules	Easy Installation	Savings in installation cost

Process Overview

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

When ready for harvesting, the dilute microalgae culture is fed directly from the growth systems into the Algae Appliance without any prior pretreatment or concentration. Each system is equipped with its own integrated control system that manages operational settings for flocculation of the algae cells and flotation and separation of the algae cells from the water.

As the raw algae passes through the Algae Appliance, it is subjected to tuned electromagnetic pulses. The system operation consists of three phases:

- First phase: high-flow, low-energy, chemical-free flocculation.
- Second phase: compromise cell walls for downstream applications, when appropriate.
- Third phase: concentration to remove up to 99% of the water.

(Optional devices are available to achieve higher solids concentration downstream from the Algae Appliance.)

Product Specifications

- Flow rates variable based upon operator controlled settings:
  - Minimum: 2 LPM (0.5 GPM) – processing 3,000 liters per day in continuous harvest.
  - Maximum: 4 LPM (1 GPM) – processing 6,000 liters per day in continuous harvest.*
    *(Sufficient for a 30,000 liter growth facility at 20% daily harvest)
- Microalgae concentration: Wide flexibility from less than 125mg to 1g/liter dry weight and beyond.
- Dimensions: Length 152 cm, width 66 cm, height 152 cm (L 5’-0”, W 2’-2”, H 5’-0”).
- Weight: 181 kg (400 pounds).
- Electrical requirements: 120/240 volts, 50/60 hertz
- Power consumption: Approximately 0.0002 kWh per liter.

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.