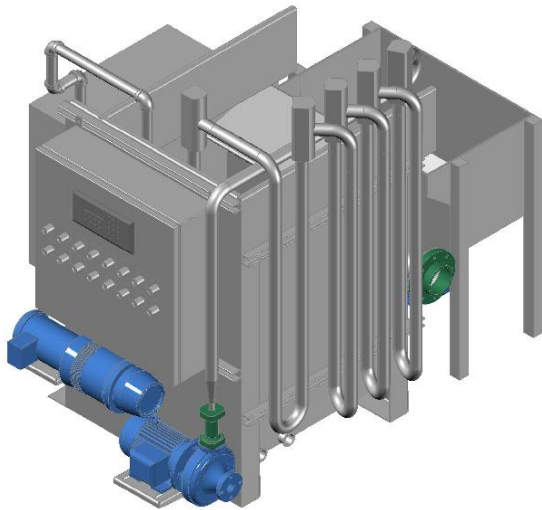
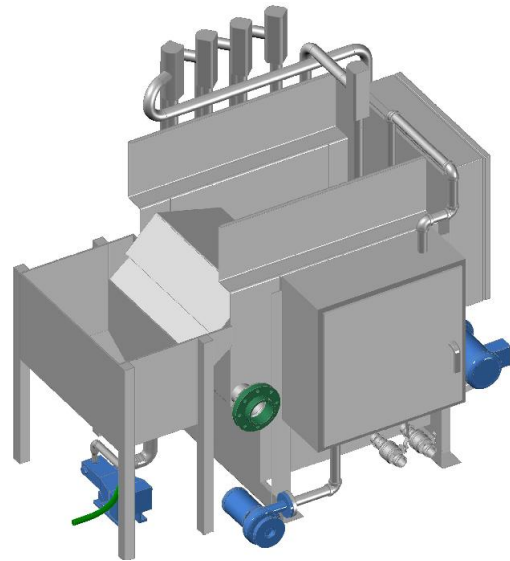


## Algae Appliance

Designed to facilitate the testing of algae harvesting process scale-up from laboratory to pilot scale, the Algae Appliance™ provides a low energy, chemical-free, continuous flow ‘wet harvest’ system to efficiently dewater, concentrate, and compromise the cell walls of dilute microalgae in suspension.



Control panel view



View from discharge side

The Algae Appliance flow rate is variable from 2 to 20 liters per minute (.5 to 5 GPM), with the potential to remove up to 90% of the initial water volume at the harvesting stage. 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	Advantage	Benefit
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 or lyse algae cells	Total energy less than one kWh per cubic meter	Maximizes the release of lipids with low energy and without chemicals
Integrated biomass concentrator	Removes up to 90% 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



A BREAKTHROUGH TECHNOLOGY TO EXTRACT OIL FROM ALGAE

## 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 Supervisory Control and Data Acquisition (SCADA) control system, along with sensors which monitor various characteristics of the input and output streams. The SCADA unit's control algorithms manage the operational settings for flocculation (algae aggregation) and for compromising of algae cell walls (cell lysing). As the dilute suspension passes through the Algae Appliance it is subjected to tuned electromagnetic pulses. The system operation consists of three phases:

- First phase: low-energy, chemical-free flocculation.
- Second phase: concentration to remove up to 90% of the water.
- Third phase (optional): cell wall compromise ("cracking") for downstream availability.

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: 20 LPM (5 GPM) – processing 30,000 liters per day in continuous harvest.\*
- \*(Sufficient for a 150,000 liter growth facility at 20% daily harvest)
- Microalgae concentration: Wide flexibility from less than 125mg to 1g/liter dry weight and beyond.
- Dimensions: Length 214 cm, width 152 cm, height 214 cm (L 7'-0", W 5'-0", H 7'-0").
- Weight: 1,140 kg (2,500 pounds).
- Electrical requirements: 120/240 volts, 50/60 hertz
- Power consumption: Approximately 0.002 kWh at 10 LPM.

## Additional Product Features

- Sensor telemetry with touch screen software for real-time control.
- Remote support by OriginOil technicians (requires support contract).
- Tunable to a wide range of fresh and saltwater microalgae species.
- Mounted on single skid for ease of transport and installation.
- Applicable to all growth platforms.