



**CROWN**  
MACHINERY

**Crown Machinery's  
Algae-processing Solutions**



## Crown Machinery Enterprise Introduction

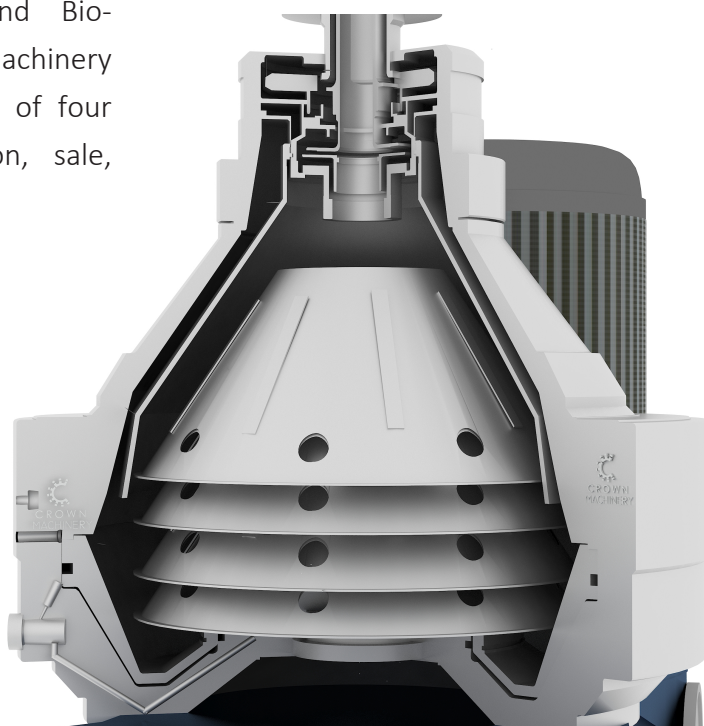
Crown Machinery Inc. is a modern innovative high-tech centrifuge R&D and manufacture enterprise with four main branches in global work located in USA , South Korea, Philippine and China. Adhering to the concept of quality is the enterprise life, innovation is the driving force for the development, Conform to the trend of the development of modern industry, Fusion concept of global economic integration, Creative thinking, Integrate liquid separation processing industry leading enterprise in the upstream and downstream resources; Gather technical force; Together with the power of the global enterprise for business purposes; Dedicated to supply the clients complete separation solution.

Our company assemble a number of skillful, talented professionals, introduction advanced of international centrifuge technology with 30 years experiences of the development and design, through adopting international advanced management method, we have developed very professional separator and centrifuge for edible oil , pharmaceutical , chemical , waste project and various liquid industry. Until now we have accumulated more than 500 clients in global world market and get wide good feedback for our products and service, as our enterprise name "Crown Machinery" described we would like to supply the products like the crown quality and service.

Nowadays, our USA branch mainly forwards the waste-water market; Manila branch mainly prompts the coconut products machinery in Asia-Pacific market; Our Korean branch also named the Hanil Science Medical Co.,Ltd. is focusing on the Bio-tech and Bio-pharmaceutical market; And Liaoyang Crown Machinery Co.,Ltd. in China works as the head-quarter of four branches to serve the machinery selection, sale, technology support and after-service job.

Up to now, we have successfully introduced many clients' final products such as coconut oil into Chinese market to achieve a mutually beneficial win-win situation. We do hope serving the client not only the products but also the wonderful experience to cooperate with us.

**Welcome to contact and visit us.**



## WHY ALGAE

Algae are the precursors for many different branches of industry whether in the cosmetics industry, pharmaceuticals, manufacture of biofuels or foodstuffs production.

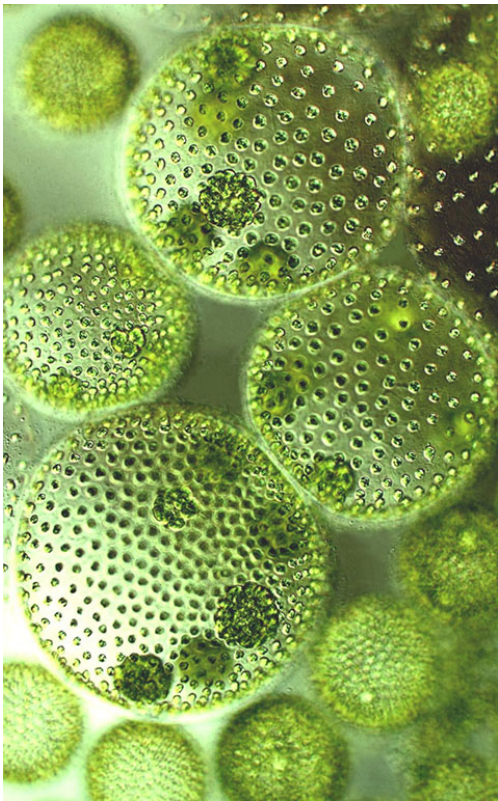
Algae are very diverse and easily found everywhere on the planet. Algae can be grown using water resources such as brackish, sea, and waste water unsuitable for cultivating agricultural crops. They can even help in waste water treatment and purification, while benefiting from using the nutrients present.

In fact, algae can theoretically produce up to 300 times more oil per acre than conventional crops, such as rapeseed, palms or soybeans, and have a short harvesting cycle -one to ten days. Algae processing face many challenges, from processing capacity limitations to production costs. To address those problems, Crown Machinery is joining in to help to find out separation technology solutions.



## Key Challenges in Algae Processing

Harvesting is defined as the separation of algae from a growing medium. Techniques for harvesting algae include settling or flotation, centrifugation, and filtration. In any case, it is the harvesting method which is crucial to the efficiency of the entire process in terms of investments as well as operation costs. In this process, commonly used machines is a continuous-flow centrifuge. It is efficient and collects both algae and other particles. However, it is more commonly used for production of value-added products from algae. Centrifuge can achieve high cake dryness in the separation and low energy demand during the process.

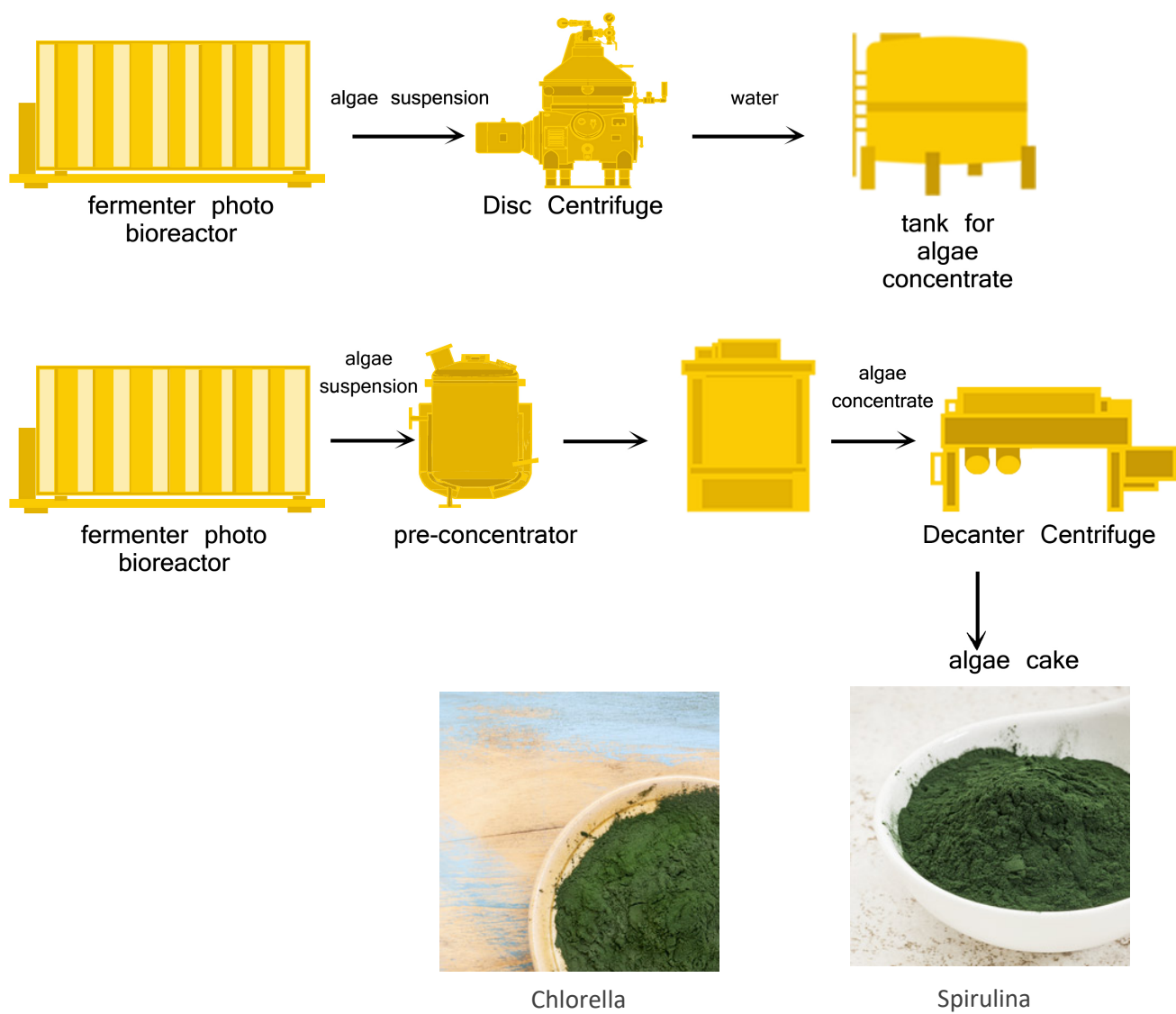


Our excellent product disc stack centrifuge and decanter centrifuge can greatly shorten production cycle by accelerating clarifying time and reduce labor cast, and guarantee the purity of final products at the same time.



# BREAKTHROUGHS IN OIL EXTRACTION FROM ALGAE

Single-Step oil extraction process is simpler and more efficient than current systems, without requiring chemicals or significant capital expenditure for many machines. Only one appropriate disc centrifuge or decanter centrifuge can speed up the whole process.



\*The Single-Step Process harvests, concentrates and extracts oil from algae, and separates oil, water and biomass in one step. No initial dewatering is required, and separates the oil, water and biomass in less than an hour.

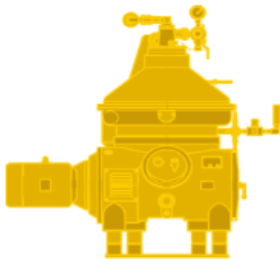


## Algae : A Start-point to Change

With the rapid development of economics, the whole world is facing strict resources shortage, like, food, energy, therefore, novel solutions will be required. Algae, as a renewable and sustainable resource, stands out.

### ◆ Biofuels

Biodiesel is the most commonly discussed energy output from algae. Due to their growth rate and yields, algae can theoretically produce 10 to 100 times more oil than other “energy” crops, but it is not the only one. There are all the way from gasoline to hydrogen to LPG. The following is the list of fuels that can be obtained from algae.



- \* Biodiesel
- \* Ethanol
- \* Hydrogen
- \* Methane
- \* Biomass – where algae biomass is directly used for combustion
- \* Other hydrocarbon fuel variants, such as JP-8 fuel, gasoline, biobutanol etc.

### ◆ Nutraceuticals

Algae are important foods in many nations, especially in Asia and America. They provide many vitamins including: A, B1, B2, B6, niacin, and C, and are rich in iodine, potassium, iron, magnesium, and calcium. In addition, commercially cultivated microalgae, are marketed as nutritional supplements, for Astaxanthin, Omega 3 Fatty Acids, Beta Carotene, CoenzymeQ10, Spirulina, Chlorella.





### ◆ Pharmaceuticals & Health Related Products

Use of algae, especially the cyanobacteria (blue-green algae), for antibiotics and pharmacologically active compounds has received ever increasing interest. There are a range of pharmaceutical products derived from algae. Some of them include: antimicrobials, antivirals & antifungals, neuroprotective products, therapeutic proteins and drugs.

### ◆ Cosmetics

In cosmetics, algae act as thickening agents, water-binding agents, and antioxidants. Algae are used in cosmetics in the forms such as algal flakes, algal oil, algal powder and algal flour. Cosmetics that could be produced from algae include soaps, clay mask, beauty serum, beauty oil, oil/salt scrub, algal whole cell shampoo and conditioner, algae anti-ageing creams and so on.

### ◆ Animal & Fish Feed

The production of low-cost fish and animal feed from algae can provide a natural food source for fish and farm animals.



### ◆ Pollution Control

Algae are currently used in many wastewater treatment facilities, reducing the need for more dangerous chemicals. Algae can be used to capture the runoff fertilizers that enter lakes and streams from nearby farms. Algae are used by some power plants to reduce CO2 emissions.



## Algae Centrifuge Machine Standard Design

The machine has a main frame that consist a horizontal drive shaft with clutch and brake, worm gear, lubricating oil bath and vertical bowl spindle in the lower position.

The bowl is mounted on top of the spindle, fixed by the upper parts, the gasket, the collecting parts, and frame hood. The material feed into the bowl, by the effects of centrifugal force the liquid phase pumped out of machine through outlet pipe, meanwhile the solid phase adhere on the bowl wall, then were discharged automatically by operation water. The electric motor is of the variable frequency drive type or of controlled-torque type. All parts in contact with material are made of stainless steel.

### Benefit of Crown Disc centrifuge in Algae Harvest

Disc stack centrifuges are suitable for use in the harvesting stage to separate the algae cells from the liquid growth media. It works at a high rotation speed generating more powerful centrifugal force which means that it's efficient to separate ultra fine solids particles from liquids and separate two different liquids by density. Automatically discharging can greatly reduce labor cost.



DGC-400



DGC-300

### Disc Centrifuge Main Parameter

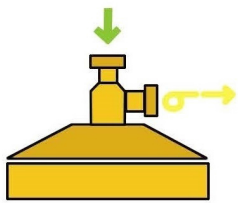
Model	Bowl Speed (rpm)	Through-put Capacity (L/H)	Running Load (kw)	Dimensions (mm)		
				Width	Front-to-Back	Height
300	7302	300-500	4	950	950	1250
400	7070	1000	7.5	1555	1130	1640
500	6600	2000	15	1780	1500	1900
550	6000	10000	22	1800	1850	1900

\*Actual production capacity base on the raw materials.



Liquid Feeding/Discharging Configuration

DGC series  
One liquid Phase

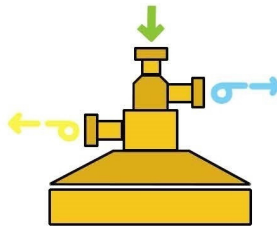


● Feeding Material

● Liquid Phase



Flow with Pressure



DGS series  
Two liquid Phase

● Feeding Material

● Light Phase

● Heavy Phase

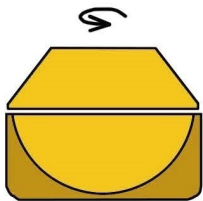


Flow with Pressure



Flow with Pressure

Discharging Method



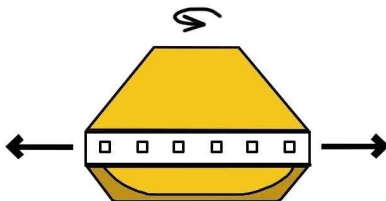
Manual Discharging

Shut down and open the bowl, manually remove the inside sediment by labor.



Automatic Discharging

Through Intermittent open lower parts of the bowl, sludge discharged automatically.



Continuous Discharging

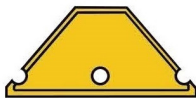
Sludge discharging achieve by the nozzles around the pericline.

Disc Separation



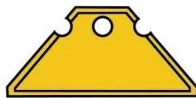
Clarification

Separate the solid particles form the liquid



Separation

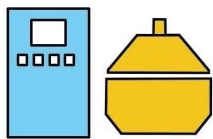
Separate a heavy liquid phase from major light liquid phase, meanwhile the suspended solid particles be separated as well. Maximum level of purified the light liquid phase.



Concentration

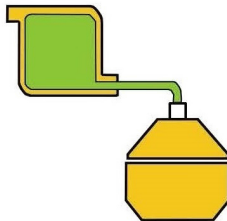
Separate a light liquid phase from major heavy liquid phase, meanwhile the suspended solid particles be separated as well. Maximum level of purified the heavy liquid phase.

Optional Components and Systems



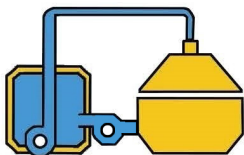
Electric Cabinet

Monitoring and adjustment of power , parameters setting and safety devices.



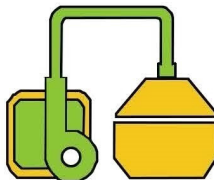
Gravity Feeding System

Ensure the material contnous and stable feeding to centrifuge.



CIP Cleaning System

Control the system clean the separation components automatically.

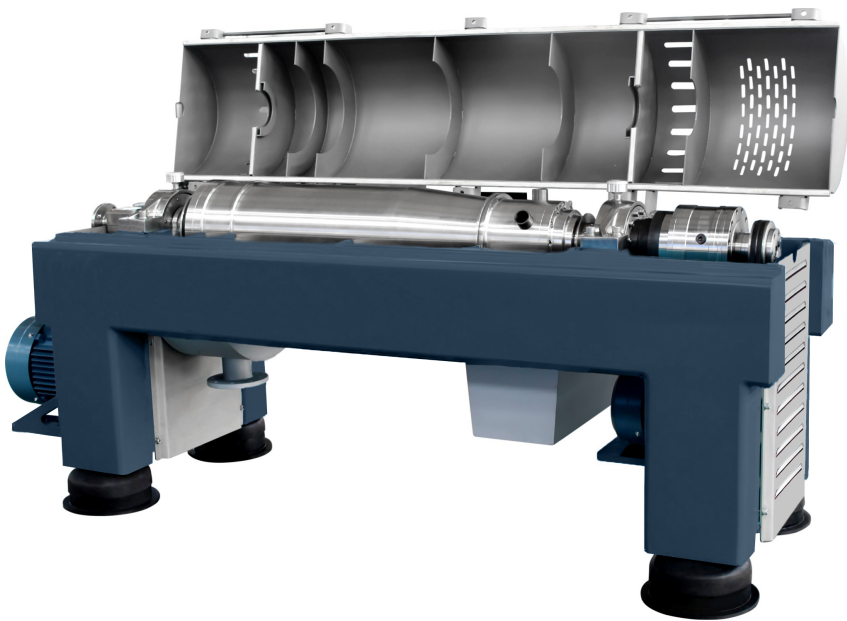


Feeding Pump

Ensure the flow of material to the centrifuge is stable and adjusted automatically.

## Algae Decanter Centrifuge Description

Crown Machinery decanters are perfect for dewatering the algae biomass slurry after it has been processed in disk centrifuge, resulting in a concentrated product. Decanter centrifuge are available to process suspensions containing high proportions solids. It can be used to clarify of liquids, dewater or thicken sludge and suspensions, separate three-phases suspensions into light liquid (normally oil), heavy liquid (normally water) and solids. It also can apply to massive production.



## Decanter Centrifuge Main Parameter

Model	300 x 1350	355 x 1600	450 x 1800	520 x 2200	650 x 2600
Bowl Dia. (mm)	300	350	450	520	650
Through-put Capacity (L/H)	1000-3000	3000-5000	50000-100000	100000-200000	200000-500000
Bowl Length Dia.(mm)	1350	1600	1800	2200	2600
L&D Ratio	1:4.5	1:4.5	1:4.0	1:4.2	1:4.0
Bowl Speed (r/min)	4200	3800	3200	3000	2800
Separation Factor	3000G	2868G	2575G	2620G	2850G
Screw Differential (r/min)	5-30 Stepless Ajustable	2-20 Stepless Adjustable	4-28 Stepless Adjustable	5-25 Stepless Adjustable	5-25 Stepless Adjustable
Motor (kw)	Main Motor11 Vice4	Main Motor15 Vice7.5	Main Motor30 Vice11	Main Motor45 Vice15	Main Motor75 Vice22
Noise db(A)	≤85	≤85	≤85	≤85	≤85

\*Actual production capacity base on the raw materials.





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