



Developing for the Green future

Unleashing Nature's Carbon-capturing Power with Technology

CARBON CAPTURE FACILITY 2025 CATALOG



www.alcarbotechnologies.com.hk

ALcarbo
Technologies

ALGAE-BASED

Photobioreactor system (PBRs)

INTRODCTION

UNLOCK SUSTAINABLE CO₂ SOLUTIONS WITH OUR PBRs

Alcarbo Technologies Limited is a climate action biotechnology company that provides carbon capture solutions. Our innovative algae photobioreactor system (PBR) is designed to capture carbon dioxide and turn it into profitable products. Microalgae possess remarkable carbon fixation capabilities through photosynthesis, occupying approximately 50% of natural CO₂ capture. This natural and efficient mechanism offers a viable approach to combat CO₂ emissions. We genetically selected the high-performing algae strains with superior carbon-fixing abilities and provided an optimal growth environment using our proprietary technologies, including nanobubble photobioreactors and unique media formulations. Our solution is space-saving, cost-effective and a key to fight climate change.



Reactor P150

Space requirement: 1m²/unit
CO₂ capturing rate: 75kg/year

Varied module sizes tailored for scalable project needs

Our innovative automatic algae photobioreactor system is designed to efficiently reduce your CO₂ emissions while occupying minimal space and requiring low maintenance. Its modular design allows for easy scalability and customization to fit the specific space and resources available at each location.

The CO₂ captured is transformed into biomass by the algae, which our team then processes for permanent storage, raw food materials, or biofuel production. Take a step towards sustainability with our cutting-edge solution!



Reactor P650

Space requirement: 2.8m²/unit
CO₂ capturing rate: 329kg/year



Indoor Reactor (Tailor-made)

Space requirement: 2m²/unit
CO₂ capturing rate: 150kg/year

Features

Auto-cleaning

Water level control

Maximized light penetration

Storm-Proof frame

High circulation design

Harvesting system



Traditional algae culturing face challenges include manual labor reliance and energy-intensive algae harvesting methods. To address this, we created a Low-Energy Separation System (LESS) and integrating advanced technologies for efficiency and cost reduction.



Where can the solution be applied to?

Power stations, manufacturer factories, the aviation industry, oil drilling plants, Building roof tops, Garden outdoor area



Major Technologies

ALGAE MUTATION TECHNOLOGY

Algae strains with enhanced carbon-fixing abilities were selected from 75,000 species. Through mutagenesis, their carbon fixation rates were boosted, yielding 'Super carbon-fixing mutant' algae with highly efficient CO₂ absorption

CULTURING MEDIA FORMULATION

Accelerates microalgae growth and minimizes costs by optimizing a specialized culture media formula. This unique formulation is a key ingredient for maximizing super-algae growth, enhancing carbon capture efficiency.



NANOBUDDLE PHOTOBIOREACTOR

A Transparent flat-panel photobioreactor with a high surface-volume ratio. A unique bottom slope enhances air-lift circulation and improves tank emptying efficiency. Nanobubble technology for better CO₂ dissolution. Inexpensive typhoon-resistant reactor holder frame.

Patent

CN 202410329034.9
US 18928433
EP 24209377.1

VN 1-2025-01828
ME PCT/CN2025/083463
HK CN120682901A



Comparing with trees



Carbon
Capture Rate

329 kg / Year

10 kg / Year



Set-up Cost

USD 191

USD 115



Maintenance
Cost

USD 61

USD 475



Space
Requirement

2.8 m² / Unit

36 m² / Unit



End Use

Food /
Biofuel raw materials

N/A

*** Gold standard listed carbon capture solution, CMA testing certified

THE CO₂ capturing progress

1

Water source

FRESH / SEA / WASTE WATER

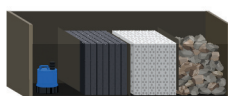


OUR MUTANT STRAIN CAN ADAPT TO VARIOUS WATER SOURCES. OUR PROJECT CAN BE APPLIED TO DIFFERENT REGIONS.

2

Filtering

PHYSICAL REMOVAL OF UNWANTED MATERIALS FROM WATER SOURCE



ONLY SIMPLE FILTERING IS NEEDED TO REMOVE PARTICLES OR CONTAMINANTS FROM THE WATER SOURCE, PROVIDING A BETTER ENVIRONMENT FOR THE ALGAE. MICRONUTRIENTS OR HEAVY METALS WILL PASS THIS FILTERING FOR ALGAE TO CAPTURE.

3

Culture medium

OPTIMUM ENVIRONMENT FOR ALGAL GROWTH

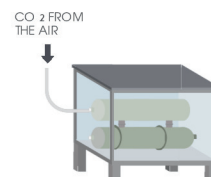


ALCARBO'S MEDIUM FORMULATION CAN OPTIMIZE THE CARBON CAPTURING RATE OF OUR ALGAE STRAINS.

4

Nanobubble

INTENSIFY CARBON SOURCE

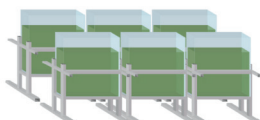


NANOBUBBLE INCREASES THE DIFFUSION RATE OF ATMOSPHERIC CO₂ TO THE WATER FOR THE ALGAE TO CAPTURE.

5

Photobioreactor

HIGHEST EFFICIENCY BUT LOWEST EMISSION



OUR PHOTOBIOREACTOR SYSTEM (NANO TREE) IS DESIGNED TO PROVIDE SOLAR REACHING SURFACE FOR OUR ALGAE. THE DESIGN SIMPLIFIED THE STRUCTURE TO MINIMIZE THE EMISSION FROM THE PRODUCTION OF THE REACTORS. MEANWHILE STRONG ENOUGH TO WITHSTAND DISASTERS LIKE TYPHOON. AIM FOR LONG-LASTING DURABILITY.

6

Harvesting

WATER RECYCLING

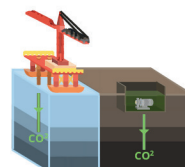


OUR LOW-ENERGY SEPARATION SYSTEM (LESS) FILTER OUT ALGAE FROM THE CULTURING MEDIUM TO REUSE THE WATER FOR THE NEXT PRODUCTION CYCLE.

7

Permanent storage

REVERSE THE CO₂ RELEASE PROCESS



CO₂ WILL BE CAPTURED IN THIS STAGE BY ALGAE AND STORE IN SUGAR FORM LIKE A CARBON CONTAINER. BY PERMANENTLY STORING THOSE "CONTAINERS" IN THE SEA BED OR UNDERGROUND, WE CAN ACTIVELY REDUCE THE CO₂ FROM THE ATMOSPHERE.

Algae products

SUSTAINABLE MODEL



PART OF OUR ALGAE WILL TURN INTO RAW MATERIALS FOR AGRICULTURE, FISH FARMING, BIOFUEL, SUPPLEMENTS AND COSMETICS. THE EARNINGS WILL HELP US TO SCALE-UP THE CARBON CAPTURING PROJECT.



Facility Specifications

1-ton Carbon Capture Facility Specifications			
Photobioreactor	No. Photobioreactor *	4.0	
	Carbon Capture/ day (kg)	3.6	
	Carbon Capture/ yr (ton)	1.3	
	Tree replacement/ yr (unit)	132	
	Saved space (m2)	493	
Total Required Photobioreactor space (m2)		12.0	
		m2	Details
Dimension of System Setup in Pump Facility	Filter unit w/ rainwater collection & UV disinfecting unit	1.0	1*1*1m (1 ton)
	Media tank with mixer (concentrated)	0.9	1*1*0.9m (500L)
	Reservoir tank	4.0	2*2.75m (8 ton)
	Nanobubble generator	0.1	0.75*0.38*0.4m
Total Required Pump room space (m ²)		6.0	
Dimension of System Setup in Harvest Facility	Harvest Tank	3.4	2.2*1.84m (5 ton)
	Low-Energy Separation System (LESS)	18.0	6*3*2m
Total Required Harvest Toom space (m ²)		21.4	
Total Required space (m ²)		39.4	
		KWh	
Energy Consumption (KWh/year)	Power pump 1 (Water source > Filter > UV > Media tank)	36.4	
	UV	11.6	
	Mixer	25.0	
	Power pump 2 (Reservoir > Nanobubble generator > algae panel)	68.3	
	Air blower + Nanobubbler	409.5	
	Harvesting pump 1 (Algae)	204.8	
	Harvesting pump 2 (Water recycling > Rainwater collection)	32.8	
Total Energy Consumption (kWh/ year)		788.3	
Total Carbon Footprint (ton/ year) (Could be covered by solar power)		0.3	
		m3	
Water Consumption	Total water volume	2.6	
	Annual water consumption	239.5	
	Annual recycle water	95.8	
Net Annual water consumption		143.7	
Noise level (dB)		73	
Working Condition	Temperature (°C)	15-50	
	Minimum light intensity (μmol/m2/sec)	100	
	Minimum load limit (kg/m2)	270	
	Freshwater pipe flowrate (L/min)	20-40	
	Drainage	Required	
	Single phase 13A socket (unit)	3	

***Set-up costs may vary due to case-by-case scenario

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AND START YOUR CARBON CAPTURE!

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