Developing for the Green future

CARBON CAPTURE FACILITY

CATALOG

By
Alcarbo
Technologies

UNLEASHING NATURE'S CARBON-CAPTURING POWER
WITH TECHNOLOGY

2024

www.alcarbotechnologies.com.hk

UNLOCK SUSTAINABLE CO_2 SOLUTIONS WITH OUR PBRS

ALGAE-BASED

Photobioreactor system (PBRs)

INTRODUCTION

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 CO_2 capture. This natural and efficient mechanism offers a viable approach to combat CO_2 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.

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.

P650

Space requirement: 2.8m2/unit

CO2 capturing rate: 329kg/year

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!

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.

NANOBUBBLE 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 202410329034.9 (CN) ; 18928433(US); 24209377.1 (EP)

COMPARE TO TREES

Gold stardard listed carbon capture solution,
CMA testing certified,

Carbon capture rate:	329kg/year	10kg/year
Set-up cost:	USD 191	USD 115
Maintenance cost:	USD 61	USD 475
Space requirement:	2.8m²/ unit	36m²/ unit
End use:	Food/Biofuel raw materials	N.A.

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 OPTUMIZE THE CARBON CAPTURING RATE OF OUR ALGAE STRAINS.

4

NANOBUBBLE
INTENSIFY CARBON SOURCE

NANOBUBBLE INCREASES THE DIFUSSION 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 SIMIPLFIED 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.

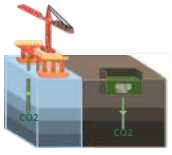
6

HARVESTING
WATER RECYCLING

OUR LOW-ENERGY SEPERATION 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.

OR

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.

1 -ton Ca rbo n Ca pture F acilit y Sp ecif icatio ns

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
To ta l Req ui red P ho tob ioreacto r s pace (m 2)		12.0

		m2	Details
Dimension of System Setup in Pump Facility	Filter unit w/ rainwater collection & UV disinfecting unit	1.	1*1*1m (1 ton)
	Media tank with mixer (concentratred)	0	1*1*0.9m (500L)
	Reservoir tank	0.	2*2.75m (8 ton)
	Nanobubble generator	9	0.75*0.38*0.4m
Total Required Pump room space (m^2)		4. 6	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 (m2)		21.	
Total Required space (m2)		4	
		39.	

		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
To ta l C ar bo n Footprint (ton/ y ear) (C ould be covered by solar pow e r)		0.3

		m3
Water Consumption	Total water volume	2.6
	Annual water consumption	239.5
	Annual recycle water	95.8
N et A nnua l w ater consumption		143.7

Noise level (dB)		73
Work ing C ondition	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

PARTNERS

CUSTOMERS

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AWARDS

CONTACT US AND START YOUR CARBON CAPTURE!

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