豐麒
FENGQI

Carbon-based Technology System and Its Applications

Integrated Solutions for Agricultural Quality & Efficiency Improvement + Water Environment Treatment

CONTENTS

01 Technology Overview

Three Core Technologies

Fengqi's carbon-based technology system focuses on two major fields: agricultural quality improvement & soil remediation, and water environment treatment. Through the coordinated application of three core technologies, it achieves efficient resource recycling and ecosystem improvement

Carbon-based Micro-core Far Infrared Ecological Wave Energy Technology

Focuses on agricultural quality improvement and soil remediation. It activates soil vitality through wave energy resonance and intelligent regulation, realizing crop yield increase and quality improvement

Carbon Crystal Water Activation System Technology

Specializes in water environment treatment. It uses carbon nanomembrane photocatalytic technology to achieve water purification and ecological reconstruction, restoring the self-purification capacity of water bodies

Carbon Wave Wood Source Three-dimensional Ecological Agriculture Technology

Integrates Broussonetia papyrifera fermentation energy breeding and wave energy technology. It constructs a closed-loop ecosystem of "planting-breeding-planting" to realize efficient resource recycling

Technology Application Boundaries and Conditions

This technology system is an engineered technology integration solution for water environment treatment and ecological agriculture. It is not a chemical dosing process or a single product. Its delivery form consists of equipment configuration, operating parameters and engineering implementation plans

Core Efficacy

- Improve the dissolved oxygen environment of water bodies, promote efficient degradation of organic pollutants, and help water body self-purification
- Optimize the soil-water-microorganism system conditions, and assist in improving crop growth performance and stability

Application Limitations

- Cannot replace necessary measures such as pollution source control and sewage interception projects
- Not applicable to high-concentration, sudden exogenous pollution scenarios
- When hydrodynamic conditions are insufficient or load exceeds the standard, standalone application is difficult to achieve desired results
- Cannot replace normal fertilization, irrigation and integrated pest and disease management

Implementation and Evaluation Principles

- Conduct engineered design based on pre-project surveys. Effect evaluation requires setting up control areas and introducing third-party testing
- Water environment projects use the Environmental Quality Standards for Surface Water (GB 3838-2002) as the evaluation basis. Agricultural applications need to combine periodic observation and analysis.

Intellectual Property and Technology Authorization Description

Patent Ownership

The core patents of the technology system, including carbon nanomembrane material applications and physical field control devices, are held by the corresponding technical right holders

Fengqi Group's Role

As a technology integrator and engineering implementation entity, it is responsible for technical solution design, equipment selection, system implementation and operation management under the framework of legal authorization. It provides overall technical solutions and engineering services externally, without involving the transfer of individual patents

Compliance and Achievement Ownership

- The use of patented technology is based on legal authorization, and the implementation process complies with relevant laws and regulations.The underlying patented technology achievements belong to the original right holders.
- The engineering achievements and operation data formed during project implementation are managed in accordance with contract agreements. Fengqi Group enjoys the rights and interests of engineering implementation and commercialization services.

02 Carbon-based Micro-core Far Infrared Ecological Wave Energy Technology

Technology and Mechanism of Action

Technical Details

Far Infrared Resonance Effect (6-14μm)

- Under specific far-infrared band and field action conditions, it may affect the hydrogen bond network of water molecules and their physical properties. This forms environmental conditions conducive to mass transfer and ecological process recovery in the soil-water-microorganism system
- The related effects are closely related to water body conditions, operating parameters and application scenarios

Terahertz Wave Biological Effect (0.1-10THz)

- Under controlled power density and action conditions, the terahertz frequency band physical field may interact with the vibration characteristics of biomolecules
- This affects the processes related to cell metabolism.The related effects need to be verified and evaluated within safe parameter ranges and combined with specific application scenarios

Four-dimensional Driving System

Wave Energy Resonance Driving

Under specific environmental conditions and operating parameters, the relevant physical field may improve the metabolic activity and functional expression level of soil microbial communities. This produces a positive impact on soil ecological processes

Material Cycle Coordinated Driving

Participates in the relevant material cycle processes in the soil-water-microorganism system. It provides conditional support for microbial metabolic activities

Water Medium Conduction Driving

Uses water as the medium to efficiently transmit energy and reactions to deep soil layers, achieving full coverage without dead ends

Full-cycle Coverage Driving

Intervenes throughout the entire process from sowing to harvesting, and dynamically optimizes the crop growth environment

Technology and Mechanism of Action

Soil In-situ Regeneration and Remediation

Mechanism

- Activates the activity of indigenous microorganisms (such as Bacillus) in the soil, increasing their quantity by 3-5 times rapidly. These microorganisms start to decompose organic matter in the soil
- Promotes the formation of humus, significantly increasing the humic acid content in the soil by 112%-118%. At the same time, wave energy promotes the adsorption of salt ions by soil colloids, achieving rapid salt sedimentation
- Under the action of wave energy, the insoluble nitrogen, phosphorus, potassium and other nutrients in the soil are gradually converted into free states that are easily absorbed by plants. The soil's EC value (electrical conductivity) is gradually reduced and returns to a healthy range suitable for crop growth

Crop Yield Increase and Quality Improvement

Mechanism

- Promotes root system development and improves leaf photosynthesis efficiency, thereby accumulating more photosynthetic products and achieving a significant increase in crop yield (10%-85%)
- Enhances the absorption and transport capacity of beneficial substances (such as selenium), improving the nutritional quality of agricultural products (such as selenium content). At the same time, the wave energy environment inhibits the growth of pathogenic bacteria, reducing pesticide use. As a result, 102 types of pesticide residues are not detected, and agricultural products restore their original ecological taste
- Improves the utilization efficiency of water and fertilizers, reducing the amount of pesticides and fertilizers used by 10%-55%. Meanwhile, wave energy induces plants to produce more stress-resistant substances, significantly enhancing the crop's drought resistance, waterlogging resistance, and disease and insect pest resistance.

Core Modules

Far Infrared Module

Emits 6-14μm far infrared rays, resonates with water molecules, and promotes deep absorption

Terahertz Module

Under controlled power density and action conditions, the 0.1–10THz frequency band physical field may have a positive impact on physiological processes such as biological cell membrane permeability

Acoustic Wave Module

Releases specific frequency acoustic waves, serving as one of the physical auxiliary measures in the integrated pest management (IPM) system. It interferes with the behavior of some pests

Internet of Things (IoT) Module

Realizes remote monitoring and intelligent control of equipment, and uploads data to the cloud in real time

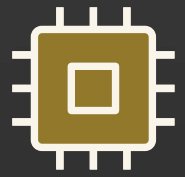
Photovoltaic Power Supply Module

Uses solar energy for power supply, which is green and environmentally friendly. It ensures the long-term operation of the system in the field

Technical Advantages

Multi-dimensional Coordination

Achieves the trinity coordinated effect of physical wave energy, chemical oxidation and biological enzymatic hydrolysis. The effect is far superior to single methods



Intelligent Response

Real-time monitors soil EC and pH values through sensors. The system regulation response time is less than 5 seconds, achieving precise management

Ecological Compliance

No chemical agents are added throughout the process. It complies with the EU Organic Agriculture Standard (EU 889/2008) and is safe and environmentally friendly

Application Scenarios

Saline-Alkali Land Improvement

Aiming at the vast area of saline-alkali land, we transform it into high-yield farmland through technical means, turning waste into valuable resources

Crop Cultivation

Widely applicable to various crops such as grain, fruits and vegetables, tea, and Chinese medicinal herbs, significantly increasing yield and quality

Livestock, Poultry and Aquaculture

Helps improve breeding environmental conditions, reduce the risk of disease occurrence, and enhance the stability of product quality

03 Carbon Crystal Water Activation System Technology

Technology and Mechanism of Action

Core Material: Low-dimensional Carbon Nanomembrane

- **Nanoscale characteristics:** Thickness is only 10-20nm, with a huge specific surface area and ultra-wide potential window
- **High-efficiency electrode:** Acts as an "electron factory" to efficiently generate and conduct highly active electrons, laying the foundation for photocatalysis

Core Mechanism: Photocatalytic Redox Reaction

- **Energy Excitation:** Absorbs photon energy to excite and generate highly active electrons (e^-) and holes (h^+)
- **Active Attack:** Electrons directly degrade organic matter. Holes dissociate water molecules to generate hydroxyl radicals (·OH), realizing dual oxidative decomposition of pollutants

Pollutant "Self-consumption" Chain Reaction Cycle

Driven by light energy
Excites electron-hole pairs

Oxidative decomposition
Pollutants are converted into "carbon dots"

Chain reaction
Carbon dots become new catalytic centers Note 1

Continuous removal
Promotes mineralization

Self-consumption purification Note 2
Generates CO_2 + H_2O

Note 1: Under specific experimental and operating conditions, some degradation products may participate in the formation of new reaction active sites, thereby affecting subsequent reaction processes. This process needs to be combined with actual water body conditions

Note 2: Under the action of photocatalysis and redox reaction, it promotes the degradation and mineralization of organic pollutants in water bodies, and creates more favorable conditions for subsequent biological processes. The actual degradation path and final product form are related to pollutant types and operating conditions

Four Stages of Water Quality Improvement

Pollutant Release Period (about 10 days)

Macromolecular pollutants are cracked, and some indicators may increase temporarily. This is a normal phenomenon of system startup

Rapid Degradation Period (about 15 days)

Small molecular pollutants are oxidized in large quantities. Core indicators such as COD and ammonia nitrogen decrease significantly, and water quality improves rapidly

Stable Purification Period (about 20-45 days)

Pollutant concentration continues to decrease steadily. Water transparency is greatly improved, and the water color gradually becomes clear

Ecological Recovery Period (3-6 months)

Aquatic biological communities begin to rebuild naturally. Water bodies restore self-purification capacity and form a healthy ecosystem

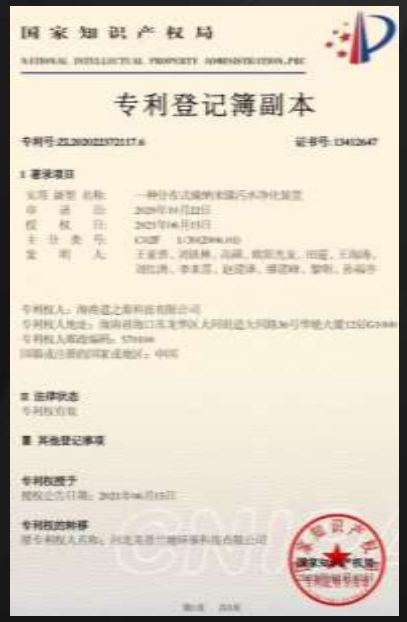
Core Patents

September 20, 2024

Carbon Nanomembrane Water Purification Device Patent

July 13, 2021

A Molecular Magnetic Resonance Water Purification Patent



June 1, 2021

A Distributed Carbon Nanomembrane Material Manufacturing Equipment Patent

June 15, 2021

Carbon Nanomembrane Aquarium Purifier Patent

October 3, 2023

Carbon Nanomembrane Sewage Purification Device

June 15, 2021

Carbon Nanomembrane Gas Purification Device

Application Scenarios

Black and Odorous River & Lake Treatment

Controls internal source pollution at the source, achieves co-treatment of sediment and water, and restores the self-purification capacity of rivers

Drinking Water Source Protection

Precisely degrades microcystins, ensures drinking water safety, and reduces the operational costs of water treatment plants

Landscape Water Body Maintenance

Provides long-term algae inhibition, improves water transparency, and creates a beautiful urban water environment

04 Carbon Wave Wood Source Three-dimensional Ecological Agriculture Technology

Technology and Mechanism of Action

Technology Integration Logic: Dual-engine Driving

Broussonetia papyrifera Fermentation Energy Ecological Breeding Technology

- Raw materials: Broussonetia papyrifera/mulberry leaves (high protein) + multi-strain composite probiotics
- Process: Ton-bag facultative anaerobic silage fermentation to convert into high-efficiency biological feed

Carbon-based Micro-core Far Infrared Wave Energy Technology

- Planting end: Promotes growth, improves yield and quality
- Breeding end: Regulates temperature and humidity, purifies air and water quality, and reduces the incidence of diseases

Core Closed Loop: Efficient Resource Recycling

First Loop: Planting (Broussonetia papyrifera/mulberry)
Produces biological feed and controls nutrition from the source

Second Loop: Breeding (livestock, poultry/aquatic products)
Feeds with biological feed, and converts manure into organic fertilizer

Third Loop: Replanting (vegetables, fruits/grain)
Organic fertilizer improves soil, completing the material and energy cycle

Application Scenarios

Three-dimensional Spatial Layout System

Upper Layer: Ecological Chicken Raising
Chicken activities provide natural fertilizer and pest control services, constructing an aerial ecological layer

Middle Layer: Large-scale Pig Raising
Pig manure is fermented into organic fertilizer or put into fish ponds to realize waste utilization

Lower Layer: Aquatic Breeding
Uses pig manure to cultivate plankton as natural bait for fish

Surrounding Area: Broussonetia papyrifera and Vegetables/Fruits
Broussonetia papyrifera is used to produce feed, and vegetables and fruits are used as cash crops, forming a closed loop

Core Value and Application Achievements

Efficient Resource Utilization
Turns waste into treasure, converting livestock and poultry manure into organic fertilizer and aquatic bait, realizing internal resource circulation

Product Quality Improvement
Ecological feed and optimized environment create high-quality agricultural products with delicious meat and no pesticide residues. Vegetables and fruits are green and safe

Economic Benefit Multiplication
The "three-dimensional planting and breeding + direct sales" model greatly improves the unit output value and creates characteristic brands for rural revitalization

Significant Ecological Benefits
Reduces the use of chemical fertilizers and pesticides, protects water and soil resources, and realizes green and sustainable agricultural development

05 Application Cases

Note:

The data and conclusions of the application cases in this chapter are based on the phased control observation results under specific demonstration conditions, and do not constitute a guarantee commitment for the effects under different regional and environmental conditions

Yuan Longping's 100,000-mu Seawater Rice Project - Saline-alkali Farmland (Hanting, Weifang)

(Unimproved seawater rice: 455.79 kg/mu)

(Improved seawater rice: 630.18 kg/mu)

Yield Increase
38.2%

Note: Based on the comparison between the demonstration area and the control area

（潍坊寒亭）袁隆平十万亩海水稻-盐碱化耕地

Comparison of Demonstration Effects

Production Zone

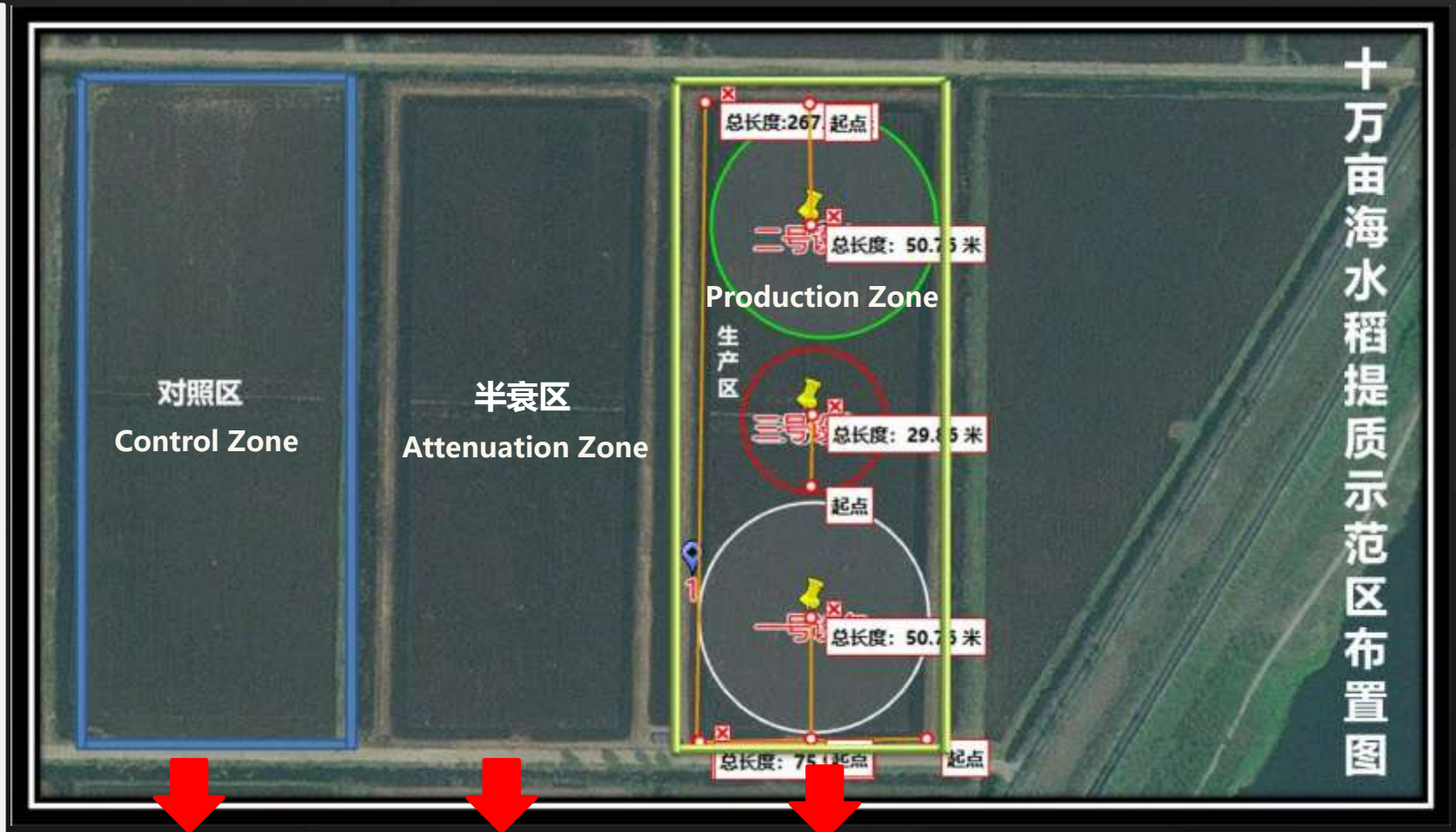
Equipment Deployed

Attenuation Zone

Affected by Equipment Wave Frequency

Control Zone

Isolated from Equipment Influence, Conventional Cultivation & Management



455.79kg	547.08kg	630.18kg	Actual Measured Yield
--	20.03%	38.26%	Yield Increase

Note: Based on the comparison between the demonstration area and the control area

Chonggu Paddy-to-Dryland Soybean Production Base, Tonghe County

Rice-Rice-Bean Three-Year Rotation

- Implementation scale: 120 mu
- Implementation period: April 23 - October, 2023
- Implementation effects:
    1. Soybean root system is developed with many root nodules
    2. Each soybean plant has 132 pods, mostly 3-4 pods per node
    3. Actual yield: 328.4 kg/mu (yield of plots without experimental equipment: 226.5 kg/mu)
    4. Yield increase rate: 44.8%, setting a record for the highest soybean yield per mu in Tonghe County's history

Nodule Comparison

Seed Comparison

Note: Based on the comparison between the demonstration area and the control area

China Agricultural University Farmland Ecological Regeneration Research Group – BRICS International Giant Rice-Crab Quality Improvement and Yield Increase Demonstration Base

Growth Status Within Working Radius

Growth Status Outside Working Radius

China Agricultural University Farmland Ecological Regeneration Research Group – BRICS International Giant Rice-Crab Quality Improvement and Yield Increase Demonstration Base

Comparison of Growth Status Inside and Outside the Working Radius

Yield Increase
35%

Growth Performance Comparison

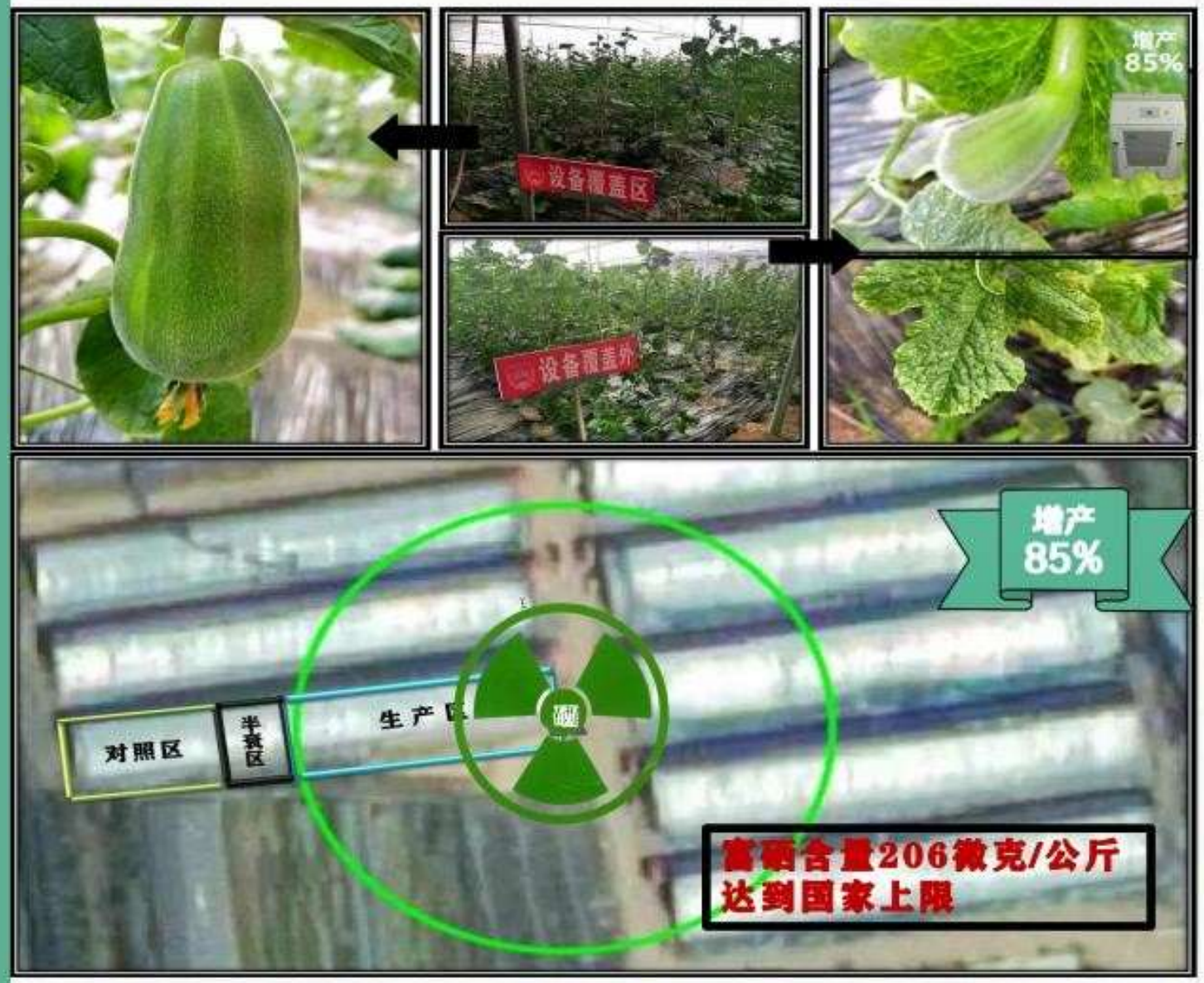
- **Inside the Working Radius**
  1. Height: approx. 2.2 meters
  2. Effective tillers: 76
  3. Grains per panicle: 581
- **Outside the Working Radius**
  1. Height: approx. 1.7 meters
  2. Effective tillers: 49
  3. Grains per panicle: 372

Note: Based on the comparison between the demonstration area and the control area

Shandong Hongyuan Zunyue Qingzhou Melon Seed Purification and Quality Improvement & Yield Increase Demonstration Project

Effects in equipment coverage area:

1. Stems are thick, branches and leaves are luxuriant. Each leaf is waxy green and fully expanded with sufficient nutrition, basically free of viruses and insect pests.
2. Flowers are large and numerous, fruits set evenly, and growth is rapid. It is expected to be on the market about one week earlier. Especially, the fruit shape is beautiful with basically no fruit cracking.
3. Tasting of green fruits shows crispness, sweetness and no bitterness, which exceeded the expectations of the planter. The ecological taste is good.
4. Yield: 2890 jin/mu, yield increase rate: 85%. Selenium content: 206 μg/kg, reaching the national upper limit.



Saline-alkali Farmland Soybean Yield Increase Test Demonstration Project, Yancheng City, Jiangsu Province

- Project background: University-local cooperation project between China Agricultural University and Tinghu District, Yancheng City
- Implementation effects:
    1. Improved soybean yield: 257 kg/mu; yield of unimproved fields: 169 kg/mu
    2. yield increase rate: 51.4%.Chlorophyll content of improved soybeans increased by 37%
    3. The number of root nodules per soybean plant in improved fields is generally 20-38, while there are basically no root nodules in control fields

Note: Based on the comparison between the demonstration area and the control area

China Agricultural University - Zhejiang Tea Group Key Research Project on "Heavy Metal Removal, Pesticide Residue Removal and Selenium Enrichment"

Carbon-based Microcore Farmland Ecological Regeneration Technology optimizes the growth environment of tea plants and improves the underforest ecosystem

- **Project background:** Aims to research and apply the key technologies of the whole industrial chain of selenium-enriched Longjing tea through demonstration construction, comprehensively improve the quality and grade of selenium-enriched Longjing tea from the source, build an industry benchmark through demonstration, provide technical solutions and industrial support for the creation of the regional public brand of selenium-enriched Longjing tea, and explore an efficient and operable path model for the value co-creation and high-quality development of the whole industrial chain of high-quality functional Zhejiang tea, including summer tea and autumn tea black tea and matcha after spring tea. Therefore, the project approval has important practical significance and demonstration value
- **Project objectives:** Through tea garden soil improvement and activation and remediation of original aging branches, regain vitality; make the relevant detection indicators of tea antibiotics, hormones, pesticide residues and heavy metals not detected or better than the limits of current national standards; stabilize the high level of organic selenium content in tea; explore an operation mode that integrates "tea culture, tea technology and tea industry" and is based on the high-quality development of the whole industrial chain of high-quality functional Zhejiang tea

China Agricultural University - Zhejiang Tea Group Key Research Project on "Heavy Metal Removal, Pesticide Residue Removal and Selenium Enrichment"

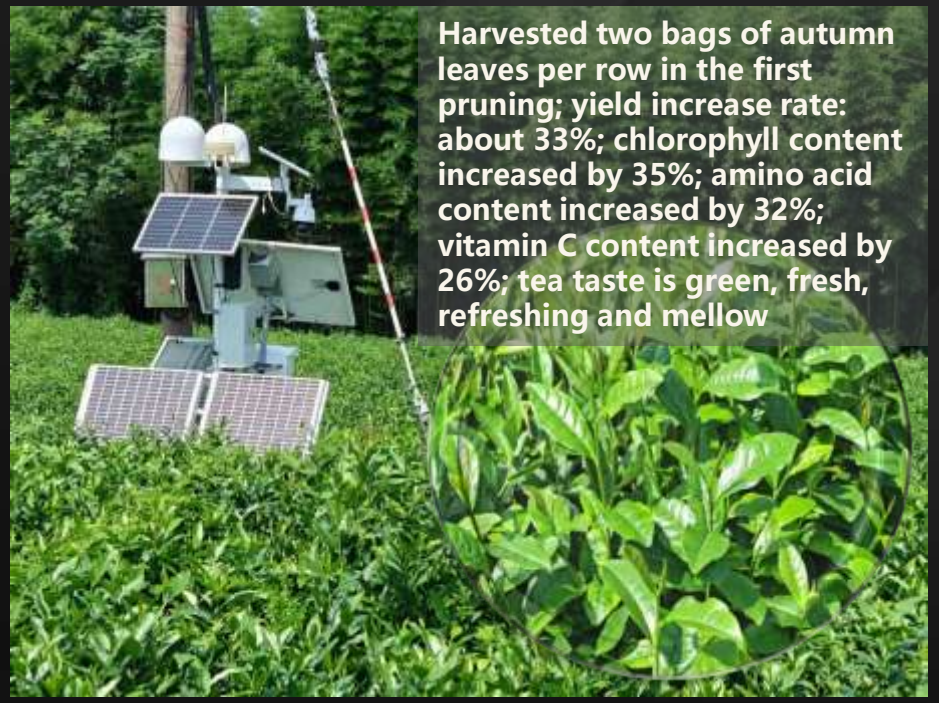
Implementation effects (comparison between inside and outside working radius)

1. **Pest and Disease ComparisonInside working radius:**

- Tea leaves are basically free of holes caused by insect gnawing, showing significant disease and insect resistance
- Outside working radius: Tea leaves have insect gnawing marks and partial branch and leaf aging

2. **Growth ComparisonInside working radius:**

- Tea grows luxuriantly with high chlorophyll content, thick leaves and obvious waxy texture
- Outside working radius: Tea growth is opposite, with many old branches and leaves aging



Inside working radius

Outside working radius

China Agricultural University - Zhejiang Tea Group Key Research Project on "Heavy Metal Removal, Pesticide Residue Removal and Selenium Enrichment"

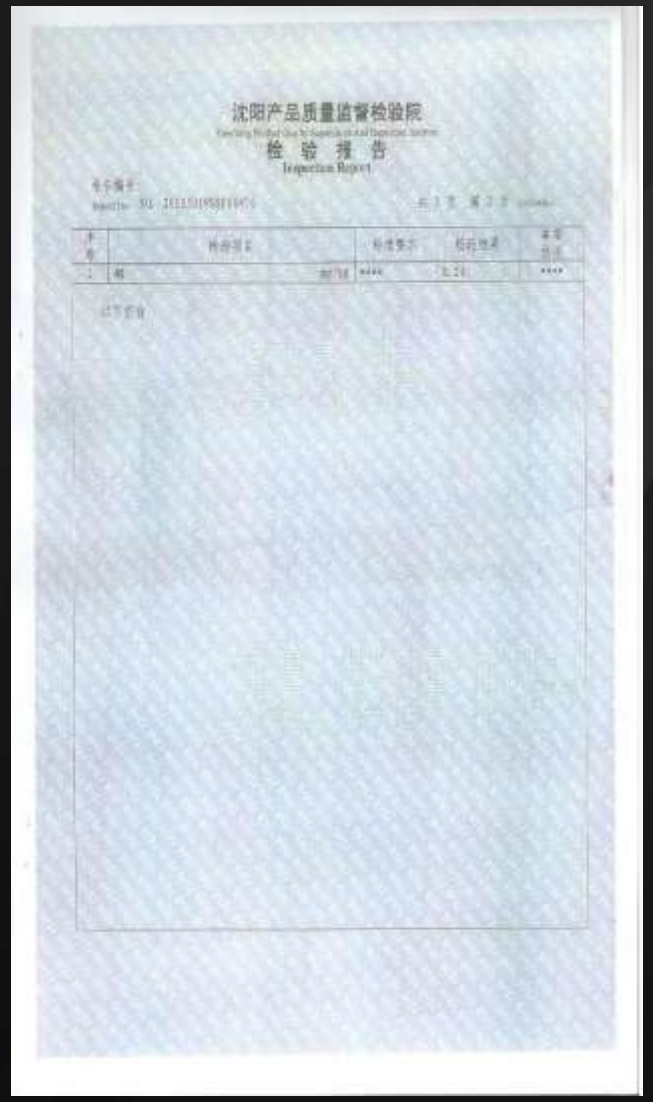
Within Working Radius	Outside Working Radius
Early germination, thick and tender	Few and small buds
Each node has buds, with an average of 10-14 buds per branch	Only 2-5 buds per branch
Strong fragrance, slight astringency and obvious sweet aftertaste	Light fragrance and obvious astringency

- Yield increase rate: 20%-30% on average; cold resistance, disease and insect resistance are enhanced; on the market 7-9 days earlier
- For 6.3 mu of selenium-enriched tea, the harvest is 500 jin, equivalent to 79.36 jin/mu; the yield in previous years was 44 jin/mu; yield increase: about 35.36 jin/mu, yield increase rate: 80.3%
- Previous VC content: 4-5; current VC content: 11.5, an increase of 130%; selenium content: 110 μg/kg

Note: Based on the comparison between the demonstration area and the control area

Relevant Test Reports on Far Infrared Negative Ion Empowerment

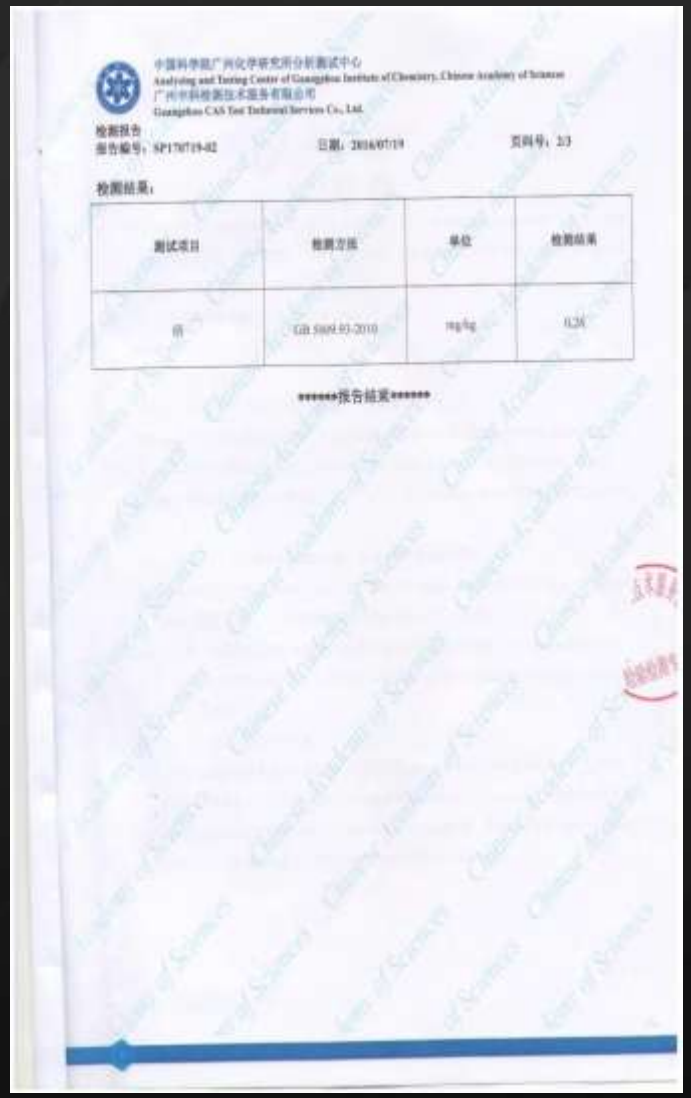
Selenium-enriched pork test report


沈阳产品质量监督检验院

检 验 报 告

Inspection Report

Selenium-enriched chicken test report


检测报告

检测结果：

测试项目	检测方法	单位	检测结果
硒	GB 5009.93-2010	mg/kg	0.26

******报告结束******

Pesticide residue test report


北京中科光析化工技术研究所（电气实验室）

研究测试报告

（Research Test Report）

样品名称及编号 Sample Name and NO.	测试项目 Test Item		测试结果 Test Result	指标 Index	结论 Conclusion
新型能量波频加载仓 /20210316-08-02-001	波长，μm		9.13	8-15	符合
	电磁辐射		符合要求	无辐射	符合
	农残去除率（测试三次）	第一次，%	60	–	–
		第二次，%	49	–	–
		第三次，%	55	–	–

备注：以上指标由委托方提供

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9. 13um

60% of pesticide residues are removed

Relevant Test Reports on Far Infrared Negative Ion Empowerment

Chicken heavy metal test report

Chicken drug residue test report

Chicken harmful bacteria test report

Egg heavy metal and harmful bacteria test report

Egg antibiotic test report

Selenium-enriched egg test report

Cross-accumulation Zone Rice Seed Multiplication Project, Bayiwu Farm, Beidahuang Group

Comprehensive crop indicators

(Rice yield increase rate: 27.89%)

(Chemical fertilizer reduction rate: 25%)

(Pesticide reduction rate: 20%)

(Pesticide residues not detected (meeting national regulations))

(Amino acid content reaching the national upper limit)

(Selenium content: 320 μg/kg)

Note: Based on the comparison between the demonstration area and the control area

Soil Condition Comparison of Experimental Plots, Chonggu Paddy-to-Dryland Soybean Production Base, Tonghe County

Soil Condition Comparison

Technical Indicator	Experimental Group	Control Group
Electrical Conductivity	259	123
pH Value	5.9	6.7
Nitrogen	15	0
Phosphorus	82	16
Potassium	74	8

The soil nutrient status of the experimental plots with deployed equipment is significantly better than that of the control group without equipment, and the rotation objective has been excellently achieved

Jilin Understory Ginseng Project, Farmland Ecological In-situ Regeneration and Remediation Research Group, China Agricultural University

Pesticide residue test report (interim): No pesticide residues detected

CTI 华测检测

林下参过程检测

检测结果：

序号	检测项目	单位	检测结果	检出限	技术要求	单项结论	检测方法
	5-六六六	mg/kg	未检出	0.000179	/	/	GB/T 5009.19-2008 第一法
5	氯菊酯	mg/kg	未检出	定量限：0.05	≤20	符合	GB 23200.113-2018
6	氯氰菊酯和高效氯氰菊酯	mg/kg	未检出	定量限：0.05	≤20	符合	GB 23200.113-2018
7	氟戊菊酯和S-氟戊菊酯	mg/kg	未检出	定量限：0.01	≤0.1	符合	GB 23200.113-2018
8	杀螟硫磷	mg/kg	未检出	定量限：0.05	≤0.5	符合	GB 23200.113-2018
9	溴氰菊酯	mg/kg	未检出	定量限：0.05	≤10	符合	GB 23200.113-2018
10	乙酰甲胺磷	mg/kg	未检出	定量限：0.05	≤0.05	符合	GB 23200.113-2018
11	硒	mg/kg		定量限：0.03	/	/	GB 5009.268-2016 第一法
12	氨基酸总量						
	天冬氨酸	g/100g		定量限：0.00036			GB 5009.124-2016
	组氨酸	g/100g		定量限：0.0020			GB 5009.124-2016
	酪氨酸	g/100g		定量限：0.0095			GB 5009.124-2016

CTI 华测检测

林下参过程检测

检测结果：

序号	检测项目	单位	检测结果	检出限	技术要求	单项结论	检测方法
1	滴滴涕						
	滴滴涕	mg/kg	未检出	/	≤0.2	符合	GB/T 5009.19-2008 第一法
	p,p'-滴滴涕	mg/kg	未检出	0.000481	/	/	GB/T 5009.19-2008 第一法
	o,p'-滴滴涕	mg/kg	未检出	0.000412	/	/	GB/T 5009.19-2008 第一法
	p,p'-滴滴伊	mg/kg	未检出	0.000345	/	/	GB/T 5009.19-2008 第一法
	p,p'-滴滴滴	mg/kg	未检出	0.000465	/	/	GB/T 5009.19-2008 第一法
2	氟氰戊菊酯	mg/kg	未检出	0.0100	≤20	符合	GB/T 23204-2008 3
3	甲氰菊酯	mg/kg	未检出	定量限：0.05	≤5	符合	GB 23200.113-2018
4	六六六						
	六六六	mg/kg	未检出	/	≤0.2	符合	GB/T 5009.19-2008 第一法
	α-六六六	mg/kg	未检出	0.000097	/	/	GB/T 5009.19-2008 第一法
	β-六六六	mg/kg	未检出	0.000634	/	/	GB/T 5009.19-2008 第一法
	γ-六六六(林丹)	mg/kg	未检出	0.000226	/	/	GB/T 5009.19-2008 第一法

工作半径内灌木　　工作半径外灌木

三、综述

2023年7月26日，课题调查组前往吉林省延边朝鲜自治州龙井市林下参大健康共享领养产业园基地对碳基微芯林地生态原位再生系统应用进行中间成果现场调查。课题组根据现场调研，多角度采集相关现象和结果，一致认为：项目以林地生态原位再生系统工程技术与装备为基础，以林下参绿色优质高效系统技术为保障，通过碳基微芯技术的碳氮调控机制促进了人参果早熟、人参枝叶推迟衰老，提升了人参及各种植物抗病虫害能力、激活了原土著微生物，增加生物量。目前人参长势良好，并现场取样委托第三方对人参进行农残检测。

业主（签章）：

调查结果严谨，情况属实。

中国农业大学农地生态原位再生修复课题组

2023年7月27日

7/7

Jilin Understory Ginseng Project, Farmland Ecological In-situ Regeneration and Remediation Research Group, China Agricultural University

Growth comparison between inside and outside working radius (biomass comparison):

Inside working radius: A large number of ant nests and various other organisms are found under the forest, with extremely rich biomass.

Outside working radius: No ant nests found temporarily, and biomass is relatively small

Fengqi Pond Comprehensive Improvement Pilot Project (Undisclosed Site)

Project background and challenges

Launch time: November 11, 2025

Core challenges:

- Withstanding severe cold, freezing and multiple power outages;
- verifying technology and ecological remediation under extreme conditions

Key water quality data analysis

Ammonia Nitrogen (NH3-N): From 2.3 mg/L to 0.2-0.3 mg/L, better than Class III water standard; nitrogen-containing pollutants are efficiently removed.

Chemical Oxygen Demand (COD): Fluctuates in the range of 105-112 mg/L, not exceeding the mild pollution threshold of black and odorous water bodies (150 mg/L). This is caused by sediment digestion leading to water level drop and sampling point changes, not water body deterioration

Core conclusions and effects

Three strategic goals achieved:

✓ Eliminate endogenous pollution
✓ activate water ecosystem
✓ restore system resilience

The technical system demonstrates strong environmental adaptability and is in line with the requirements of Baotou City's governance plan

Overall Project Evaluation Summary

The experimental treatment successfully achieved the leap from "physical foundation" to "ecological remediation" under extremely unfavorable conditions. The significant improvement of ammonia nitrogen indicators verifies the high efficiency of the technology. The scientific explanation of COD fluctuations eliminates the risk of deterioration, laying a solid foundation for subsequent comprehensive ecological restoration

Note: Water quality evaluation is based on the Environmental Quality Standards for Surface Water (GB 3838-2002), and assessed through the comprehensive changes of indicators including dissolved oxygen, chemical oxygen demand (COD), ammonia nitrogen, and total phosphorus

Fengqi Pond Comprehensive Improvement Pilot Project (Undisclosed Site)

Four core phenomena: Witnessing systematic ecological remediation

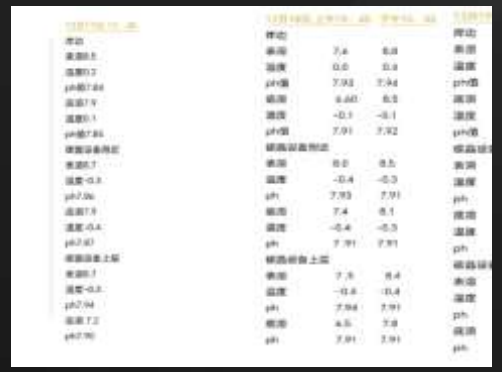
Significant Sinking of Ice Surface

Phenomenon: Cumulative sinking exceeds 50 cm, while adjacent untreated ponds show no such phenomenon
Interpretation: Sediment is decomposed in situ on a large scale, and the most stubborn endogenous pollution is being fundamentally eliminated

Widespread Formation of "Bubble Ice" Under Ice Layer

Phenomenon: A large number of stringed bubbles frozen under the ice layer, which is not found in untreated ponds
Interpretation: The bubbles are mainly CO_2 produced by the decomposition of organic matter in sediment, which can be used as one of the on-site characterization phenomena of enhanced decomposition process of organic matter in sediment

Sustained High Level of Dissolved Oxygen (DO) in Water Body

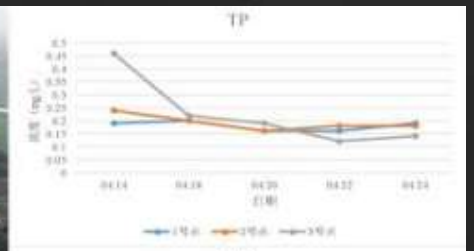


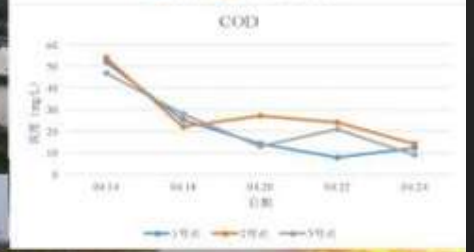
Phenomenon: Under frozen low temperature, DO is stably maintained at 9-11 mg/L for a long time, far exceeding the Class III surface water standard
Interpretation: Indicates that the water body has the foundation to support higher trophic level organisms, which is a sign of moving towards "ecological reconstruction"

Return of Top Aquatic Insect "Diving Beetle" Population

Phenomenon: A large number of adult and larval diving beetles are observed after ice chiseling, which are extremely sensitive to water quality
Interpretation: Indicates that the water body has transformed from an "anoxic digestion system" to an "oxygen-rich purification system", and vitality is activated

Water Quality Standard-reaching Treatment Project of Poliu Sluice Section, Wenjiao River, Hainan





Test Item	April 14	May 16	Removal Rate
COD	54 mg/L	19.2 mg/L	64%
NH_3-N	1.85 mg/L	0.88 mg/L	52%
TP	0.46 mg/L	0.18 mg/L	60%

Project overview: Wenjiao River is the largest river in Wenchang City. The treated section of the national control section of Poliu Sluice has a river length of 4.2 km, which is a natural river with a width of 100-200 m and an average water depth of about 6 m (wet season). The flow rate is 0.1-0.3 m/s, and the water quality is inferior to Class V. Agricultural non-point source pollution is discharged irregularly. After treatment, the water quality of Poliu Sluice section of Wenjiao River has stably reached the Class III surface water standard

Note: Water quality evaluation is based on the Environmental Quality Standards for Surface Water (GB 3838-2002), and assessed through the comprehensive changes of indicators including dissolved oxygen, chemical oxygen demand (COD), ammonia nitrogen, and total phosphorus

Water Quality Improvement Project of Caiputai and Guangdian Zhangzhuang, Baiyangdian (Xiong'an)

- Initial dissolved oxygen of water in Caiputai and Guangdian Zhangzhuang of Baiyangdian: 1-2 mg/L
- 15 days after equipment startup, the dissolved oxygen increased to 3.91 mg/L and 6.19 mg/L respectively, belonging to Class IV and Class II surface water
- The working radius of the equipment is nearly 3 kilometers
- By the end of 2019, the water quality of the central lake area section of Baiyangdian had stably reached the Class IV surface water standard

Note: Water quality evaluation is based on the Environmental Quality Standards for Surface Water (GB 3838-2002), and assessed through the comprehensive changes of indicators including dissolved oxygen, chemical oxygen demand (COD), ammonia nitrogen, and total phosphorus

rainage Sump Treatment Project of Hebei Industrial Enterprises

- Main application technology: Carbon crystal water activation system
- Treatment period: 120 days
- Treatment effects: The water quality of the sump reached the Class V surface water standard, and the heavy metal detection of sludge was better than the Class II standard for agricultural land

Note: Water quality evaluation is based on the Environmental Quality Standards for Surface Water (GB 3838-2002), and assessed through the comprehensive changes of indicators including dissolved oxygen, chemical oxygen demand (COD), ammonia nitrogen, and total phosphorus

THANKS