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High-Throughput Plant Solutions: Bioreactors

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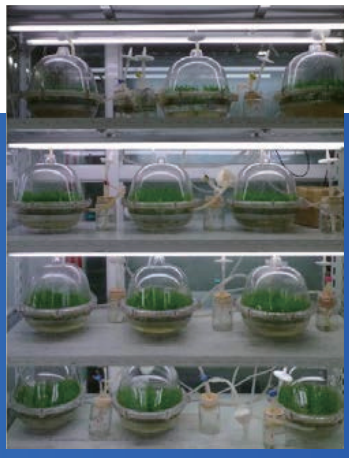
BioF–IV High–Throughput Plant Bioreactor

Introduction

The BioF-IV High-Throughput Plant Bioreactor represents the pinnacle of innovation in plant tissue culture and micropropagation technology. Designed to meet the needs of both researchers and industrial users, this system offers unparalleled efficiency, scalability, and ease of use.



Product Structure and Components

- High-Throughput Plant Bioreactor Composition:The bioreactor is composed of tank assemblies, series/parallel connection components, gas exchange and power control units, and inoculation accessories.
- Enhanced Cultivation Capacity:By configuring the reactor tanks in series or parallel, the cultivation capacity of the plant bioreactor can be significantly increased, allowing for higher processing throughput.
- Integrated Design:The system features a holistic design with complete supporting components, ensuring ease of operation, effective contamination prevention, and improved inoculation efficiency

Application Features

- Rapid Seedling Development:Significantly accelerates seedling growth, reducing cultivation time by over one-third.
- Minimal Transfers Required:Eliminates or greatly reduces the need for transfers, cutting labor costs by more than half.
- Healthy and Robust Seedlings:Produces larger and stronger seedlings with synchronized acclimatization and probiotic treatment, leading to higher transplant survival rates.
- Versatile Cultivation Capabilities:Capable of cultivating cell clusters, plant tissues, protocorms, hairy roots, and other plant organs.
- Direct Development of Storage Organs:Extended cultivation allows direct development into tubers and bulbs, enabling tissue-cultured plants to reach the market earlier.
- Plant-Microbe Co-Cultivation:Supports co-cultivation of microorganisms and plant tissues, enhancing the yield of natural products.

Product Advantages

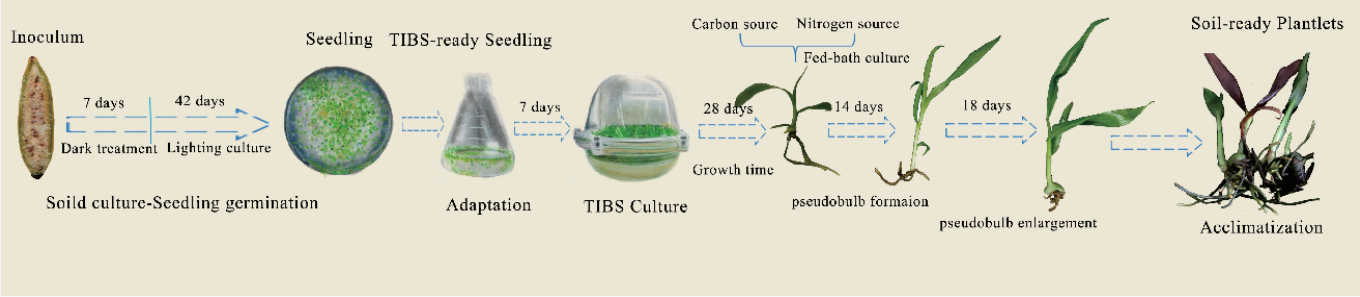
- High Throughput:Dozens or even hundreds of plantlets can be cultivated within a single reactor vessel, significantly increasing the quantity compared to traditional tissue culture bottles.
- Simplified Process:The entire life cycle or extended cultivation can be achieved without the need for multiple transfers, without affecting tissue development or plant growth.
- High Efficiency:Timely exchange of culture medium and gas ensures the supply of nutrients and CO_2, enhancing growth efficiency.

- Cost Reduction:Saves a significant amount of materials, simplifies the inoculation process, and improves automation levels, thereby reducing labor costs.
- High Quality:Intermittent immersion cultivation reduces vitrification, resulting in high-quality seedlings and somatic embryos with high transplantation survival rates.
- Wide Applications:Suitable for plant virus elimination, seedling propagation, breeding research, bioproduction, germplasm resource conservation, genetic transformation, and other fields.

Product Applications

Main Cultivation Objectives:

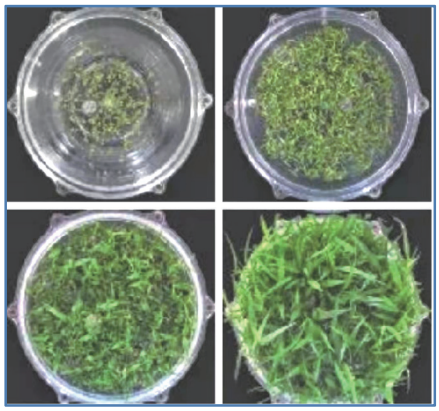
- Propagation of Economic Crops and Medicinal Plant Seedlings:Strawberries, konjac, bananas, medicinal plants, flowers, etc.
- Breeding of Salt-Tolerant, Drought-Resistant, and Disease-Resistant Varieties:Mutant screening and mass propagation and evaluation of progeny from individual plants.
- Large-Scale Cultivation of Plant Tissues, Cells, and Organs:Protocorms, bulbs, micro-tubers, artificial seeds.
- Acclimatization and Group Immunity of Seedlings:Concentrated treatment of sterile tissue-cultured seedlings with probiotics and antagonistic bacteria during the late cultivation stage.
- Cell Factories and Product Preparation:Achieving high-level and stable expression of active products through stress and co-cultivation.

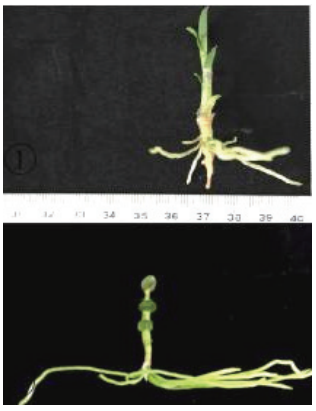


Applied to Seedling Production

Mass Propagation of Seedlings

Advantages in Cultivating Woody Plants:Overcoming browning and inhibition phenomena, enabling continuous growth or direct cutting propagation.



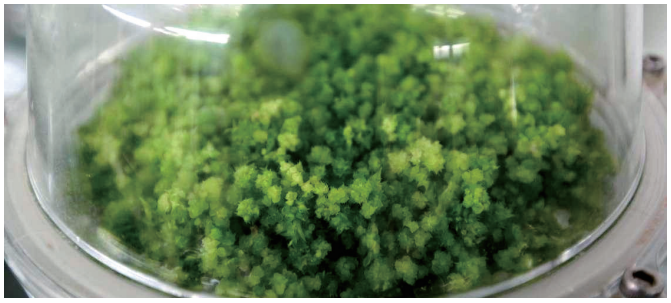


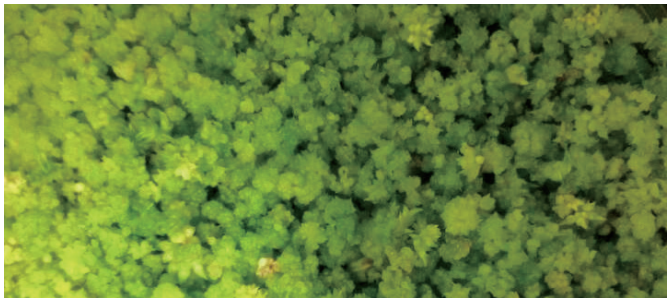
Cultivation of Tubers and Pseudobulbs as Propagules

By supplementing nutrients and extending the cultivation period in the bioreactor, propagules such as tubers can be further obtained, reducing the field growth time of tissue-cultured seedlings by approximately one year.

Cultivation of Protocorms and Other Sterile Propagative Organs

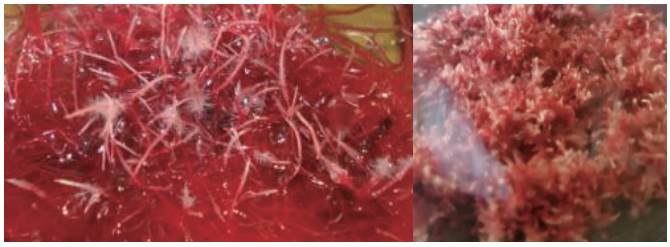
The image below shows: Protocorms of Dendrobium nobile, which can express dendrobine and can also be induced to develop into Dendrobium seedlings.





Cultivation of Medicinal Plant Hairy Roots and Product Preparation

The image below shows: Hairy roots of Lithospermum erythrorhizon, which can produce pharmaceuticals, cosmetics, and food additives.

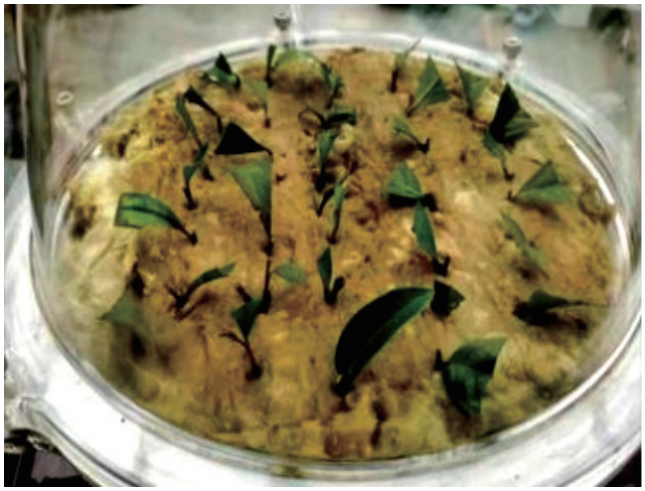


Applied to Germplasm Resource Exploration and Cultivation

- Plant detoxification and germplasm resource purification.
- Functional verification,transgenic, and molecular breeding of plant genes.
- Seedling expansion and industrialized agriculture.
- Research on plant mutants and heterozygous breeding.
- Plant cell differentiation and plant developmental physiology.
- Plant cell totipotence

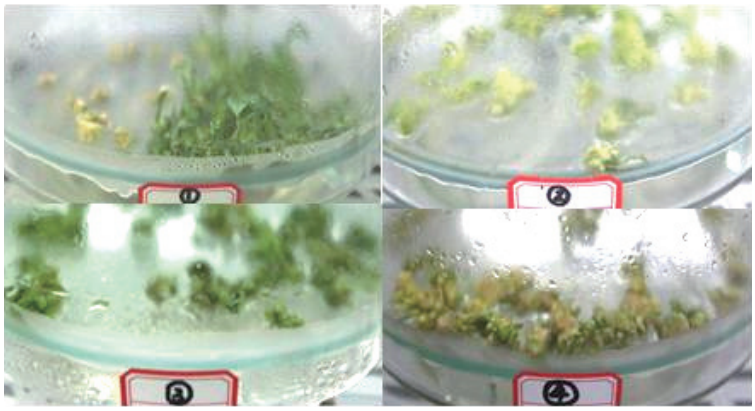
Applied to Cutting, Grafting, and Resource Conservation

The image below shows: The cultivation effects of tea seedlings and agarwood directly cut and cultured in the BioF-IV Plant Bioreactor. The portable reactor vessels offer large storage capacity, ease of transport, and convenient real-time observation and processing.

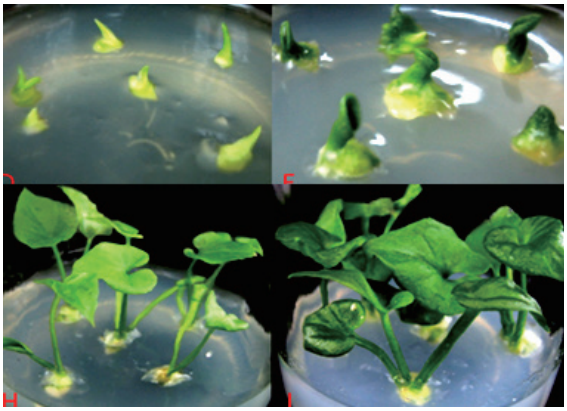


Applied to High-Throughput Variety Screening

Screening Process and Cultivation Effects of Salt-Tolerant Pinellia ternata Strains



Conventional strain



New strain

Applied to Controlled Pollination and Full Life Cycle Studies

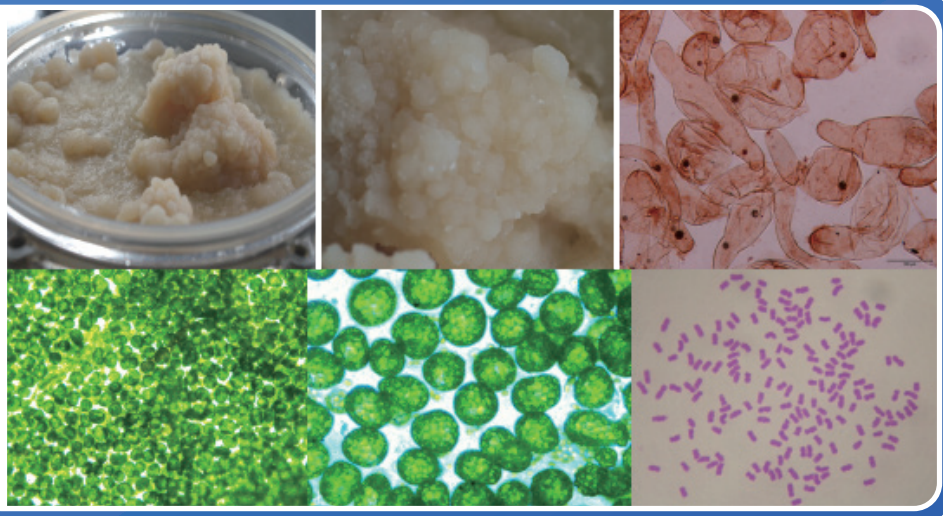
The image shows: Promoting Dendrobium flowering and achieving artificial pollination through sufficient nutrient supply in the BioF-IV Plant Bioreactor. After full cultivation, an adequate amount of fresh Dendrobium stems is also obtained.

Applied to Plant/Microbe Co-Cultivation Systems

Applied to Group Immunity of Tissue-Cultured Seedlings and High-Efficiency Screening of Dominant Microbial Strains for Biofertilizers

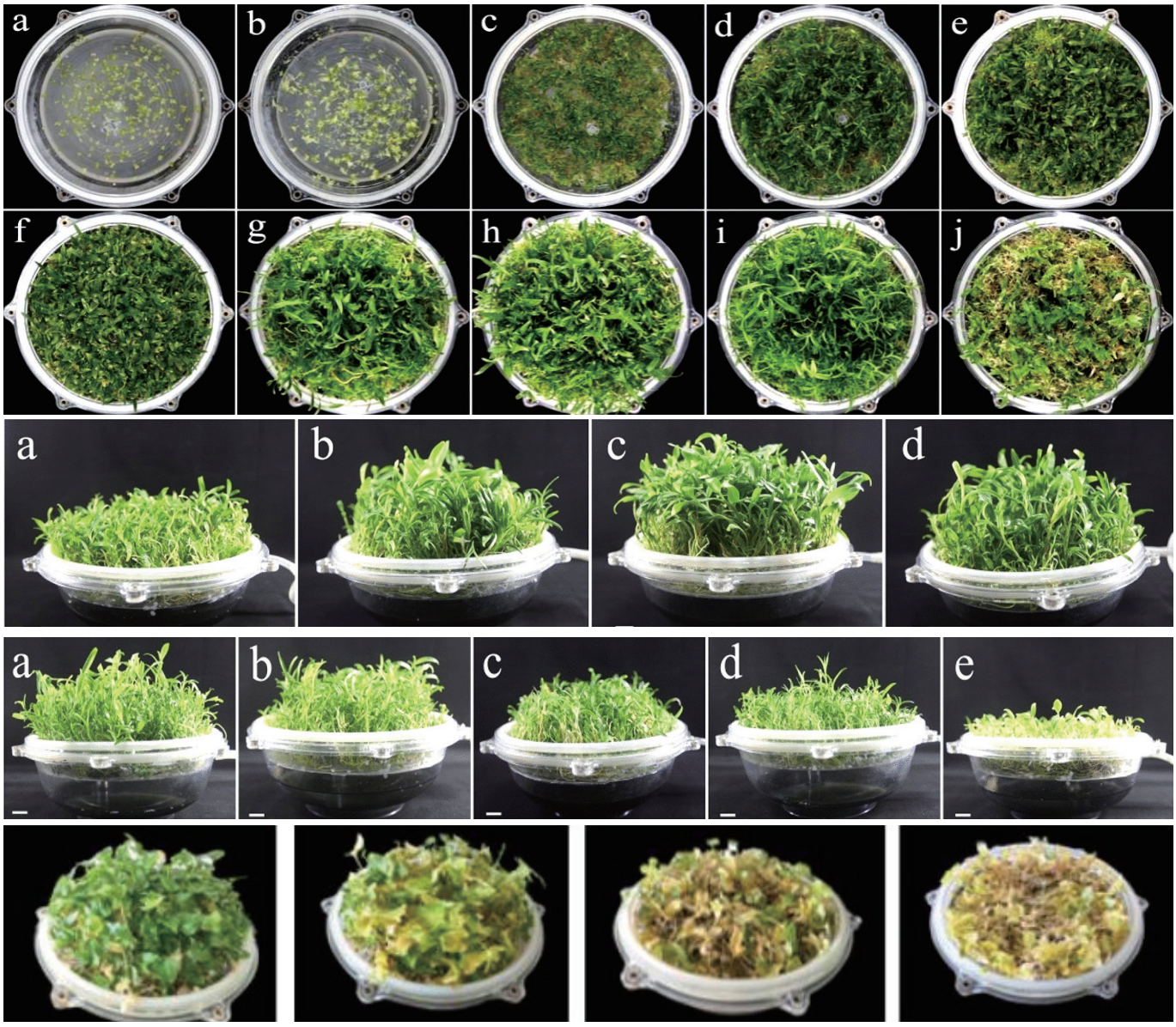
Applied to Basic Research

Applied to Plant Tissue and Stem Cell Cultivation



Applied to the Response of Plant Tissues and Plants to Other Treatment Technologies

Studying the Effects of Effectors on Plant Growth



Images:

Cultivation process of Dendrobium nobile tissue-cultured seedlings in the BioF-IV Bioreactor (a-j, each interval 15 days).

Effects of different immersion frequencies on seedling growth during Dendrobium nobile cultivation in the BioF-IV Bioreactor (third row).

Promotion/inhibition effects of different concentrations of MeJA treatment on the growth of Dendrobium nobile cultivated in the bioreactor (fourth row).

Effects of different concentrations of MeJA stress treatment on promoting the lodging of Pinellia ternata in the bioreactor (fifth row).