

Multiple Cutter System for Plant Tissue Culture (2016-045)

Cutting Technique for Reduced Labor and Increased Product Output.

Market Overview

This micro-propagation technique utilizes a specialized tissue culture vessel and culture process, allowing for increased output and decreased labor time. Plant tissue culture via micro-propagation is used for almost the entirety of the banana, sugarcane, floral, and medicinal plant markets, with the demand for tissue-cultured plants growing by roughly 20% each year. In the United States alone there are more than 70 established commercial tissue culture facilities with production capacities reaching 200 million plantlets per year. Most micro-propagation costs are associated with labor, which limits the types of crops that can be profitably produced in a laboratory setting. Clemson University researchers have developed a novel micro-propagation technique that involves quick, efficient cutting techniques and an innovative culture method. This technology decreases the required labor per plant and broadens the variety of crops that can be produced cost-effectively in the laboratory.

Technical Summary

This novel method involves a simple vessel and tools to improve the cutting of elongated plant shoots. The vessel is inverted so that the root matrix resides in a narrow lid at the bottom of the container, while the shoots remain in the larger part of the vessel at the top. Removing the vessel top allows a blade to access the rooted base of the shoots. A single motion can then be used to cut shoots at the base. With the motion of the operator's wrist, rotating the root matrix in the narrow lid allows the harvested shoots to drop into a sterile receiver, while cutting across the remainder of the vessel surface. The base retains the rooted plants and allows for rapid regrowth of additional shoots when the vessel is reassembled. Fresh media or water may be added to the matrix to ensure high quality regrowth. The vessel and its contents remains sterile and can be harvested several times.

Application

Plant tissue culture via micro-propagation

Development Stage

Functional prototype

Advantages

- Novel cutting technique can harvest dozens of shoots at once, increasing micro-propagation efficiency.
- Original cutting vessel remains sterile, allowing for multiple harvests in a single crop season.
- Cost of labor per plant cut is greatly reduced, increasing profit margins.

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Provisional	United States	62/724,410	NA	2016-045	Dr. Jeffery Adelberg



About the Inventors

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Dr. Adelberg earned his Ph.D. in Plant Physiology from Clemson University in 1993. His research focuses primarily on high-value plant propagation systems, liquid-based systems and process design, plant mineral nutrition, vessels and environmental control, integration of laboratory and greenhouse acclimatization, and the responses of difficult-to-propagate medicinal plants to environmental conditions. His work also includes a micro-greens project encompassing mineral nutrition, vessels and packaging, and cleanroom process development.

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