

基于C8051F005的组培CO₂微环境调控系统的研制与试验

Development and test on new monitoring and control system of CO₂ gaseous micro-environment for plant tissue culture based on C8051F005

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英文关键词: plant tissue culture; CO₂ gaseous micro-environment; C8051F; auto-control system

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中文摘要:

基于C8051F005芯片设计开发一种新型组培气体微环境控制系统, 采用高纯度CO₂定压定量供给和自动箱内循环在线监测技术, 成功解决了CO₂气体难以自动精确施放和传感器检测精度及其稳定性的问题, 实现了组培微环境CO₂浓度的按需设定和自动控制。该系统能够同时记录CO₂浓度的下降量和时长, 既可用于研究不同组培微环境因子对组培苗同化CO₂速率的影响, 又能用于规模化组培育苗生产。以驱蚊香草、冬青、大花蕙兰组培苗为实验材料, 验证系统可靠性与可行性。结果表明该系统运行可靠, 控制精度高, 能够满足规模化组培育苗对气体微环境调控的需求和组培微环境建模的科研要求。

英文摘要:

Based on C8051F005, a new monitoring and controlling system of CO₂ micro-environment for plant tissue culture was developed, which can feed high concentration CO₂ by constant pressure and quantum, and can monitor CO₂ concentration of microenvironment automatically and circularly on line. The developed system resolved such problems as the discharging CO₂ exactly and automatically, the CO₂ detecting precision and stability decreased by high relative humidity in vitro. In the system, the CO₂ concentration in micro-environment can be set up according to demands and be controlled automatically and accurately, and also the decrement of CO₂ concentration and the time length of this course can be recorded. The system can be applied to the research of assimilation rate of CO₂ in different environmental factors, and the large-scale production of plantlets in vitro. By the experiment on Cymbidium hybridum, holly and Mozzie Buster, the feasibility and reliability of the system have been tested. Results show that this system can meet the control requirement of gaseous environment for large-scale production of plant tissue culture, and can meet the research requirement of building model of micro-environment of tissue culture.

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