Arabica Coffee Micropropagation Through Somatic Embryogenesis via Bioreactors

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ABSTRACT

Vegetative propagation of coffee is highly desirable because it can reduce the time it takes to establish high-valued coffee plantations. Segregating hybrids, selected somaclone mutants or transgenic plants could be immediately scaled-up for commercial purposes. Coffee somatic embryos produced in liquid cultures inside bioreactor vessels are an ideal system for coffee micropropagation.

Friable embryogenic cultures (FET) were isolated from leaf cultures of *Coffea arabica* cv. Red Catuai and multiplied on solid medium for about 16 months. This FET cell line was used to establish embryogenic liquid cultures at a density of 5-10 ml packed cell volume (PCV) per 100 ml.

High frequency somatic embryo production was obtained after inoculating 18 month-old FET liquid cultures into 5-liter bioreactor vessels at a density of 1-5 ml PCV/liter. Fresh regeneration medium was provided during weekly changes for 5 weeks. Embryo development medium was added at the 9th week and embryos were harvested at the 14th week of culture. In this study, a low cost bioreactor model, specially designed for micropropagation purposes, was successfully tested. A total yield of 45,000 embryos were recovered from the 5-liter vessel. Samples of these bioreactor-generated embryos were plated on germination media to evaluate the plantlet conversion rate.