

Control of Fungal Contamination in Plant Tissue Culture Using Synthetic and Natural Antifungal Agents

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Microbial contamination remains a serious issue in the plant tissue culture industry. This study was conducted to evaluate effective synthetic and natural antifungal agents to control the fungal contaminations in plant tissue culture. Different natural antifungal agents (cinnamon oil, clove oil, and ethanol garlic extraction), synthetic antifungal agents (carbendazim, mancozeb, chlorothalonil, and thiram) were screened using agar disk diffusion method against the common contaminants of tissue culture media, namely, *Penicillium* sp., *Cladosporium* sp., and *Pythium* sp. The effective antifungal agents were tested in tissue culture by calculating contamination percentage against control. Different concentrations (in the range of 50, 75, 150, 300, 600, 1200 mg/L for carbendazim, mancozeb, chlorothalonil, thiram; 100, 200, 400, 800 mg/L for cinnamon oil, clove oil and 250, 500, 1000, 2000, 4000 mg/L garlic extraction) of effective antifungal agents were used as treatments in a Complete Block Design with twelve replicates. Sterilized explants were cultured in MS medium incorporated with three natural antifungal agents and four synthetic antifungal agents with above concentrations as treatments to control fungal contamination in plant tissue culture. The highest effectiveness in controlling of contaminants were observed in 300 mg/L of carbendazim, 600 mg/L of mancozeb, 2000 mg/L ethanol garlic extraction (based on the fresh weight) for *Penicillium* sp., 300 mg/L of carbendazim, 300 mg/L of mancozeb for *Cladosporium* sp. and 300 mg/L of chlorothalonil, 600 mg/L of thiram and 4000 mg/L ethanol garlic extraction for *Pythium* sp. by incorporating to culture media, respectively. The level of plant growth and shoot production with media incorporated with antifungal agents is needs to be explored.

Keywords: Cinnamon oil, clove oil, garlic extraction