

**IDENTIFICATION AND CONTROL OF CONTAMINATING AGENTS
IN TISSUE CULTURE OF SELECTED FRUIT CROPS
BANANA (*Musa spp.*) AND PAPAYA (*Carica papaya*)**

W.L.C. FERNANDO*, D.P. PREMATHILAKE** AND
D.C. BANDARA*

*Department of Agricultural Biology, Faculty of Agriculture, University of Peradeniya

**Horticultural Crop Research and Development Institute, Department of Agriculture,
Gannoruwa, Peradeniya

Plant production through tissue culture is a prominent industry, facilitated with its numerous benefits. However, the problem of explants being destroyed due to systemic infections still remains unsolved. Banana (*Musa spp.*) and Papaya (*Carica papaya*) crops were used in this study, to identify possible bacterial and fungal contaminating agents using antibiotics and antifungal compounds and to find the effect of these control measures on the shoot explants.

Three experiments were performed to achieve the above objectives. Shoot explants of banana and papaya were cultured in modified Murashige and Skoog (MS, 1962) medium and the contaminants that initiated after few subcultures were initially classified as bacteria or fungi based on their morphological features. In both crops, more bacteria were found than fungi. All suspected contaminants were identified at least up to their genus levels. Bacteria by, Gram staining, growing on Yeast Extract-Dextrose-Calcium Carbonate agar medium, growing on King *et al.*'s medium B agar and by observing pigmentation and fungi by, observing prepared permanent slides. Twelve fungal species were identified of which six were chosen for further experiments. Four bacterium species were also identified.

The next experiment aimed at developing a control measure for the identified bacteria and fungi. A modified MS medium supplemented with three antibiotics (Streptomycin, Rifampicin and Cefalexin) and two antifungal compounds (Benlate and Mycoral) were used. Bacteria were subjected to 28 antibiotic treatments while fungi were subjected to six antifungal compound treatments. The level of growth of the contaminant on each treatment was read according to a numerical scale, which was then analyzed using SAS, according to Wilcoxon Rank Sums and NPR1WAY procedure. All fungi were controlled with 1000 mg/l Benlate. Both *Bacillus spp.* and *Xanthomonas spp.* were controlled with 250 mg/l each of Streptomycin and Rifampicin. *Erwinia spp.* was controlled with 750 mg/l Streptomycin. However, for *Streptococcus spp.* 150 mg/l each of Streptomycin, Rifampicin and Cefalexin was the most effective.

Finally, the effect of selected control methods on banana and papaya shoot cultures was tested. Banana shoot cultures showed the highest survival rate on media with 1000 mg/l Benlate, whereas for papaya it was on media with 1300 mg/l Benlate. However a 50% - 75% survival rate was observed on both shoot cultures, on media with a combination of both antibiotics and antifungal compounds.

Thus, it can be suggested that in order to control both these contaminants at the same time, for banana and papaya tissue culturing a combination of both antibiotics and antifungal compounds in the culture media is most suitable.