RESEARCH NOTES

PROPYLENE OXIDE VAPOUR AS A PLANT TISSUE STERILANT FOR BIOASSAY OF ANTIBIOTICS

The methods usually adopted for sterilization of plant tissues in the bioassy of antibiotics present in them are washing with sterile water, freezing and using mercuric chloride. (Mitchell 1954, Gray 1956, Lockwood 1958). These methods were, however, found unsatisfactory for tissue sterilization while studying the absorption and translocation of streptomycin in tomato plants,

Propylene oxide was reported to be useful for biological sterilization (Whelton *et al.* 1946, Hansen and Snyder 1947, Ark 1947). This material was therefore tried in comparison with the other methods for plant tissue sterilization, the details of which are presented in this paper.

Whole tissues of tomato plants sprayed with streptomycin as well as of unsprayed plants were washed in tap water and dried between folds of filter paper. Leaf and stem discs and root bits were cut using sterile instruments and placed in a vacuum desiccator of one litre capacity in open petri dishes. One ml of propylene oxide contained in a clean china dish was placed in the lower compartment of the desiccator and a partial vacuum created within by drawing out air. After ten minutes of exposure to the vapour of propylene oxide the desiccator was opened and the dishes containing the tissues closed with sterile lids. The presence of the antibiotic in the tissues was assayed by planting the tissues on a culture of *Bacillus subtilis* on potato-dextrose agar plated in petri dishes and noting the zone of inhibition and contaminants, if any.

Washing the tissues in several changes of sterile water, freezing them overnight after washing in sterile water and surface sterilization in 1:1000 mercuric chloride for 15 seconds followed by washing in several changes of sterile water were also done in comparison.

Results showed that the washing and freezing treatments did not help in avoiding growth of contaminants around the tissues. In the case of mercuric chloride treatment, it was not possible to wash the tissues free of the chemical and this had an inhibitory effect on the test organism. The propylene oxide treated tissues of plants sprayed with streptomycin, formed well defined inhibition zones while similar tissues of unsprayed plants did not show inhibition. Contaminants were absent in both the cases. Propylene oxide vapour was thus proved to be ideal for sterilization of plant tissues.

References

Ark, P. A. 1947. Disinfecting power of propylene oxide and propylene chloride in relation to phytopathogenic bacteria and fungi. *Phytopathology. 37:* 842

Gray, R. A. 1956. Increasing the absorption of streptomycin by leaves and flowers with glycerol. *Phytopathology. 46:* 105-111

Hansen, H. N and Snyder, W. C. 1947. Gaseous sterilization of biological materials for use as culture media. *Phytopathology.* 37: 369-371

Lockwood, J. L. 1958. A method for studying absorption of streptomycin by using leaf discs of *Sedum purpurum. Phytopathology. 48:* 150-155

Mitchell, J. W., Zaumeyer, W. J. and Prestan, W. H. 1954. Absorption and translocation of streptomycin by bean plants and its effect on halo and common blight organisms. *Phytopathology. 44:* 25-30

Whelton, R., Phaff, H. J., Mrak, E. M. and Fisher, C. D. 1946. Control of microbiological food spoilage by fumigation with epoxides. Food *Industr. 18* (1): 91-93., (2): 84-86, 228, 230

Division of Plant Pathology,
Agricultural College & Research
Institute, Vellayani, Kerala State

L. Rema Devi
J. Sam Raj

(*Accepted* : 26-6-1971)