B-36: *In vitro* mass propagation of potato (*Solanum tuberosum* L.) using commercial fertilizers

A S Balasooriya[1], A Champika Senaratne[1], Kumudu Fernando[2]
([1]*Central Agricultural Research Institute, Gannoruwa,* [2]*Deot, of Botany, Univ. of Peradeniya*)

Sri Lanka requires 118,000 metric tons of potato annually but produces only 51,451 metric tons. Therefore millions of rupees are required to import the deficit. Clonal propagation of potato using tissue culture provides a convenient and rapid method of propagation. *In vitro* tuberization of potato provides basic material for seed potatoes and also for germplasm conservation and exchange. In Sri Lanka, micropropagation and microtuberization is not yet practised routinely because of high capital expenditure and also due to the expense and scarcity of the chemicals needed. The preparation of media needs technical know how, which limits transfer of technology to less educated farmers. Therefore this study was undertaken to test alternative tissue culture media using commercial fertilizers to provide a simple and inexpensive medium.

Potato mother plants were maintained in greenhouse to obtain explants. Shoots tips, axillary buds, leaf pieces and tubers were used as explants for culture establishment. Murashige and Skoog (1962) medium, Maxicrop and Hyponex media were used in this experiment with different concentration of hormones. Shoot tips and leaf pieces were exposed to continuous flow of tap water for 30 min and were immersed in 70% alcohol for 5-10 sec. Then they were transferred into 10% chlorox & were swirled for 15 min. After that, sterilized plant material was washed with water 3 times and transferred into a sterilized beaker with a small amount of sterilized water. Meristem tips were isolated and placed on media solidified with 0.8% agar. In leaf explants, 0.5 x 0.5 cm pieces were cut and placed in media.

Cultures were incubated in culture room with 25 ± 2°C temperature and 1000 lux illumination. Roots from *in vitro* cultures were cut into approximately 5 cm fragments and were inoculated into the flask containing liquid media, cultures were maintained on a shaker. Well rooted plantlets were transferred into liquid medium and incubated at 18°C to induce microtubers.

Observations were made every week and data obtained from 10 replicates of each treatment were analysed using Lotus 123 and EPISTAT computer programs.

The significant (0.01 level) difference in shoot growth was seen in MS medium supplemented with 0.01 mg/1 NAA and 0.1 mg/1 GA_3 when compared to Maxicrop and Hyponex. Shoot growth in Maxicrop medium significantly increased with the increase of concentration of Maxicrop upto 4 ml/1 while highest shoot growth occurred at the lowest concentration of Hyponex (1 mg/1). Six weeks after the inoculation in Maxicrop and Hyponex media, plantlets started to turn pale green in colour. However the plantlets in the MS medium still looked green and healthy after the same period of time. The maximum root growth occurred in Maxicrop medium. In leaf pieces, the highest degree of callus formation occurred in MS medium supplemented with 1 mg/1 BAP, 0.1 mg/1 NAA and 1 mg/1 GA_3 in comparison with other media. The combination of BAP, NAA and GA_3 gave high yield of callus as compared to combination of Kinetin, NAA and GA_3 in the same basal medium. 0.5 mg/1 GA_3 0.1 mg/1 NAA and 1 mg/1 BAP was found to be optimum for plant regeneration *via* callus. The ability of formation of callus was reduced when NAA was omitted and GA_3 was reduced to 0.3 mg/1. Callus production was highest in leaf pieces which were derived from the midrib area when compared to the explants taken from the rest of the leaf blade. Microtuber formation was highest in MS medium supplemented with 8 mg/1 BAP and 100 g/1 sugar when compared to Hyponex and Maxicrop with same concentration of BAP and sugar.

MS medium is the best medium for shoot tip, leaf culture and micro tuberization among the media which were tested.

MS medium with 1 mg/l BAP, 0.1 mg/l NAA and 1 mg/l GA_3 was best for callus formation from leaf. MS medium with 0.5 mg/l GA_3 0.1 mg/l NAA and 1 mg/l BAP was best for shoot proliferation.
Macicrop and Hyponex media can be used in the event where MS is not available.

Hyponex at 1 g/l can be used for germplasm conservation.