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PROPAGATION OF PAPAYA THROUGH TISSUE CULTURE

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Abstract

Possibility of vegetative propagation of papaya was studied by culturing apical and lateral shoots in MS media with all possible combination of NAA (0.186 and 0.372 mg/1) and BA (0, 113, 0.226, 0.452, 0.904 mg/1). The best combination for shoot was 0.186 mg/1 NAA+0.225 mg/1 BA. But the shoots did not elongate properly until 1 mg/1 GA_3 was added.

Key words: Papaya, Tissue culture, Propagation.

Papaya is propagated by seed and since it is a highly cross pollinated crop a plant can not be expexted to be true to type. There are, however, evidence of clonal propagation of this crop through grafting and rooted cuttings (Shookmark and Tai 1975) but these techniques are generally difficult and mostly unsuccessful. Because of its sex problems, improvement of this important crop has not yet been possible in Bangladesh. Immense variation in the population is obtained if papay plants are grown even from seeds collected from a very good mother plant. A successful method of propagation through tissue culture would be very useful for improvement of papaya.

There are some reports that papaya can be propagated through tissue culture using explant from seedlings (Yie and Liaw, 1977 ; Mehdi and Hogan, 1976; Arora and Singh, 1978 and De Bruigne *et al.*, 1974). These results would be of little value for papaya improvement, because the productifity and the fruit quality of the mother plant is unknown until the fruit is matured. Improvement of papaya may be possible through tissue culture only when the tissue is obtained from mature mother plant with known description of productivity and fruit quality.

The culture media suitable for seedling tissue may not be suitable for the tissues from mature plants. This work was therefore undertaken to study the possibility of papaya micropropagation using tissues from mature plants.

Year-old papaya plants of unknown varietal description were used for the experiment. Shoot tips (apical and lateral) were collected and the attached flower primordia and the petioles were removed. The explants were thoroughly rinsed in distilled water and then surface sterilized by agitation in 1% sodium hypochloride solution for 10 minutes. After carefully rinsing in distilled water for five times, the explant were taken in a clean bench and were planted in

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culture media. The percentage of sugar and agar was 3% and 0.8% respectively and the p^H was adjusted to 5.7.

In the first preliminary experiment shoot miltiplication media 'A' of Murashige, 1977 was used with four concentrations of 2ip (15,20,25 and 30 mg/1) and a constant concentration of IAA (0.3 mg/l). Even after 90 days of culturing both apical and lateral shoots (5 mm) there was no growth of the tissue. In the second experiment both apical and lateral shoots (5 mm) were cultured in MS media (Murashige and Skoog, 1962) with all possible combinations of NAA (0.186 and 0.372 mg/l) and BA (0.113, 0.226, 0.452 and o.904 mg/l). Even through there was satisfactory growth of leaf with 0.186 mg/l NAA and 0.225 mg/l BA, the shoot internode did not elongate satisfactorily and thus formed a compact mass of shoot, so much so that the bases of the shoots could not be distinguished from one another.

There was very little shoot growth in other hormone combinations. The media with low hormone concentration formed little callus. Subculturing those shoots two times in the same media with respective hormone combinations did not improve the growth. The third experiment included MS media + 0.186 mg/l NAA + 0.225 mg/l BA + variable concentrations of GA_3 (0.1mg/l, Img/l, 5 mg/l and 10 mg/l). The treatment of GA_3 (filter sterilized) was added for elongation of internode so that mass propagation could be done from nodal explant of GA_3 treated shoots. GA_3 at the rate of 1 mg/l was found to be very satisfactory in elongating the internodes. The shoot axis grew about 3 cm long 30 days after culturing at this concentration of GA_3. The other GA_3 concentrations used could not elongate the shoot internode.

One batch of nodal explant from the GA_3 treated shoots were planted in the same media with 1 mg/l GA_3 for further multiplication. All of them were damaged by fungal contamination. One batch of GA_3 treated nodal explants and one batch of auxiliary buds were planted in MS media with five concentrations of NAA (0.186, 0.93, 1.860, 2.790 and 3.720 mg/l) for rooting. Most of the explant were contaminated and the remaining ones did not form any root even after 40 days.

The results suggest that the use of nodal cuttings from GA_3 treated papaya explant is possible for micropropagation using MS medium with a combination of 0.186 mg/l NAA 0.225 mg/l BA and 1 mg/l GA_3.

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