

IN VITRO PROPAGATION OF *CARICA PAPAYA* L. var. 'COORG HONEYDEW' FROM NODAL EXPLANTS

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Abstract – Multiple shoots were obtained from nodal explants of two month old seedlings of *Carica papaya* L. var. 'Coorg Honey Dew' regenerated *in vitro*. The nodal explants were regenerated on MS medium fortified with BAP, Adenine Sulphate, NAA and coconut milk in various combinations. Cut ends of the regenerated shoots were excised and dipped for 30 seconds in IBA (500–3000 mg/l) dissolved in 50% ethanol, then inoculated on plain MS medium for rooting. The micropropagated plants were successfully hardened.

INTRODUCTION

Papaya is an important fruit crop, native to tropical America. It is popular in the subtropics for its easy cultivation, rapid growth, quick economic returns, and adaptation to diverse soils and climates (Harkness, 1967; Seelig, 1970; IIHR, 1979; Campbell, 1984). Cultivated papaya is a small, unbranched, and usually dioecious plant, although hermaphrodite sex types occur (Harkness, 1967; Seelig, 1970; Samson, 1986). Conventional method of propagation is by seeds. Vegetative propagation methods do not exist for large-scale production; thus, clonal propagation by tissue culture is much desired (Bankar and Sharon, 1996).

Carica papaya L. var. 'Coorg HoneyDew' a selection from 'HoneyDew' is a popular gynodioecious cultivar. There are no male plants; female and bisexual occur in equal proportions.

Nodal segments of two-month-old seedlings of *Carica papaya* L. var. 'Coorg Honey Dew' regenerated *in vitro* were used to initiate multiple shoot. Tissue culture system using shoot tips from seedlings and lateral buds from female plants was tried for the propagation of papaya variety 'Coorg HoneyDew' (Pandey and Rajeevan, 1983). However, the present work shows that being a gynodioecious cultivar, the nodal explants also served as an important explant material for the mass propagation of *Carica papaya* L. var. 'Coorg HoneyDew.'

MATERIAL AND METHODS

Two-month-old seedlings of *Carica papaya* L. var. 'Coorg HoneyDew' were regenerated *in vitro*. Nodes were excised and regenerated on MS medium (Murashige and Skoog, 1962) containing 3% sucrose and 0.8% agar, fortified with BAP, NAA and Adenine Sulphate singly, in different combinations and in various combinations supplemented with coconut milk. The pH of the culture media was adjusted to 5.8 prior to autoclaving at 15 kg/cm². All cultures were maintained in an incubation room at 26 ± 1°C and 16 h photoperiod with 3000 lux.

The nodal explants regenerated multiple shoots in 6-8 weeks. Cut ends of the regenerated shoots were excised and dipped for 30 seconds in IBA (500–3000 mg/l) dissolved in 50% ethanol, then inoculated on plain MS medium for rooting. The resultant plantlets were transplanted after 4 weeks into small pots containing soil, vermiculite and cow dung (1:1:1) mixture and then shifted to green house (RH–80%) for further establishment. For each treatment, 24 cultures were raised and every experiment was repeated thrice and the quantitative results are tabulated.

OBSERVATIONS AND DISCUSSION

Nodal segments of *Carica papaya* L. var. 'Coorg Honey Dew' cultured on MS medium fortified with BAP, Adenine Sulphate or NAA (0.5-4 mg/l) singly

Table 1. Multiple shoot formation on nodal explants of *Carica papaya* L. regenerated *in vitro*.

MS medium				Cultures with multiple shoots (Average%)	Shoots/explant (Average number)
BAP	AS	NAA	CM		
	(mg/l)		(%)		
1	0.5	0.5	5	54.16 ± 4.16	0.80 ± 0.10
2	0.5	0.5	5	77.77 ± 2.40	1.94 ± 0.08
3	0.5	0.5	5	81.92 ± 2.39	2.09 ± 0.09
1	0.5	0.5	10	69.44 ± 2.40	1.80 ± 0.16
2	0.5	0.5	10	86.10 ± 2.42	5.00 ± 0.10
3	0.5	0.5	10	58.33 ± 4.17	1.46 ± 0.14
1	0.5	0.5	15	63.88 ± 2.40	1.30 ± 0.04
2	0.5	0.5	15	66.66 ± 4.16	1.82 ± 0.09
3	0.5	0.5	15	83.32 ± 4.17	2.29 ± 0.18

± Standard deviation

BAP - Benzyl aminopurine

NAA - Naphthalene acetic acid

AS - Adenine Sulphate; CM - Coconut milk

Table 2. Effect of different concentration of IBA dissolved in 50% ethanol on rooting of excised shoot.

IBA (mg/l)	Rooting (%)	No. of roots/shoot
Control	0.0 ± 0.00	0.00 ± 0.00
500	4.0 ± 2.00	2.00 ± 1.00
1000	13.0 ± 1.00	2.00 ± 1.00
1500	21.3 ± 0.57	1.33 ± 0.57
2000	51.6 ± 0.57	2.66 ± 0.57
2500	64.3 ± 2.08	10.33 ± 1.52
3000	22.6 ± 1.52	2.00 ± 1.00

IBA - Indole Butyric acid

did not produce any shoots. MS medium fortified with BAP, Adenine Sulphate and NAA in various combinations elicited poor response. The nodal segments cultured on MS medium fortified with BAP, NAA and Adenine Sulphate and coconut milk

in various combinations produced multiple shoots within 6-8 weeks. (Fig. 1A) The best response was elicited by MS medium fortified with BAP (2 mg/l), Adenine Sulphate (0.5 mg/l), NAA (0.5 mg/l) and 10% coconut milk with an average of 5.00 ± 0.10 shoots per explants. (Table. 1) After 4-6 weeks, individual shoots were excised and used for rooting. Cut ends of the regenerated shoots were dipped for 30 seconds in IBA (500-3000 mg/l) then inoculated on plain MS medium. (Fig. 1B) Maximum rooting (64.3%) was elicited when cut ends of multiple shoots were dipped in IBA (2500 mg/l) in 50% ethanol. (Table. 2) The resultant plantlets grew well in small pots containing soil, vermiculite and cow dung (1:1:1) mixture.

REFERENCES

- Bankar, R.G. and Sharon, M, 1996. High frequency clonal propagation of papaya from field grown plants. *Bioresearch J.* 01 (1): 17-22.
- Campbell, C. W. 1984. Papaya—Tropical fruits and nuts, p. 246-247, In: F.W. Martin (ed.). *Handbook of tropical food crops*. CRC Press Inc., Boca Raton, FL.
- Harkness, R. W. 1967. Papaya growing in Florida. *Florida Agric. Exp. Sta. Cir.* S-100.
- Indian Institute of Hort Research (IIHR), 1979. *Papaya cultivation*. Ext. Bul. 19, Indian Inst. Hort. Res., Bangalore, India.
- Murashige, T. & Skoog, F. 1962. A revised medium for rapid growth and bioassays with tobacco tissue cultures. *Physiol. Plant.* 15: 473-497.
- Pandey, R. M. and Rajeevan, M. S. 1983. Propagation of papaya through tissue culture. *Acta Horti.* 131: 131-139.
- Samson, J.A. 1986. Papaya, p. 256-269. In: *Tropical fruits* (2nd edition). Tropical Agriculture Series, Longman Inc., New York.
- Seelig, R.A. 1970. *Papaya—Fruit and vegetable facts and pointers*. United Fresh Fruit and Vegetable Association, Washington, DC., p. 7.
