EFFECTS OF EXPLANTS AND CULTURE MEDIUM FACTORS ON *INVITRO* PROPAGATION OF ROSE (*ROSA HYBRIDA* L.)

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To improve the procedure for in vitro propagation of clean planting materials of rose, experiments were conducted to investigate the effect of types of explant and several growth regulator substances on in vitro shoot and root regeneration and shoot proliferation.

Apical growing tips and auxiliary buds of the rose variety Vang Vien Do were compared as explants on Murashige & Skook (MS) culture medium with addition of saccharose 30 g/l, kinetin 0.3 mg/l, α-naphthalene acetic acid (NAA) 0,01 mg/l, and benzyl aminopurine (BAP) at concentrations 2.5, 3.0 and 3.5 mg/l.

MS medium with addition of 0.01 mg/l NAA, 9 g/l agar and 0.05 g/l activated charcoal. Growth regulators 1) BAP 3.0 mg/l, 2) BAP 2.0 mg/l + kinetin 0.5 mg/l and 3) kinetin 1.0 mg/l, were used as treatments to investigate their effect on in vitro shoot proliferation of Kiss Orange rose. Several concentrations of MS minerals and light regimes on rooting of shoots were also investigated for their effects on rooting of shoots in vitro. The pH of all media was adjusted to 5.6.

Results showed that percent of regeneration of nodal explants ranged from 67 to 90%, significantly higher than those of growing tip explants (Table 1 & Plate 1). While shoots produced from nodal explants 30 days after inoculation increased with increasing concentrations of BAP 2.5-3.0-3.5 mg/l, accordingly 53-70-80%, with percentage of explants regenerated into callus only about 10%, the growing tip explants did not produce shoots, but only callus at 75-68-73%, respectively (Table 2).

Culture media containing 3.0 mg/l BAP and /or 2.0 mg/l BAP + 0.5 mg/l kinetin affected the turn up of 80 % of explants to shoot regenerating and significantly increased the number of shoots per explant compared to the medium solely containing 1.0 kinetin (Table 3). Meanwhile the presence of kinetin in the medium helped to improve considerably the quality of regenerated shoot. IBA had a significantly higher effect in stimulating root formation in vitro than did NAA. In the medium containing 0.5 mg/l IBA, the number of shoots that produced roots in the variety Kiss Orange and RH08.1 was significantly higher than those in medium containing 2.0 mg/l NAA. A similar situation was observed for the number of roots per shoot and root length (Plate 2).

Table 1. Percentage of live and clean apical growth tip and auxiliary bud explants obtained 30 days after inoculation in vitro on MS medium with different concentrations of BAP

BAP concentration	Explant type		Alive and clean explants (%)
	Auxiliary bud	Apical growth tip	
2.5 mg/l	67 c	75 bc	71 b
3.0 mg/l	80 b	68 c	74 b
3.5 mg/l	90 a	73 bc	82 a
% alive and clean explant	79 a	72 b	
CV (%)	7.68		

In a column, means with the same letter are not significantly different at P≤0.05

Table 2. Percentage of apical growth tip and auxiliary bud explants producing callus and/or shoots 30 days after inoculation *in vitro* on MS medium containing different concentrations of BAP

BAP concentrations	Auxiliary bud		Apical growth tip	
	Callus (%)	Shoot (%)	Callus (%)	Shoot (%)
2.5 mg/l	13	53	75	0
3.0 mg/l	10	70	68	0
3.5 mg/l	10	80	73	0

Table 3. Percentage of shoots developing shoot clumps, number of shoots per clump and shoot quality of Kiss Orange rose 30 days after transplanting *in vitro* on media containing different levels of cytokinin

Cytokinin level	shoot developing shoot clumps (%)	No of shoots /clump	Shoot quality (1-5)
3.0 mg/l BA	80.0 a	2.7 a	2.5 b
1.0 mg/l kinetin	22.7 b	1.2 b	4.7a
2.0 mg/l BA + 0.5 mg/l kinetin	81.3 a	2.5 a	4.1 a
CV (%)	11.71	7.39	8.65

In a column, means with the same letter are not significantly different at P≤0.05. Shoot quality (1-5): 1= too poor, 5= very vigorous and healthy.

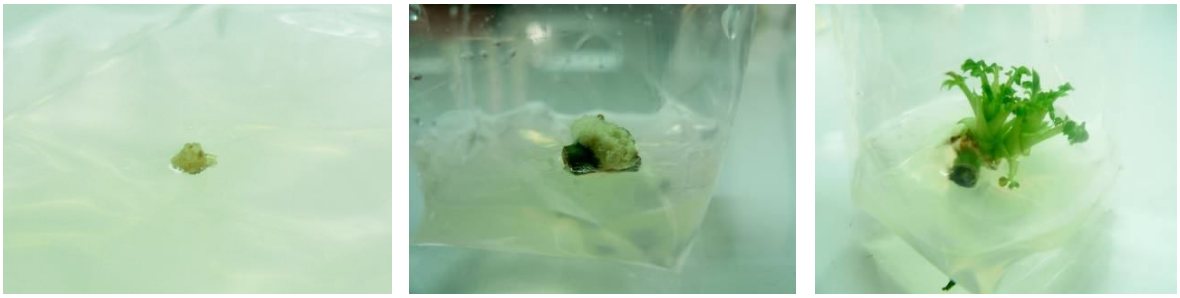

Figure 1. From left to right. Callus developed from an apical growth tip, callus from an auxiliary bud and shoot from auxiliary bud 30 days after inoculation

Figure 2. From left to right. Roots of Kiss Orange 10 days after inoculation, roots of RH08.1 10 days after inoculation and Kiss Orange 30 days after inoculation