Improving efficiency of micropropagation of *Eucalyptus pellita*

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INTRODUCTION

Eucalyptus pellita is one of the economically important *Eucalyptus* species for solid wood and veneer manufacture. It has good stem straightness with limited branching, fast growth, good coppicing ability, low lignin, high cellulose and is more resistant to attack by pathogenic fungi and insect rather than some other tropical tree plantation species. Micropropagation through direct organogenesis axillary buds method has been established in invitro culture systems. However, response to micropropagation among genotypes can be variable according to culture medium, plant growth regulators (PGRs) and carbon source. The objective of this study was to observe the influence of culture medium strength, different plant growth regulators and sucrose concentration on efficiency of micropropropagation, acclimatisation and survival after de-flasking.

METHODOLOGY

Explants were collected from two clones in the nursery and then introduced to culture medium for shoot induction (Figure 1).

Shoot explants from the introduction were tested with half and full-strength MS culture medium and different growth regulators (Naphthalene-acetic acid (NAA) and 6-Benzylaminopurine (BPA) during multiplication phase to encourage shoot to multiply and grow (Table 1).

The elongated shoots were then transferred to medium containing 10, 20, 30 and 40g/L sucrose during the rooting phase to test its effect on the shoot root development, growth and survival after de-flasking.

Rooted plantlets from propgation *in-vitro* were acclimatized prior to planting out in the nursery.

Table 1: Different strength medium and concentration of plant growth regulator (PGRs) affecting numbers of shoot growth raised from bud explants

Medium strength		Plant growth regulator volume (mg/L)		Number of shoots growth per explant
P1	P2	Naphthalene-acetic acid (NAA)	6-Benzylaminopurine (BAP)	
1/2MS		0.1	0.05	2
1/2MS		0.1	0.1	2
1/2MS		0.1	0.25	3
1/2MS		0.1	0.5	2
MS		0.1	0.05	3
MS		0.1	0.1	4
MS		0.1	0.25	9
MS		0.1	0.5	5
	1/2MS	0.1	0.05	2
	1/2MS	0.1	0.1	3
	1/2MS	0.1	0.25	3
	1/2MS	0.1	0.5	3
	MS	0.1	0.05	2
	MS	0.1	0.1	4
	MS	0.1	0.25	9
	MS	0.1	0.5	5

Figure 1: Propagation of *E. pellita in-vitro*

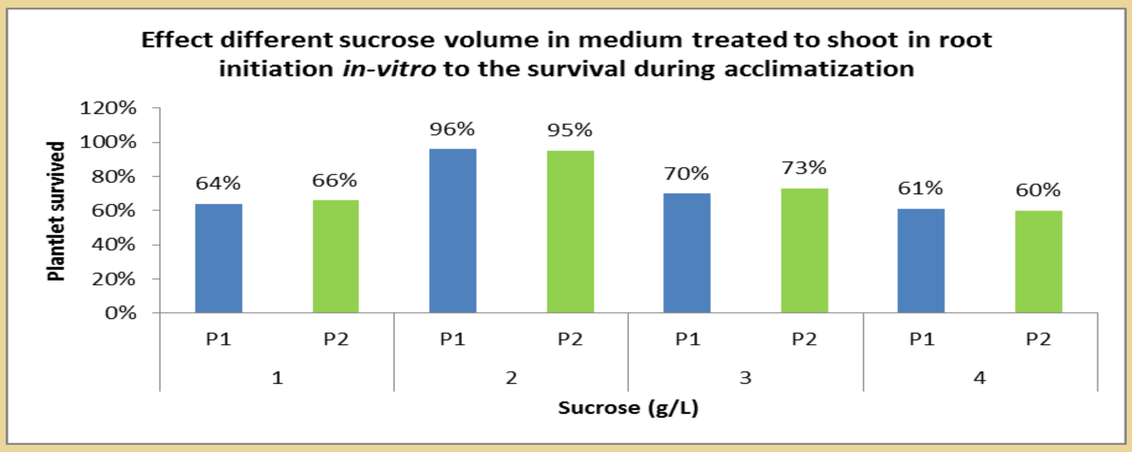
RESULT & DISCUSSION

From both genotypes of *E.pellita* tested, results indicate that full strength MS medium with a combination of 0.1mg/L Naphthalene- acetic acid (NAA) and 0.25mg/L 6-Benzylaminopurine (BAP) increased elongated shoot productivity (Table 1) from the shoot explants (Figure 2). High sucrose concentrations (4g/L) induced good formation of the root systems with greater root number and root length (Table 2). However, whilst 4g/L sucrose better for root system development *in vitro*, acclimation potential was higher using 2g/L sucrose, giving the highest survival after hardening (96%)and transferring to a potting media (Figure 3).

Refinement of micropropagation method of *E.pellita* has increased the efficiency of plantlets production and significantly improved their survival during acclimatization.

Figure 2: Vigorous shoot growth from bud explants on two different *E.pellita* clones

Table 2: Various volume of sucrose added to MS culture medium resulting a different number of shoot growth from the bud explants



Sucrose (g/L)		Shoot height (cm)	Number of root	Root length (cm)
P1	P2			
1		2.7 ± 0.09^{d}	2.1 ± 0.18^{d}	1.3 ± 0.11^{e}
2		4.0 ± 0.00^{c}	3.8 ± 0.13^{c}	2.3 ± 0.11^{d}
3		4.5 ± 0.15^{b}	4.6 ± 0.26^{b}	3.7 ± 0.16^{b}
4		4.9 ± 0.08^{a}	6.4 ± 0.15^{a}	4.9 ± 0.13^{a}
	1	2.8 ± 0.11^{d}	2.5 ± 0.12^{d}	1.0 ± 0.00^{e}
	2	4.0 ± 0.00^{c}	4.1 ± 0.16^{bc}	2.1 ± 0.08^{d}
	3	4.9 ± 0.06^{a}	4.4 ± 0.18^{bc}	3.3 ± 0.19^{c}
	4	4.8 ± 0.10^{a}	6.1 ± 0.08^{a}	4.9 ± 0.08^{a}

Figure 3: Multiple sucrose volume that treated to shoot during root initiation *in-vitro* consequently affecting to plantlet acclimatization survival in pre-nursery.

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