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Effect of Plant Growth Regulators on Axillary Shoot Growth in Rosmarinus officinalis L. Cultured In Vitro

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기내배양 로즈마리의 액아생장에 미치는 식물생장조절제의 영향

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Objectives

Rosemary (Rosmarinus officinalis) is an aromatic herb native to Mediterranean which has been shown one of the strongest natural antioxidant. Tissue culture is considered an alternative method for plant rapid propagation. The present study reported the effects of different plant growth regulators on shoots growth and multiplication through tissue culture from shoot-tips and single-node stems..

Materials and methods

○ Materials

The plant materials were chosen from the well-grown R. officinalis plants in the greenhouse. The young shoots(5-7cm) were collected and washed with running tap water, then kept in distilled water for about one hour. The leaves were removed, and the rest part of the shoots were dipped into 70% ethyl alcohol for 1 min, 0.5% sodium hypochlorite supplemented with several drops of Tween-20 for 15 min and rinsed with autoclaved distilled water three times, 5 min each. The sterilization of the plant materials was finished in the clean bench.

○ Methods

MS medium with 7 g.L-1 agar and 30 g.L-1 sucrose was used, and the pH of the mediums was adjusted to 5.8. Shoot tips(1.5cm) and single-node stems(1-1.5cm), were cultured on the medium supplemented with NAA 0, 0.01 mg.L-1 and various cytokinin concentrations. Culture condition was adjusted under 16/8h photoperiod at 25±1℃. Data were collected after 8 weeks culture.

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Results

After 3 weeks, the regenerated shoots rooted in control both in the shoot culture and node culture. In shoot culture, treatments with NAA were much better than without any auxin treatments for shoot growth and multiplication. 0.01 mg.L-1 NAA and 0.5 mg.L-1 BA combination was the optimal treatment for shoot growth, whereas the treatment of 0.01 mg.L-1 NAA and 1.0 mg.L-1 BA was better to the shoot multiplication. Among different cytokinins, BA was much better than kinetin In node culture, 0.2 mg.L-1 BA with 0.01 mg.L-1 NAA treatment was good for both shoot induction and growth, while the 0.5 mg.L-1 BA treatment was better for shoot multiplication.

Table 1. Effects of different concentrations of cytokinins supplemented to MS medium on shoot-tip and single-node stems of R. officinalis cultured in test-tubes, after 8 weeks.

Treatment ($mg.L^{-1}$)		Survival rate (%)	No. of axillary shoots[a]	No. of nodes per shoot[a]	Rooting rate (%)	No. of roots per shoot[a]	Callus formation (%)
Shoot-tips							
Control		60	0.17±0.20	5.5±0.69	95	1.67±0.42	—
NAA	BA						
0.01	0	60	1.31±0.68	1.72±0.43	—	—	—
	0.2	70	1.55±0.47	2.39±0.88	—	—	—
	0.5	50	3.20±0.25	4.15±0.61	—	—	—
	1.0	60	4.50±0.32	4.10±0.68	—	—	—
	TDZ						
0.01	0.2	60	0	3.00±0.21	—	—	—
	0.5	60	1.50±0.29	2.25±0.48	75	3.25±1.70	75
	1.0	0	—	—	—	—	—
	Kinetin						
0.01	0.2	0	—	—	—	—	—
	0.5	30	1.50±0.50	3.50±0.50	—	—	—
	1.0	70	0.57±0.29	3.14±0.46	—	—	—
Single-node stems							
Control		60	1.60±0.54	3.60±0.69	83	3.2±0.33	—
NAA	BA						
0.01	0	60	1.32±0.49	1.82±0.37	—	—	—
	0.2	80	2.00±0.68	3.31±0.61	—	—	—
	0.5	80	3.13±0.72	2.63±0.46	—	—	—
	1.0	30	1.65±0.53	2.50±0.38	—	—	—
	TDZ						
0.01	0.2	50	2.80±0.68	2.60±0.48	30	1.2±0.46	25
	0.5	30	1.78±0.45	3.49±0.36	67	1.5±0.65	78
	1.0	90	2.40±0.51	0.40±0.24	—	—	33
	Kinetin						
0.01	0.2	50	1.80±0.44	2.70±0.26	—	—	—
	0.5	80	1.25±0.28	2.88±0.44	—	—	—
	1.0	50	1.80±0.55	2.70±0.24	—	—	—

a ±S.E : standard error.