Induction of Callus by Anther Culture of Licorice(*Glycyrrhiza uralensis*)

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Objective

Licorice(*Glycyrrhiza uralensis*) is usually produced under extensive culture, and also has many variation of geographical origion or plant characteristics. The fundamental research work on the production of licorice is scarce, expecially about the difference among cultivars for growth characteristics, glycyrrhizin production, and tissues culture, which are needed for more and further studies. The objective of this study is to evaluate several factors on the phytohormones and inorganic compound, which may affect the variability in callus formation by anther culture of licorice.

Materials and Methods

Licorice populations, origated from China and were grown in a field at Kyungpook national university in 2001. Seven treatments were employed to investigate the effect of phytohomones, namely : 2,4-D, IAA, BAP, BA, and hormone concentrations from 0.5 to 2 ㎎ per liter.

The rate of callus formation was represented by the percentage of the anthers with calli to that of the plated anthers. Following the method used in *B. falcaturm*, anthers from one plant were cultured in the same day.

Anthers were collected in the morning, and were surface sterilised in EtOH, and 2% sodium hypochlorite and rinsed three times with sterile distilled water. Other details are shown in SON et al., MS medium containing 3% sucrose and seven kind of phytohormones (Table 1) adjusted to pH 5.8 was used. The anthers were placed in a petri dish containing 20ml of the medium and then incubated at 25℃ in the dark.

Results

The callus formation was observed from 3 weeks after inoculation. A total of 5280 anthers were cultured, and a total 1870 calli were obtained. The frequency of callus formation shown Table1.

Table1. Effect of phytohormore on callus formation.

2,4-D	BAP	IAA	BA	No. of anthers	% of anthers
	(mg L-1)			cultured	with calli
2	-	-	-	600	0
1	-	-	-	780	0
-	-	1	-	660	0
-	1	-	-	940	0
1	-	-	1	710	94.4
0.5	0.5	-	-	970	80.0
-	-	0.5	0.5	620	68.4

The medium containing 1mg of 2,4-D + 1mg of BA per liter was the must favorable for licorice. The frequency of callus formation was 94.4%. For single hormone treatment, no callusing, or very low frequency of callus formation, was observed in the medium containing 2,4-D, BA, IAA and BAP. For licorice anther culture, phytohormones of 1mg of 2,4-D + 1mg of BA per liter was most effective for inducing callus formation. Haploid-production may offer a tool for more efficient breeding programs and genetic studies in licorice. This report is very important on the production of a haploid plantlet through the anther culture of licorce.

Table2. Change of inorganic compound in medium after 3 weeks of callus formation.

		Al	Ca	Cu	Fe	K	Mg	Mn	Na	S	Si	Zn
2,4-D 1mg	Con	0.23	23.46	1.60	1.28	23.35	10.40	1.55	6.19	30.51	0.41	2.65
+ BA 1mg	Media	0.47	26.32	1.69	1.01	23.41	10.72	1.78	10.12	22.43	0.04	0.69
IAA 1mg	Con	0.24	21.95	1.58	0.90	19.59	10.26	1.42	6.47	29.01	0.05	0.71
+ BA 1mg	Media	0.42	31.69	1.60	1.24	22.04	15.97	2.04	15.27	25.02	0.04	0.75
2,4-D 0.5mg	Con	0.27	29.68	1.58	1.25	24.16	10.74	1.95	10.93	22.61	0.03	0.801
+ BAP 0.5mg	Media	0.18	27.06	1.609	0.83	24.63	10.70	1.71	8.356	21.47	0.016	0.595

References

SON et al., 1997. Japenese J. Crop Sci. 66(1):137-138

SON et al., 1997. Japenese J. Crop Sci. 66(2):333-334