rpc00061

Glycyrrhiza echinata Ak-1 callus culture

Components

- A 9-cm plastic Petri dish, containing cells placed on semi-solid medium

Notice

- Subculture the cells to fresh medium immediately after arrival [Notes I].
- Do not store the cell culture in a refrigerator and a freezer.
- Maintain aseptic conditions of the cell culture, and work in a laminar flow cabinet.

Method

- Culture medium: MS medium, 0.1 mg/L 2,4-D, 1 mg/L kinetin, 0.9% (w/v) agar, pH 5.8 (medium no. 50) [Materials III]
- Culture conditions: 25–27°C, dark [Methods II]
- Subculture: 28-day intervals [Methods I]

Citation of cell line

When results obtained by using this cell line are published in a scientific journal, it should be cited in the following manner: "*Glycyrrhiza echinata* Ak-1 cell line (rpc00061) was provided by the RIKEN BRC through the National BioResource Project of the MEXT, Japan."

Experimental Plant Division
RIKEN BioResource Research Center (BRC)
Koyadai 3-1-1, Tsukuba, Ibaraki 305-0074
Japan
FAX: +81 29 836 9053
E-mail: plant.brc@riken.jp
http://epd.brc.riken.jp/en/

Introduction

Licorice Ak-1 cell line was established from a leaf and a petiole of *Glycyrrhiza echinata* L. (Nakamura *et al*. 1999). The Ak-1 callus culture has the capacity for producing an isoflavonoid-derived phytoalexin, medicarpin, by elicitor treatment. The Ak-1 cells are grown on a Murashige and Skoog (MS) medium supplemented with 0.1 mg/L 2,4-dichlorophenoxyacetic acid (2,4-D) and 1 mg/L kinetin, and solidified with 0.9% (w/v) agar, pH 5.8. Our Ak-1 cell culture has been maintained in the dark at 25–27°C and subcultured at 28-day intervals.

Materials

Chemicals and stock solutions

(All stock solutions are stored at 4°C)

A) MS salt mix

Murashige and Skoog Plant Salt Mixture, FUJIFILM Wako Pure Chemical Corporation (#392-00591)

B) Sucrose

C) MS_VT

Nicotinic acid	0.5 mg/mL
Pyridoxine·HCl	0.5 mg/mL
Thiamine·HCl	0.1 mg/mL
Glycine	2 mg/mL

D) MS_inositol

myo-Inositol	40 mg/mL

E) 2,4-D (0.2 mg/mL)

2,4-D sodium monohydrate 0.236 mg/mL
(2,4-Dichlorophenoxy)acetic acid sodium salt monohydrate, Sigma-Aldrich (D6679)

F) Kinetin (0.2 mg/mL)

Kinetin 0.2 mg/mL
Dissolve kinetin in small volume of KOH (1 N), and fill up with distilled water

G) Agar, powder

H) KOH (1 N)

Glassware and equipment

A) Erlenmeyer flask (100 mL), capped with two layers of aluminum foil

B) Forceps, sterilized before use

Preparation of MS medium (medium no. 50)

1. Dissolve the following chemicals in approximately 800 mL of distilled water.

MS salt mix	1 bag (1 L)
Sucrose	30 g

2. Add following stock solutions, and fill up to approximately 950 mL with distilled water.

MS_VT	1 mL
MS_inositol	2.5 mL
2,4-D (0.2 mg/mL)	0.5 mL
Kinetin (0.2 mg/mL)	5 mL

3. Adjust the pH of the solution to 5.8 with KOH (1 N), and fill up to 1 L with distilled water.

4. Pour 40 mL of the medium into a 100-mL flask containing 0.36 g of agar.

5. Autoclave the flask at 121°C for 20 min.

Methods

1. Pick up an appropriate amount of callus cells from a 28-day-old culture with a forceps and place the cells onto fresh MS medium.

2. Incubate cell cultures under the dark condition at 25–27°C.

Notes

- We send Ak-1 cells on semi-solid MS medium in a 9-cm disposable Petri dish. The cells should be subcultured to fresh MS medium immediately after arrival.

- In order to maintain Ak-1 callus culture stably, it is essential to observe the growth of cells carefully. Because proliferation of Ak-1 cells is affected by culture conditions, such as a room temperature, aeration conditions of the culture and so on, an amount of cells transferred to fresh medium and the subculture intervals may vary from one

lab to another. We usually inoculate three to four pieces of Ak-1 callus (about 3–5-mm in diameter) on 40 mL of MS medium in a 100-mL flask, and culture them for 28 days.

References

Nakamura K, Akashi T, Aoki T, Kawaguchi K, Ayabe S (1999) Induction of isoflavonoid and retrochalcone branches of the flavonoid pathway in cultured *Glycyrrhiza echinata* cells treated with yeast extract. Bioscience, Biotechnology, and Biochemistry 63: 1618–1620. DOI: 10.1271/bbb.63.1618

Appendix A: Formulation of culture medium

Table A.1. Murashige and Skoog medium
(medium no. 50)

Chemical	Concentration (mg/L)
KNO_3	1900
NH_4NO_3	1650
$CaCl_2 \cdot 2H_2O$	440
$MgSO_4 \cdot 7H_2O$	370
KH_2PO_4	170
H_3BO_3	6.2
$MnSO_4 \cdot 4H_2O$	22.3
$ZnSO_4 \cdot 7H_2O$	8.6
KI	0.83
$Na_2MoO_4 \cdot 2H_2O$	0.25
$CuSO_4 \cdot 5H_2O$	0.025
$CoCl_2 \cdot 6H_2O$	0.025
$FeSO_4 \cdot 7H_2O$	27.8
Na_2-EDTA	37.3
Nicotinic acid	0.5
Pyridoxine·HCl	0.5
Thiamine·HCl	0.1
Glycine	2
myo-Inositol	100
Sucrose	30000
2,4-D sodium monohydrate	0.118
Kinetin	1
Agar	9000