rpc00054

Coptis japonica Cj 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: LS medium, 100 μM NAA, 1 μM BAP, 1% (w/v) agar, pH 6.0 (medium no. 42) [Materials III]
- Culture conditions: 27℃, dark [Methods II]
- Subculture: 56-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: "*Coptis japonica* Cj cell line (rpc00054) was provided by the RIKEN BRC through the National BioResource Project of the MEXT, Japan."

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Introduction

Cj cell line was established from a root of *Coptis japonica* (Thunb.) Makino var. *dissecta* (Yatabe) Nakai ex Satake (Fukui *et al.* 1982, Sato *et al.* 1993). The Cj callus cells exclusively accumulate berberine in the vacuoles. The Cj cells are grown on a Linsmaier and Skoog (LS) medium supplemented with 100 μM 1-naphthaleneacetic acid (NAA) and 1 μM 6-benzylaminopurine (BAP), and solidified with 1% (w/v) agar, pH 6.0. Our Cj cell culture has been maintained in the dark at 27℃ and subcultured at 56-day intervals.

Materials

Chemicals and stock solutions

(All stock solutions are stored at 4℃)

A) MS salt mix

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

B) Sucrose

C) LS_VT

Thiamine·HCl	0.16 mg/mL
myo-Inositol	40 mg/mL

D) NAA (10 mM)

NAA·K	2.243 mg/mL

Potassium 1-naphthylacetate, FUJIFILM Wako Pure Chemical Corporation (#161-04021)

E) BAP (1 mM)

6-Benzylaminopurine	0.225 mg/mL

Dissolve 6-benzylaminopurine in small volume of KOH (1 N), and fill up with distilled water

F) Agar, powder

Agar, powder, Junsei Chemical (#24440-1201)

G) 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 LS medium (medium no. 42)

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.

LS_VT	2.5 mL
NAA (10 mM)	10 mL
BAP (1 mM)	1 mL

3. Adjust the pH of the solution to 6.0 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 0.4 g of agar.

5. Autoclave the flask at 121℃ for 20 min.

Methods

1. Pick up an appropriate amount of callus cells from a 56-day-old culture with a forceps and place the cells onto fresh LS medium.

2. Incubate cell cultures under the dark condition at 27℃.

Notes

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

- In order to maintain Cj callus culture stably, it is essential to observe the growth of cells carefully. Because proliferation of Cj 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 four pieces of Cj callus (about 7-mm in diameter) on 40 mL of LS medium in a 100-mL flask, and culture them for 56 days.

References

Fukui H, Nakagawa K, Tsuda S, Tabata M (1982) Production of isoquinoline alkaloids by cell suspension cultures of *Coptis japonica*. In: Fujiwara A (ed) "Plant Tissue

Culture 1982", Proceedings of the 5th International Congress of Plant Tissue and Cell Culture, pp 313–314, Maruzen, Tokyo, Japan

Sato H, Tanaka S, Tabata M (1993) Kinetics of alkaloid uptake by cultured cells of *Coptis japonica*. Phytochemistry 34: 697–701. DOI: 10.1016/0031-9422(93)85342-O

Appendix A: Formulation of culture medium

Table A.1. Linsmaier and Skoog medium
(medium no. 42)

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
Thiamine·HCl	0.4
myo-Inositol	100
Sucrose	30000
NAA·K	22.43
6-Benzylaminopurine	0.225
Agar	10000