

rpc00013

## ***Mentha arvensis* Mar-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: LS medium, 1  $\mu$ M 2,4-D, 1  $\mu$ M kinetin, 1.2% (w/v) agar, pH 5.7 (medium no. 9) [[Materials III](#)]
- Culture conditions: 27°C, dark [[Methods II](#)]
- Subculture: 28–42-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: “*Mentha arvensis* Mar-1 cell line (rpc00013) was provided by the RIKEN BRC through the National BioResource Project of the MEXT, Japan.”

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## Introduction

Mint Mar-1 cell line was established from a seedling of *Mentha arvensis* L. (Nakabayashi *et al.* 1995). The Mar-1 cells are grown on a Linsmaier and Skoog (LS) medium supplemented with 1  $\mu$ M 2,4-dichlorophenoxyacetic acid (2,4-D) and 1  $\mu$ M kinetin, and solidified with 1.2% (w/v) agar, pH 5.7. Our Mar-1 cell culture has been maintained in the dark at 27°C and subcultured at 28–42-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) LS\_VT

Thiamine·HCl	0.16 mg/mL
<i>myo</i> -Inositol	40 mg/mL

D) 2,4-D (1 mM)

2,4-D sodium monohydrate	0.261 mg/mL
(2,4-Dichlorophenoxy)acetic acid sodium salt monohydrate, Sigma-Aldrich (D6679)	

E) Kinetin (1 mM)

Kinetin	0.215 mg/mL
Dissolve kinetin in small volume of KOH (1 N), and fill up with distilled water	

F) Agar, powder

G) KOH (1 N)

### Glassware and equipment

A) Erlenmeyer flask (200 mL), capped with two layers of aluminum foil

B) Forceps, sterilized before use

### Preparation of LS medium (medium no. 9)

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
2,4-D (1 mM)	1 mL
Kinetin (1 mM)	1 mL

3. Adjust the pH of the solution to 5.7 with KOH (1 N), and fill up to 1 L with distilled water.
4. Pour 80 mL of the medium into a 200-mL flask containing 0.96 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 28–42-day-old culture with a forceps and place the cells onto fresh LS medium.
2. Incubate cell cultures under the dark condition at 27°C.

### Notes

- We send Mar-1 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 Mar-1 callus culture stably, it is essential to observe the growth of cells carefully. Because proliferation of Mar-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 pieces of Mar-1 callus (about 8-mm in diameter) on 80 mL of LS medium in a 200-mL flask, and culture them for 28–42 days.

### References

- Nakabayashi T, Shimo Y, Honda C, Kamisako W, Kimura Y (1995) Phosphodiesterase I in cultured cells of *Mentha arvensis*. *Phytochemistry* 39: 1013–1016. DOI: [10.1016/0031-9422\(95\)00162-Z](https://doi.org/10.1016/0031-9422(95)00162-Z)

## Appendix A: Formulation of culture medium

Table A.1. Linsmaier and Skoog medium  
(medium no. 9)

Chemical	Concentration (mg/L)
KNO <sub>3</sub>	1900
NH <sub>4</sub> NO <sub>3</sub>	1650
CaCl <sub>2</sub> ·2H <sub>2</sub> O	440
MgSO <sub>4</sub> ·7H <sub>2</sub> O	370
KH <sub>2</sub> PO <sub>4</sub>	170
H <sub>3</sub> BO <sub>3</sub>	6.2
MnSO <sub>4</sub> ·4H <sub>2</sub> O	22.3
ZnSO <sub>4</sub> ·7H <sub>2</sub> O	8.6
KI	0.83
Na <sub>2</sub> MoO <sub>4</sub> ·2H <sub>2</sub> O	0.25
CuSO <sub>4</sub> ·5H <sub>2</sub> O	0.025
CoCl <sub>2</sub> ·6H <sub>2</sub> O	0.025
FeSO <sub>4</sub> ·7H <sub>2</sub> O	27.8
Na <sub>2</sub> -EDTA	37.3
Thiamine·HCl	0.4
<i>myo</i> -Inositol	100
Sucrose	30000
2,4-D sodium monohydrate	0.261
Kinetin	0.215
Agar	12000