

Optimal Treatment of GA₃ for germination of Direct Somatic Embryos from Mature Zygotic Embryos of *Panax ginseng* C. A. Meyer

National Institute of Crop Science, RDA

Young-Chang Kim, Ok-Tae Kim, Kyong-Hwan Bang, Dong-Yun Hyun, Sung-Woo Lee, Dong-Hwi Kim, Seon-Woo Cha, and Hee-Woon Park*

Objectives

On *Panax ginseng* tissue culture, both internal and external environment factors, such as plant growth regulator and explant sources are important. This experiment was initiated to investigate the effects of optimal treatment of GA₃ on germination of somatic embryos ginseng from explants and to establish a method of rapid propagation and maintenance of valuable germplasm. The present paper discusses the influence of GA₃ concentrations on the morphological development of ginseng somatic embryos.

Materials and Methods

- **Plant Material** : Stratified seeds of *Panax ginseng* C. A. Meyer
- **Germination and Plant Regeneration**
 - Germination was induced by transferring the cotyledon explants together with the cotyledonary somatic embryos to a 1/2 MS medium containing 5-15 mg/L GA₃ and 3% sucrose for two to four weeks. When shoots detached from explants grew to 7 cm long, the rooted plantlets were moved to the greenhouse, where they were grown in pots containing a 1:1:1 mixture (by volume) of autoclaved soil, sand, and peat,

Results

To investigate the optimal treat-time for high frequency of the germination rate, somatic embryos at different stage, globular, hart, torpedo, or cotyledon, were cultured on the medium containing GA₃. When GA₃ was treated at cotyledonary stage, the highest germination rate was observed (Table 1). The shoots having a root were developed into normal plants. In GA₃ concentration test, somatic embryos cultured without GA₃, referred to the control, allowed 0% germination rate. Whereas, the germination rate of somatic embryos treated with GA₃ was 65-80% after one month of cultivation (Table 2). After three months of cultivation, the result shows that treating 3-5 mg/L GA₃ resulted in the highest germination rate (91-95%) and rooting rate from shoots (80-85%). It is significantly different with that compared to other concentrations.

*주저자 연락처(Corresponding author) : Park, Hee Woon E-mail : hwpark@rda.go.kr Tel : 031-290-6819

In this study, our results demonstrated that the developmental stage of somatic embryo in response to GA₃ treatment and concentrations showed improvement of germination and plant regeneration after 3 months of culture.

Table 1. Effect of GA₃ on germination of somatic embryos and the rooting at different stage of somatic embryos.

Stage of somatic embryos	Germination rate of somatic embryos (%)	Rooting rate of somatic embryos (%)
Globular stage	0	0
Heart stage	32	12
Torpedo stage	92	77
Cotyledon stage	95	83

Table 2. The effect of GA₃ concentrations on the rate of germination and rooting.

Concentration (mg/L)	Germination rate of somatic embryos (%)	Rooting rate of somatic embryos (%)
0	0	0
3	91	85
5	95	80
10	89	71
15	87	65

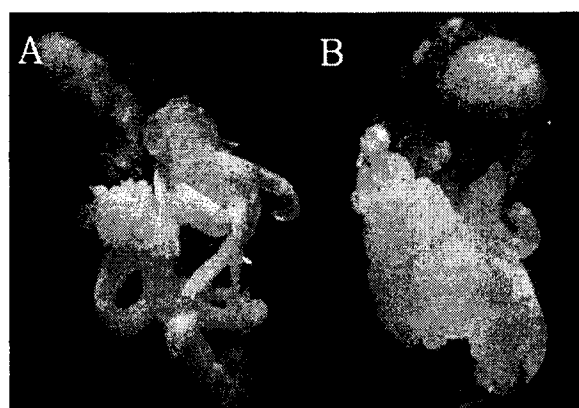


Fig. 1. The effect of GA₃ concentrations on germination of somatic embryo.
A : 5mg/L GA₃, B : 15mg/L GA₃.