

Tissue Culture of Rare and Endangered Plants in China

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1. Introduction

Rare and endangered plants in natural environment show many characteristics, such as low setting percentage, remarkable year-to-year variations, distinguished biennial bearing and etc. In addition, the immature seeds and ground seeds are usually to be eaten by animals. Underground seeds are decay easily so that the ability of the natural regeneration of endangered plants is severely weak and the population sizes are smaller and smaller. Furthermore, the seedling has many defects, such as unstable hereditary features, an intermixture of the good and the bad, inferior productivity and so on. Natural or seed reproduction are unable to meet the market demand and in vitro culture is an excellent alternative for propagating rare and endangered plants.

2. Advance in tissue culture of rare and endangered plants in China

Tissue culture offers a benefit means of protect endangered plants. Up to now, Four species of Class 1 protected plants and 19 species of Class 2 protected plants had been cultured among 8 Class 1 protected plants and 159 Class 2 protected plants in China.

3. Different pathway in tissue culture of rare and endangered plants in China

Organogenesis and somatic embryogenesis have been employed for culturing rare and endangered plants. In general, *Davidia involucreta* Baill. (Fig. 1), *Camellia chrysantha* (Hu) Tuyama, and *Ginkgo biloba* L. et al. could be regenerated through organogenesis. *Panax ginseng* C.A. Mey. and *Tetraena mongolica* Maxim. could be cultured via somatic embryogenesis.

4. Factors affect tissue culture of rare and endangered plants

Base medium, phytohormone, and some other nutrition components significantly affected tissue culture of rare and endangered plants. To date, 74.6% of endangered plants was cultured with Murashige and Skoog (MS) medium. In process of shoot induction, 85% plants needed 6-benzylaminopurine (BA) as the phytohormone. The concentrations were from 0.05 to 3.0 mg-L⁻¹. For inducing roots, 50% endangered plants only needed naphthaleneacetic acid (NAA) or indole-3-butyric acid (IBA). The concentrations in general were from 0.5 to 2.0mg-L⁻¹. About 21.4% of them needed NAA or IBA combination with BA. Some endangered plants, *Platycerium wallichii* Hook. and *Gymnocarpus przewalskii* Maxim., could root without any phytohormone. Additional ingredients, such as coconut water (CW), CH (casein hydrosylate), and glutamine were benefit for shoot organogenesis and vigorous seedling growth.



Figure 1: *Davidia involucreta*.

5. Conclusions

There are 23 endangered plants which have been investigated using tissue culture. However, only *Panax ginseng* C. A. Mey. and *Ginkgo biloba* L. could be successful applied for commercial production. Others are still at the primary stage. For example, the inductivity, multiplication, rooting rates of them are low. Also, the studies on somatic embryogenesis, cell culture, and protoplast culture should be strengthened. There is a long to reach satisfaction on regenerating rare and endangered plants and more funds should be allocated on these culture studies.

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