

Tissue Culture and Micropropagation of Mongolian Licorice (*Glycyrrhiza uralensis* Fisch.)

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Abstract

Mongolian licorice (*Glycyrrhiza uralensis* Fisch.) is a pharmacologically important plant rich in flavonoids and saponins. For tissue culture, root and cotyledon explants from seedlings were used. Sterilized explants with one node were used for micropropagation. Half-strength Murasige-Skuge medium and Gamborg's B5 medium with different supplements were used for the induction of calluses and multiple shoots. Conditions for tissue culture and micropropagation of *G. uralensis* were determined.

Key words: callus, *Glycyrrhiza uralensis*, *in vitro*, micropropagation, Mongolia, nodal culture

Introduction

Currently, there is much international interest in increasing plant resources, plant productivity and the ability to synthesize specific compounds, especially various secondary metabolites useful for medicinal practices.

Licorice (*Glycyrrhiza uralensis* Fisch.), belonging to the family *Fabaceae*, is recognised as one of the most valuable and widely used oriental herbs. During the last few years, use of licorice has increased rapidly. However, due to human influence and natural desertification processes in Mongolia licorice resources may become exhausted in the near future.

In vitro culture and propagation are useful tools in the conservation of this important plant. Use of *in vitro* cultures of *G. uralensis* and *G. glabra* L. have been reported by a number of authors (Thengane *et al.*, 1998; Kovalenko & Kurchii, 1998; Kohjyouma *et al.*, 1995). The roots and isolated active components of these plants are widely used for treatment of viral infections, inflammatory diseases and prevention of different cancers (Arase *et al.*, 1997; Numazaki, 2003; Shiraki *et al.*, 2003).

The aim of our research is to determine methods of *in vitro* culture and micropropagation of Mongolian licorice, in order to increase the bioresources of *G. uralensis* in Mongolia.

Materials and Methods

Plant materials. Seed samples of *G. uralensis* were provided by researchers from the Institute of Botany at the Mongolian Academy of Sciences. Two and four year old *G. uralensis* leaves, roots and whole plants were also collected from Dashinchilen district in Bulgan province, and Bogd and Baatsagaan districts in Bayankhongor province during a field study.

Culture conditions. The seeds were soaked in sterilized water for 24 hours, followed by a 70% ethanol bath for 30 seconds. Stratifications were performed at 4°C for 72 hours, and the seed surface sterilized with 2% sodium hypochloride solution with a drop of Tween-20 for 5 minutes, before being rinsed with sterile water 3 times. The prepared seeds were then used for germination and micropropagation experiments.

For germination of *G. uralensis*, half-strength basal Murashige-Skoog medium (MS medium; pH 5.8) supplemented with 0.8 % agar and 1.5 % sucrose was used. Autoclaving was performed at +121 °C for 15 minutes (Oyunbileg & Mijidsuren, 2004).

Seedlings grown on Gamborg's B5 medium and supplemented with 4 different combinations of growth regulators (BAP-1.0 mg/L and 2.0 mg/L, IAA-0.1 mg/L and 1.0 mg/L) (Liao *et al.*, 2004) were used for micropropagation.