

## *In vitro* Seed Germination and Callus Induction of *Ferula ferulaeoides* (Steud.) Korov. (Apiaceae)

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### Abstract

<b>Key words:</b>	<i>Ferula ferulaeoides</i> is a highly valuable medicinal plant native to Mongolia. <i>In vitro</i> seed germination efficiency of <i>F. ferulaeoides</i> was low, and it required cold stratification for longer than 21 days and exogenous application of the hormone gibberellic acid (GA3) for germination. Cotyledons, hypocotyls and roots of two week old seedlings were cultured on Murashige and Skoog (MS) media supplemented with different auxins including 2,4-dichlorophenoxy acetic acid (2,4-D), naphthalene acetic acid (NAA) and indole-acetic acid (IAA) and cytokinin 6-Benzylaminopurine (BAP). This experiment showed that combination of BAP (0.5 mg/L) and auxins IAA and 2, 4 D was the most efficient media for callus initiation from <i>in vitro</i> germinated seedling explants. Callus was sub-cultured with 4 weeks interval on the same media as callus initiation for a long term maintenance.
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### Introduction

*Ferula ferulaeoides* is a herbaceous perennial plant of the umbelliferae (Apiaceae Lindl. 1936; Umbelliferae Juss. 1789) family. *Ferula* is a genus encompassing about 160 species, and seven species of this genus have been recorded in Mongolia.

*Ferula ferulaeoides* is a wild plant native to Mongolia. There is a study indicating the decline of population due to overharvesting of roots, seeds and herb of this rare plant for medicinal purposes (Suran, 1997). This species has been assessed as endangered because of poor regeneration in the nature and very limited geographic range (Nyambayar *et al.*, 2011). *Ferula ferulaeoides* grows on desert gravels and occurs in Mts. Mongol-Altai (Yamaat mountain, Songino river) and Zhungarian Gobi. *F. ferulaeoides* lives typically 10 to 12 years and it flowers only once at the end of its life. The plant dies after its flowering,

producing large number of seeds. Young plants produce more leaves each year and roots enlarge in size (Fig. 1), reserving active compounds and gum resin.

The large number of *Ferula* species exude a gum resin, which is considered as a valuable medicinal drug in India, Pakistan, USA, Sweden, Germany and Portugal (Fernch, 1971). Gum resin obtained from the root of some *Ferula* species is used as an ingredient of more than a hundred traditional prescription of oriental medicine. Local people use it for anti-inflammatory purposes and for wound treating. In some countries oriental medicine consider it to contain sedative, carminative, antispasmodic digestive, expectorant, laxative, analgesic, anthelmintic, antiseptic and a diuretic properties (Abd El-Razek *et al.*, 2001). Some photochemical studies of this genus showed interesting results, such as the