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## Molecular cloning and characterization of $\beta$ -1, 3-Dextran gene (*Glu*) in endangered tropic medicinal plant *Dendrobium officinale*

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**ABSTRACT Objective:** *Dendrobium officinale* (Orchidaceae) (*D. officinale*) is one of the world's most endangered plants with great medicinal value. It is mainly distributed in south China, and is often used as auxiliary treatment for a variety of tropical diseases. The strictly demanding for growing environment and climate conditions making its wild resources endangered. In nature, the relationship between seeds of *D. officinale* and fungi must be established by symbiotic system. Our purpose is to analyze the molecular events involved in the interaction between fungus and plant during this process, and provide scientific basis for the protection of its germplasm resources. **Methods:** Beta-1,3-glucan (*Glu*) is a key enzyme in the biosynthesis of polyamines, which is essential to the basic physiological and biochemical processes of plants. In this study, the full-length cDNA of *Glu* gene was obtained from symbiotic germinating seeds of medicinal plants by rapid amplified cDNA terminal (RACE) - PCR, and its expression characteristics were analyzed for the first time. **Results:** *Glu* has a full length cDNA of 1 317 bp, with one open reading frame (ORF). The deduced protein was 356 amino acids (aa) with molecular weight of 37.24 KDa and a theoretical isoelectric point of 5.17. The deduced  $\beta$ -1,3-Dextran protein, without signal peptide, had three transmembrane domain each contained 23,17 and 20 aa. Multiple sequence alignment and phylogenetic analysis showed that the sequence similarity between beta-1,3-glucan and rice beta-1,3-glucan was higher than that of dicotyledons. The expression pattern analyzed by qPCR showed that *Glu* transcripts were expressed in four tissues (non-infected fungi) without significant change. In symbiotic germinating seeds, the expression level is 23.67 times higher than that of ungerminated seeds. **Conclusion:** These results indicated that  $\beta$ -1,3-Dextran was possible involved in the symbiotic seed germination of *D. officinale*, and played an important role in the symbiosis system of mycorrhizal mutual.

**Keywords:** *Dendrobium officinale*; Symbiotic seed germination; qPCR analysis

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