

THE EFFECT OF SUBCULTURE ON HAIRY ROOT DEVELOPMENT OF JAVA GINSENG (*Talinum paniculatum* Gaertn.)

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Abstract

Java ginseng (*Talinum paniculatum* Gaertn.) root was reported to have efficacy similar to the Korean ginseng (*Panax ginseng*) root. Hairy root induction of Java ginseng on free hormone solid medium Murashige and Skoog (MS) using genetic transformation mediated by *Agrobacterium rhizogenes* had successfully performed. 2 - 3 cm in length of hairy roots were initiated from cut edge of leaves after two weeks incubation and were used for subculture experiments on solid and liquid MS medium without hormone. Subcultures were performed 4 times for two weeks period. Final incubation of the fourth subculture showed differences of medium type (solid and liquid) affected hairy root development. Hairy roots on solid MS medium grew straight and had no branching, whereas hairy roots on liquid medium had branching and forming ball like structures (2-3 structures/cm). Hairy roots which were subcultured on liquid medium looked thicker than on solid medium. The thickness of hairy root, branching and formation ball like structure indicated suitability liquid medium as subculture medium than solid medium.

Keywords: hairy root, subculture, Talinum paniculatum Gaertn.

1. Introduction

Hairy root is a plant disease caused by *Agrobacterium rhizogenes* Conn., a Gram-negative soil bacterium. When the bacterium infects the plant, the T-DNA between the TR and TL regions of the Ri-plasmid in the bacterium is transferred and integrated into the nuclear genome of the host plant. Hairy roots grow rapidly, show plagiotropic growth, and are highly branched on phytohormone-free medium (Hu and Du, 2006). *A. rhizogenes* transformed hairy roots synthesize the same component as does the roots of the intact plants and have a fast growth property in hormone-free medium. Hairy roots provide an efficient way of biomass production due to fast growth and displays high biosynthetic capabilities that are comparable to those of natural roots (Choi et al., 2008).

Hairy root culture can be an effective method of produce useful secondary metabolites in medicinally important plants like ginseng that grow slowly (Washida et al., 1998; Court, 2006). Cultivation of ginseng requires at least more than four years under shade condition and also requires the careful control of

disease (Choi et al., 2008). *Talinum paniculatum* Gaertn., as known "Java Ginseng" was reported its root has medicinal property similar to the Korean Ginseng (*Panax ginseng*) root (Wijayakusuma, 1994). Hairy root cultures of *T. paniculatum* and its optimization on biomass growth and secondary metabolite synthesis have been conducted in our laboratory. Generally, the next step after hairy root induction is subculture. The decontaminated hairy roots can be subcultured for periodic culture maintenance or batch reactor runs (Hu and Du, 2006., Rijwani et al., 1998). It was reported that subculture cycle of *Catharanthus roseus* hairy root on liquid medium effected on growth rate and the production of secondary metabolites (Rijwani et al 1998). The effect of subculture using different type of medium (solid and liquid) on *T. paniculatum* hairy root development has not been reported previously. The objective of this study was to observe the effect of subculture using solid and liquid hormone free medium on development of *T. paniculatum* hairy root.