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Introducing an adventitious root line of *Panax Ginseng* C.A. Meyer and its culture conditions

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Objectives

Optimizing lateral root inducing efficiency and root culture conditions for an adventitious root line of *Panax ginseng* and its large scale-up applicable prospect.

Materials and Methods

1. Material

Plant - adventitious root line of *Panax ginseng* C.A. Meyer (Araliaceae); Chemicals - plant hormones, Murashige and Skog medium components.

Instrumental analysis - Thermo Separation Products (TSP) HPLC, UV-6000 (3-D photo-diod array) detector, Phenomex Prodigy ODS (3) 100 A° column.

2. Methods:

Root inducing efficiency was tested on solid MS on plates in presents of combination of NAA from 0; 0.5; 1; 2; 4 mgl^{-1} and IAA from 0; 0.25; 0.5; 1; 2 mgl^{-1}. Optimizing culture condition in liquid medium was carried on 250 ml flasks, 15-L tanks and scale-up applied on 240-L bioreactors. NAA concentrations residue on pre-/post-harvested medium, root, and washing water (3 times) were evaluated with HPLC.

Results and Discussion

The root line was best inducing lateral root in liquid medium in the present of a combined auxin, NAA at 2 mg/l and IAA at 0.25 mg/l. Modified Murashige and Skog (MMS) medium components with only NO_3^- at 60mM as sole of N source greatly booted growth rate and biomass of the root line. The establishments at various culture scales showed that fresh weights were significantly increased at about 19.7; 6.9 and 11.5 folds at flasks, 15-liter and 240-liter scale-up bioreactors after a optimizing time of 6-wks culture, respectively. The eliminations of either or both toxic heavy metals $CuSO_4$ or/and $CoCl_2$ from culture medium components led to significantly reduced on lateral root inducing and root growth. The final analysis of NAA, a root inducing hormone, residues on pre- and post-culturing medium, lateral root and washing water by HPLC confirmed *ca* 99.8 percent of the hormone had been metabolized during the periodic culture.

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