

## Responses of Medium Compositions and Plant Growth Regulators to *in vitro* Organogenesis in Three *Platycodon grandiflorum* Species

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### [Introduction]

*Platycodon grandiflorum*, known as balloon flower, is a common Chinese herb in Northeast Asia including China, Korean Peninsula, Japan and Siberia that has been used for decades as a traditional prescription to eliminate phlegm, relieve cough, reduce inflammation, lower blood pressure and blood sugar and for weight loss, the treatment of tumors and improvement of human immunity. The extract and some of the major components of *P. grandiflorum*, such as platycodin D and platycodin D3, have been found to have diverse pharmacological activities, including anti-inflammatory activity, anti-allergy activity, the ability to augment immune responses, stimulate apoptosis in skin cells, antiobesity and hyperlipidemia effects, and a protective effect against oxidative hepatotoxicity.

### [Materials and Methods]

*P. grandiflorum* with wild, green and duplex were used as testing materials. Stem segment (0.8 cm<sup>2</sup>) containing one node of in-vitro-grown *P. grandiflorum* cultured on MS (Murashige & Skoog, 1962) basal medium supplemented with different levels of inorganic salts. In regards to optimum concentration (1/8 MS, 1/4 MS, 1/2 MS, MS, 2 MS) of MS medium composition, agar (0.8%) was added after controlling sucrose and pH as 3% and 5.8 respectively. The concentrations of sucrose (1, 3, 5, 7%), agar (0.8%) was added after adjusting the pH of MS medium at 5.8. For pH and agar concentration experiment, 1/4 MS culture medium was selected as reference culture medium supplemented with sucrose (3%) and agar (0.8%) to *P. grandiflorum* and *P. grandiflorum* with green petal respectively whereas 1/8 MS was maintained as reference culture medium for *P. grandiflorum* for. *duplex*.

### [Results and Discussions]

The current investigation was carried out to explore the potentiality of the shoot and root organogenesis of *P. grandiflorum* containing various petals by varying multiple medium compositions. The shoot elongation was found to be decreased as the highest concentration of salt. The same trend was found in the adventitious root. Sucrose concentrations had a significant effect on shoots and root organogenesis. The highest adventitious shoot and root development and elongation were observed when explants were cultured on 1/4 MS supplemented with 5% sucrose concentration. The explants of *P. grandiflorum* for. *duplex* regenerated optimal shoots (3 shoots) cultured on 1/8 MS medium supplemented with 3% sucrose and agar 0.8% at pH set to 3.8. However, no consistent differences of shoot formation and elongation were observed among the pH ranges. Except the pH 3.8, the adventitious root formation also presented similar trend with shoot formation which is higher formation with lower pH. Increasing the agar concentration reduced the shoot growth and rooting potential, however, the highest number of shoots and roots were observed from the 0.6% agar.

### [Acknowledgements]

This work was supported by Korea Institute of Planning and Evaluation for Technology in Food, Agriculture, Forestry (IPET) through Export Promotion Technology Development Program, funded by Ministry of Agriculture, Food and Rural Affairs (MAFRA)(116121-03-1-HD020)

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