Effects of rare sugars on growth and development in *Phalaenopsis* tissue culture©

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INTRODUCTION

Research on the effects of rare sugars in plant tissue culture is limited (Fukai and Saruta, 2004). In this study, effects of rare sugars on growth and development in *Phalaenopsis* (syn. *Doritaenopsis*) tissue culture were examined.

MATERIALS AND METHODS

Roots of in vitro plantlets were used as the source of explants. These plantlets were derived from seeds of *P.* (syn. *Doritaenopsis*) Little Gem Strips "No1" × *P.* (Yu Pin Fireworks) "3146" hybrids.

Root tips (<0.5 cm) were dissected from plantlets and were cultured on full strength Murashige and Skoog (1962) medium supplemented with 40 g L^{-1} sucrose and 8 g L^{-1} agar. One root tip was cultured in a grass tube (40 mm diameter × 130 mm) containing 30 mL of medium. The pH of medium was adjusted to 5.8, and all media were autoclaved for 15 min at 120°C. Cultures were incubated at 24±2°C under cool-white florescent lamps at an intensity of 50 µmol m^{-2} s^{-1} photosynthetic photon flux (PPF) 16 h day^{-1}.

Experiment 1

Effects of D-tagatose on growth and development in *Phalaenopsis* root tissue culture. D-tagatose (0 or 5 mg L^{-1}) was added to the medium described above. Fifteen tubes were used for each treatment.

Experiment 2

Effects of D-psicose on growth and development in *Phalaenopsis* root tissue culture. D-psicose (0 or 1 mg L^{-1}) was added to the medium described above. Fifteen tubes were used for each treatment.

RESULTS AND DISCUSSIONS

Experiment 1

The root-tip explants cultured on Murashige and Skoog medium supplemented with or without D-tagatose did not show any response. All of them did not survive more than 4 weeks of culture (Table 1).

Table 1. Effects of D-tagatose on growth and development in *Phalaenopsis* tissue culture after 4 weeks of culture.

D-Tagatose (mg L^{-1})	Survival rate (%)	Root formation rate (%)
5	0	-
0	0	-

Experiment 2

Higher percentage survival and morphogenic response of root tips cultured on Murashige and Skoog medium supplemented with D-psicose was observed (Table 2). On Murashige and Skoog medium supplemented with 1 mg L^{-1} D-psicose 40% of root tips

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survived and 26.7% of them developed new root.

Based on these results, D-psicose had little effect on root regeneration in *Phalaenopsis* tissue culture.

Table 2. Effects of D-psicose on growth and development in *Phalaenopsis* tissue culture after 4 weeks of culture.

D-psicose (mg L^{-1})	Survival rate (%)	Root formation rate (%)
1	40.0	26.7
0	26.7	6.7

Literature cited

Fukai, S., and Saruta, S. (2004). Effects of *D*-psicose on adventitious shoot regeneration from leaf explants of chrysanthemum in vitro. J. Jpn. Soc. Hortic. Sci. *73* (*SUPPL.2*), 631.

Murashige, T., and Skoog, F. (1962). A revised medium for rapid growth and bioassays with tobacco tissue cultures. Physiol. Plant. *15* (*3*), 473–497 http://dx.doi.org/10.1111/j.1399-3054.1962.tb08052.x.