DEVELOPMENT AND OPTIMIZATION OF A LOW-COST SYSTEM FOR MICROPROPAGATION OF VALUABLE MEDICINAL PLANTS OF *PASSIFLORA* SPECIES

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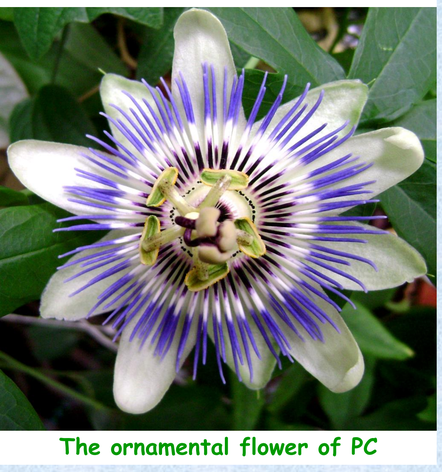
The ornamental flower of PI



The ornamental flower of PC

INTRODUCTION

Aerial parts of *P. incarnata* (PI) and *P. caerulea* (PC) contain a valuable C-glycosyl flavones affecting the central nervous system. Conventional cultivation of these plants is a very problematic, not only by the low percentage of seed germination and viability of seedlings, but also caused by plant diseases which can seriously reduce the productivity of PI and PC [Fischer, Rezende, 2008]. An alternative way to solve these problems may be used the technique of plant in vitro cultures. *In vitro* propagation methods of medicinal and ornamental plants have applied for the plant multiplication under controlled conditions and have offered the production of healthy, pathogen-free and true-to-type medicinal plants [Vijaya et al. 2008]. Up to now, various procedures for micropropagation were described, but all are expensive [Ożarowski, Thiem, 2013; Ożarowski et al., 2013].

AIMS

The aims of study were to

1)develop the efficient and low-cost procedures for propagation

2)establish a rotary liquid culture for induction of organogenesis

3)morphological examinations

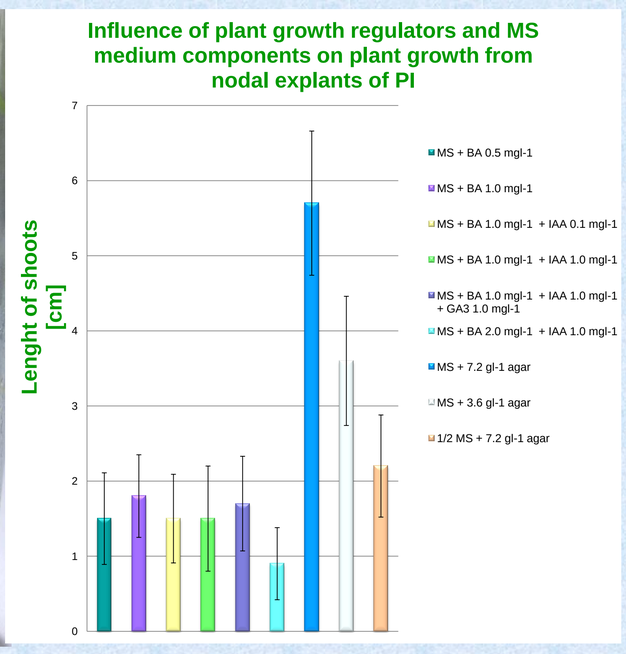
RESULTS

- Results showed that MS supplemented with 1.0 mgl^{-1} BA induced multiple shoot development of PC (16 shoots/ nodal explants) and the rapid growth of shoots (length up to 12 cm) can be observed. Medium MS with 0.5 mgl^{-1} BA induced of 9.5 shoots/ nodal explants (length up to 10 cm).
- Spontaneously rooting of PC shoots occurred on medium MS, ½ MS and MS with ½ agar. On the other hand, it was observed that lateral meristems of PI showed better regenerative response (100%) on medium MS without any plant growth regulators.
- Longer shoots of PI were obtained on nodal explants cultured on MS and MS + ½ agar (average 5.6 and 3.9 cm, respectively). The nodal tissue cultured on MS with 0.5 mgl^{-1} BA generated few short shoots (average 3.0 shoots/nodal fragment).
- Moreover, direct organogenesis was observed on root fragments in rotary system of liquid medium MS with 4.0 mgl^{-1} 2.4-D (effectiveness 90%).
- Morphological examinations showed that *in vitro* regenerated plants fast grew with normally developed leaves, without signs of disease. The plants were able to effective photosynthesis.

MATERIALS I METHODS

Shoot tips and nodal explants were excised from *in vitro* germinated plants and were cultured within 60 days on solid medium MS, 1/2 MS, MS+1/2 agar, MS + 0.1-1.0 mgl^{-1} IAA + 0.5-2.0 mgl^{-1} BA, MS + 1.0 mgl^{-1} IAA + 1.0 mgl^{-1} BA + 1.0 mgl^{-1} GA_3. The root fragments of PC were inoculated in liquid medium MS with 1.0- 4.0 mgl^{-1} 2.4-D using a stationary or rotary system.

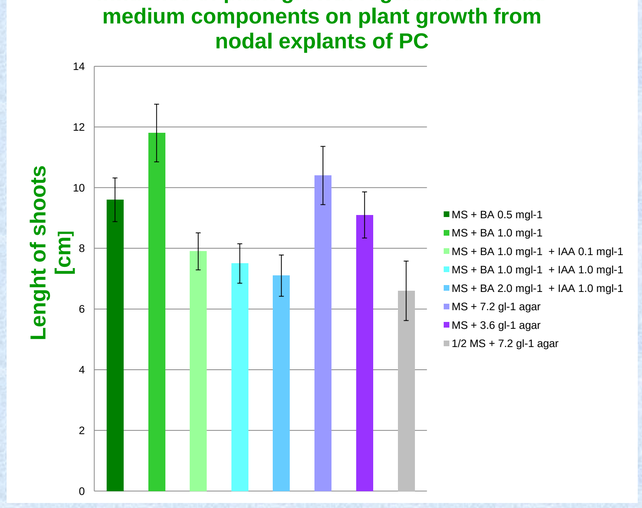
SHOOT CULTURE OF *P. INCARNATA*



SHOOT CULTURE OF *P. CAERULEA*

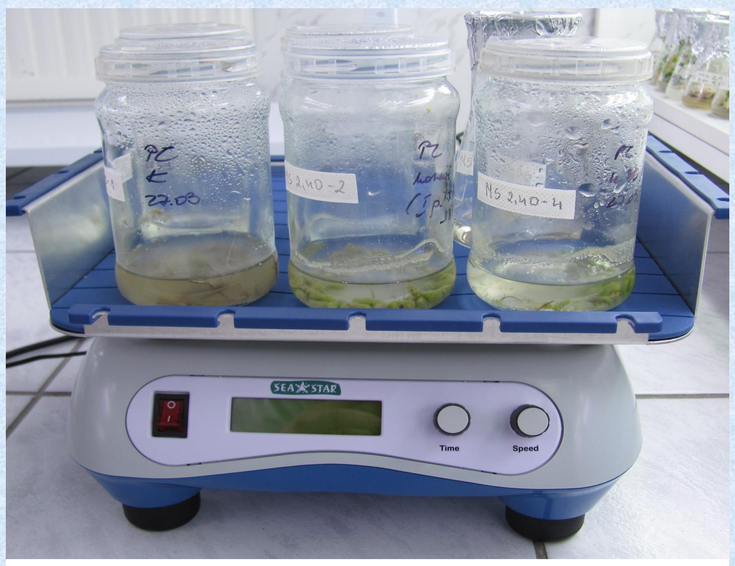
SHOOT TIP CULTURE ON MS MEDIUM

MULTIPLICATION OF SHOOTS FROM NODAL EXPLANTS ON MS MEDIUM WITH BA 1.0 mgl^{-1}

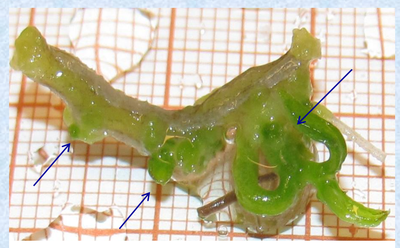


MULTIPLICATION ON MS MEDIUM WITH BA 1.0 mgl^{-1}

ORGANOGENESIS ON ROOT OF *P. CAERULEA*



ROOT CULTURE ON DIGITAL ORBITAL SHAKER



DIRECT ORGANOGENESIS ON ROOT FRAGMENTS

PC PLANTLET FROM MS MEDIUM

ACCLIMATIZATION

PI PLANT IN FLOWERPOT

CONCLUSION

- Regenerated plants PC and PI were obtain on full and half strength MS without any auxin (solid and semi-solid medium) or from root segments PC in liquid medium MS supplemented with 2.4-D
- *In vitro* shoot multiplication of PI and PC was observed on MS with BA
- These results allow for the development of the protocol in order to obtaining healthy plants with using simple and low-cost method

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