**THESIS INFORMATION**

**Thesis title**: *Study on the* *effects of metallic nanoparticles on overcome some abnormal phenomena of in vitro cultured plants*

**Speciality**: Biotechnology

**Code**: 62 42 02 01

**Name of PhD Student**: Ha Thi My Ngan

**Academic year**: 26/2016

**Supervisor**:

1. Professor Ph.D. Duong Tan Nhut – Tay Nguyen Institute for Scientific Research

2. Associate Professor Ph.D. Bui Van Le - VNUHCM - University of Science

**At**: VNUHCM - University of Science

**1. SUMMARY**:

The thesis "Study on the effects of metal nanoparticles on overcoming some abnormal phenomena of *in vitro* cultured plants" has evaluated the effects of silver nanoparticles (AgNPs), iron nanoparticles (FeNPs) and cobalt nanoparticles (CoNPs) at different concentrations on the growth, development and quality improvement of ornamental plants grown *in vitro* of rose (*Rosa hybrida* L. “Baby Love”), gerbera (*Gerbera jamesonii* “Revolution yellow”) and carnation (*Dianthus caryophyllus* “Express golem”) - beautiful flowers with high economic value and are most popular in the world with a variety of colors, shapes and uses.

The addition of AgNPs, FeNPs and CoNPs to the culture medium at the optimum concentration also helps to reduce vitrification, leaf abscission and browning in rose, gerbera and carnation micropropagation by limiting the accumulation of ethylene gas in the culture flask, reducing the activity of hydrolytic enzymes such as cellulase and pectinase, enhancing the activity of the antioxidant system (Ascorbate peroxidase-APX, Catalase-CAT, Superoxide dismutase -SOD) and increasing mineral absorbability. Besides, the plantlets derived from *in vitro* culture on media supplemented with the optimum concentration of metal nanoparticles grew and developed well, increasing their adaptability and survival rate at the nursery stage.

**2. NOVELTY OF THESIS**:

AgNPs and CoNPs added to the culture medium help to inhibit the biosynthesis and activity of ethylene gas through inhibition of the enzyme l-aminocyclo-propane carboxylic acid (ACC enzyme), thereby helping to limit the vitrification phenomenon in micropropagation of rose, gerbera and carnation.

The use of FeNPs to replace iron salts in the culture medium enhances the activity of antioxidant enzymes such as SOD, CAT and APX, thereby enhancing resistance, improving quality as well as adaptability at the nursery stage of rose, gerbera and carnation.

Leaf yellowing and abscission in micro-propagated rose were significantly improved by inhibiting the activity of the hydrolysis enzymes (cellulase and pectinase) of CoNPs in comparison with cobalt chloride (CoCl2) in the traditional culture medium.

**3**. **APPLICATIONS/ APPLICABILITY/ PERSPECTIVE**

The results demonstrate the application potential of metal nanoparticles in the field of plant micropropagation, creating high quality, homogeneous plantlets source in large quantity and able to deploy metal nanoparticles in micropropagation and cultivate crops on a large scale. Continuing to study the effects of some other metal nanoparticles - as a new research direction, a new source of materials replacing mineral nutrients in traditional culture media.

|  |  |
| --- | --- |
| **SUPERVISOR** | **PhD STUDENT** |
| **Prof. Ph.D. Duong Tan Nhut**  **Associate Prof. Ph.D Bui Van Le** | **Ha Thi My Ngan** |

**CONFIRMATION**

**UNIVERSITY OF SCIENCE**

**VICE PRESIDENT**