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GROWTH STIMULATORS IMPACT ON GROWTH AND PRODUCTIVITY POTATO PLANT IN CULTURE *IN VITRO*

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Summary. The researches results proposed for growth stimulators impact on morphometric indexes and cultivars-differentiators productivity of potato wart in culture *in vitro*. The most effective method for ontogenesis in test tube plants is the addition to the Murasige-Skoog nutrient medium the growth stimulator Poteitin at a concentration of 0.33 g/l. The root formation increase, rapid internodes growth, mass of microtubers increase in 2 times, and the number of microtubers increase per plant in 3.2 times relative to control observed on potato plants cultivar Povin.

Keywords: Potato wart, cultivar-differentiators, culture *in vitro*, nutrient mediums, growth stimulators, morhogenesis.

Introduction

Potato wart is one of the dangerous diseases of potato. *Synchitrium endobioticum* (Schilbersky) Perc. is a causative agent. It is obligate parasite, which penetrates into the tissues of plant-host. It causes character tumors, defeating all potato bodies, except roots [1–4]. Disease has a dangerous ability to speed quickly and survive in soil during long-term, even at the plant's absent [6, 9].

Potato wart was the first identified in 20th century. It creates serious danger for potato growing in numerous country throughout the world. The complex measures used for struggle with potato wart. Among them are: growing resistant varieties, following crop rotation and quarantine measures, such as careful monitoring of planting material [5, 7-9].

The phytohormones presence or absence or growth stimulants in nutrient medium content played an important role in plant morphogenesis in culture *in vitro*. These substances are key catalysts for plant growth and development. Phytohormones interact with cells, tissues, and bodies that stimulate and inhibit morphogenetic and physiological processes in plant organisms. These matters affect cell division and growth by stretching, stress resistance, tropisms, transpiration, ensure the functional integrity of the plant organism, and a natural sequence of phases of individual development. Phytohormone concentration in the nutrient medium takes important role. It's concentration and ratio relation depends upon the well-formed root system and the beginning and intensity stolon-and tuber formation [10-12].

Present paper reflects the use of growth stimulants Epin-Maxi and Poteitin, as well as their effect on the potato variety flood, since the effect of these preparation in culture *in vitro* is not sufficiently studied.

Researches purpose. was to determine the role of growth stimulators in microclonal reproduction and their effect study on morphometric parameters and productivity of potato wart differentiator cultivars.

Materials and methods

The studies conducted in the laboratory of agricultural crops biotechnology of the Ukrainian science research plant quarantine station Institute of plant protection National Academy of Agrarian Sciences during 2023-2024. Plants growth in cultivation room at 16 hours photoperiod with a

lighting intensity of 2000-2500 Lx, a temperature of 22-25°C and an air humidity of 60-80%. The growth regulators Epin-maxi and Poteitin on cultivar-differentiators of potato wart Povin (mid-ripe) adds into the nutrient Murashige and Skoog medium conducted experiment for optimization process of potato reproduction and productivity in *in vitro* culture.

The cutting conducted in quantity 25 plants. The experiment repetition conducted three times. The potato plants test tube productivity was determined on the 80th day of cultivation.

Epin-Maxi is a growth regulator with the active matter 2,4-epibrassinolide. It is used to improve the growth, development and resistance of plants to stressful conditions. The application also increases the resistance of plants to diseases and pests. Epibrassinolide is a synthetic analog of the natural plant hormone brassinolide. It belongs to the group of brassinosteroids, steroid hormones necessary for plant growth and development. Positive impact on some plant characteristics was recorded during the experiments on plants cultures (brassinolde foliar application). Among them were: chlorophyll-a, b increasing content and the sugar content, starch and soluble protein in the leaves as well as an effect on the plant growth rate. They generally improve the cultivated plants yield and their nutritional value.

Poteitin is a specialized plant growth stimulator. The active matter is a complex of 2,6-dimethylpyridine-1-oxide with succinic acid and biogenic microelements. The preparation increases the energy of germination, field germination of seeds and yield. It reduces plant illness, promotes acceleration cell division, increases leaf surface area and chlorophyll content, reduces phytotoxic effects of pesticides, improves grown products quality, increases plant resistance to stress factors of natural and anthropogenic origin. It activates the "resistance gene" and plant immunity.

Results and discussion

A number of experiments were conducted for plant stimulators growth researches. It gives us the results for morphometric indexes and productivity cultivar-differentiator potato wart Povin in culture *in vitro*. The basic task was evaluation the plants' root formation, plant's height evaluation, internodes number, quantity and root hairs length.

The final result specifies the growth stimulators Epin-Maxi and Poteitin promote the stimulation of plant ontogenesis in culture *in vitro*. The 21 st day since the experiment start is the optimal time for determining morphological indexes and second cutting. The average plant's height increased on 20-25 mm, respectively in comparison with control after the stimulants input into the nutrient medium. So the active root-forming, root's number and their length increased in 1,5 times was identified too. Optimal morphogenesis parameters were received by adding Epin-maxi-0.025 G/L or Poteitin – 0.33 mg/L to the Murasige and Skooga nutrient medium (table. 1).

Table 1

Growth regulators impact on morphometric parameters and root formation of potato cultivars-differentiators in *in vitro* culture (cultivar Povin, UkrSRPQS IPP, 2023-2024)

Environment	Plant's height, mm	Internodes number, pcs.	Root's number, pcs.	Root's length, mm
Variety Povin				
Control (MS)	64.3	5.2	6.6	51.1
MS+Epin-maxi 0,012 g/l	83.4	5.6	7.5	73.0
MS+Epin-maxi 0,025 g/l	88.8	6.9	8.2	81.4
MS+Poteytin 0,15 mg/l	76.1	7.0	7.4	78.3
MS+Poteytin 0,33 мг/л	90.9	7.8	9.1	84.5
lsd_{05}	7.2	0.1	0.3	2.6

The growth regulators Epin-maxi and Poteitin showed positive impact on potato cultivar-differentiators culture *in vitro* by researches results during the input into the nutrient medium. They favored microtuber's average weight increase, their weight and microtuber's number on one plant.

The highest results received during the following concentrations adding: Epin-maxi - 0,025g/l or Poteytin -0,33 mg. It was noticed the significant microtuber's weight growth with stimulators adding on 50% more than control. So the small number increase of microtubers on 1 plant is observed too (table2).

Table 2

Growth regulators impact on potato cultivars-differentiators in culture *in vitro* (cultivar Povin, UkrSRPQS IPP, 2023-2024)

Environment	Microtuber's weight (aver.), mg.	Microtuber's weight on 1 plant, mg.	Microtuber's quantity on 1 plant (aver), pcs.
Variety Povin			
Control (MS)	115.3	98.1	0.7
MS+Epin-maxi 0,012 g/l	183.3	176.9	0.9
MS+Epin-maxi 0,025 g/l	189.8	185.4	1.8
MS+Poteytin 0,15 mg/l	175.0	167.7	1.2
MS+Poteytin 0,33 мг/л	190.4	187.4	2.3
lsd_{05}	3.8	6.2	0.2

Conclusions

Potato cultivar Povin is the most effective for plant potato morphogenesis in culture *in vitro*. So the growth stimulator Poteitin in concentration 0,33 mg/l adds to nutrient Murasige and Skoog medium for their productive ability.The significant decrease of next indexes was determined by research way. Among them were:plant's height 90,9 mm, internodes quantity- 7,8 pcs, root's length-84,5 mm, microtuber's weight-(aver.)190,4 mm, microtuber's number on 1 plant (aver.)-0,9 pcs. They are on 30-50% higher in comparison with control indexes.

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