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CLONAL MICROPROPAGATION OF *PAULOWNIA TOMENTOSA IN VITRO*

Abstract
Paulownia tomentosa is a fast-growing species of wood that has significant economic potential (valuable wood, high biomass production rate, increased resistance to stress, etc.). A tree 15–20 m high, sometimes up to 25 m and a diameter of 0.6 m, sometimes up to 1 m.
The method of clonal micropropagation is based on the unique ability of plants to regenerate from somatic cells and allows the reproduction of plants with complicated seed or vegetative propagation, to heal the planting material and to increase the rate of its receipt several times. Also, the method of clonal micropropagation allows to renew and stabilize the number of disturbed populations of rare species of plants.

Key words: Paulownia tomentosa, clonal micropropagation, introduction, nutrient medium.

Clonal micropropagation is an important biotechnological trend that allows the mass reproduction of plants in aseptic culture. This approach is productive for the massive, rapid reproduction of valuable, unique, recruited genotypes or rare, endangered species and varieties for the propagation of plant species or unique plant species for which reproduction in nature as a seed and vegetatively is complicated. The method of clonal micropropagation is based on the induced phytohormones of the extension of the apical and axillary meristems. The essence of the method is to cultivate plants in sterile conditions with controlled parameters of the medium, on artificial nutrient media.

Today there are many different methods of clonal micropropagation. They are based on four principles:

1) activation of the development of plant meristem
2) the formation of an adventitious bud from the tissues of the explant;
3) induction of somatic embryogenesis;
4) differentiation of the adventitious buds in the primary and transversal cullus tissue [Bhojwani, 2013].

Each type of plant requires correction in the classic propagation technique.

Relevance – reproduction with help the method of tissue culture is gaining popularity. For *P. tomentosa* there is no precise mineral composition of the medium, which consistence is the optimal; it has not been determined which medium is the best.

The aim of work was to stude the process of introduction into culture in vitro *P. tomentosa.*

Materials and methods

The work was performed at the department of Microbiology, Virology and Biotechnology of the Odesa I. I. Mechnikov National University.

For introduction in culture in vitro we take shoots with activated lateral buds of plants. Shoots were taken from a donor plant in February. The material was obtained by cultivating plants in vitro in a nutrient medium of Murashige and Skoog (MS) with addition of 20 g/l of sucrose, 9 g/l of agar, and 1 mg/l of 6-benzylaminopurine (6-BAP). The next step is the growth of initial explants in a media with different consistency (on the solid nutrient media [8.0 g/l] and semi-liquid nutrient media [4.0 g/l]). Registration of the explants' survivability, time of the beginning of axillary buds proliferation, and amount of obtained shoots was conducted [Zelenanska, 2009].

Results

The technology of clonal micropropagation of *P. tomentosa,* includes the following main stages [Carmen, 2014]:

1. Selection and sterilization of primary explants.
2. Introduction of explants into culture in vitro (fig. 1).
3. Rooting and reproduction of microclones on nutrient media (fig. 2).
4. Adaptation of plants from in vitro conditions to in vivo conditions.

Fig. 1. Introduction of explants into culture *in vitro*

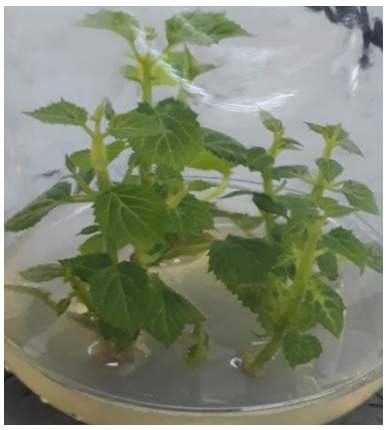

Fig. 2. Rooting and reproduction of microclones on nutrient media

The micropropagation of *P. tomentosa* was carried out through direct morphogenesis, using the shoots with axillary buds, since it is known that the plants regenerated in this way are mostly genetically homogeneous, identical to the parent form.

Semi-liquid nutrient media were used. The advantage of using semi-liquid media in comparison with solid nutrient media is revealed.

The search of the optimal nutrient medium for *Paulownia tomentosa* shoots induction in vitro was successfully done.

Modified semi-liquid MS was determined as the optimal nutrient media.

Its application contributed to better survivability, differentiation, and regeneration of *Paulownia tomentosa* shoots (Table 1).

Total vitality on MS(solid) is 40%, total vitality on MS(semi-liquid) is 60%.

Table 1

Average survivability performance of *P.tomentosa* microclones during the introduction process using different consistency nutrient media

Time passed from the planting, days	Consistency nutrient media	Type of explants	Average survivability of the microclones, %
3th	MS(solid)	shoots	90
		Shoots*	100
	MS(semil-iquid)	shoots	80
		Shoots*	100
6th	MS(solid)	shoots	40
		Shoots*	70
	MS(semi-liquid)	shoots	60
		Shoots*	90
10th	MS(solid)	shoots	0
		Shoots*	50
	MS(semi-liquid)	shoots	60
		Shoots*	60

shoots* – plant donor is seedlings obtained by microclone method

On MS(solid) there was a proliferation of buds for 6 days. On MS(semiliquid) there was only swelling of the buds.

Conclusions

1. *P. tomentosa* is a great choice for greening the cities.
2. The stage of introduction into the culture in the wind and adaptation of the plants grown in vitro to the environment are some of the most problematic stages.
3. On solid nutrient media, the percentage of liveliness is less than that of on semiliquid nutrient media.
4. Proliferation on the solid nutrient media occurred earlier.
5. Use of material from the plants obtained by in vitro gave better results.

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