UDC: 57.085.2

REGENERATION OF SELECTION VALUABLE SUNFLOWER GENOTYPES

M. Parii, S. Sytnik, D. Zhukov's

Regeneration ability for three different explant types of two Ukrainian sunflower genotypes was investigated. Efficiency of regeneration for used culture system was about 8% in case of hypocotyl and cotyledon explants. For root explants regeneration was not achieved. Any of the regenerated shoots developed root system, so the regeneration system for given genotypes needs to be improved.

Sunflower, Helianthus anuus, in vitro culture, regeneration.

Sunflower - one of the most important oilseed Ukraine and the world. Sunflower has little genetic diversity, prompting scientists to its

expand both classical breeding methods, and by means of biotechnological approaches, including genetic transformation and somatic hybridization of wild species. These technologies can provide introduction to cultural forms Sunflower properties such as resistance to fungal and bacterial infections, resistance to pests, increased content of unsaturated fatty acids, etc. [1].

One of the prerequisites for the genetic improvement of plants using biotechnology is the availability of efficient regeneration system in vitro. In general, Cell potency somatic plant cells, ie the ability to differentiation, morphogenesis and formation of a plant depends on plant species plant genotype specific tissues and cell types, etc. That is, different species and genotypes within a species and different cell types of the same plant have different ability to regenerate. Sunflower belongs to the species for which no effective, reproducible and henotyponezalezhnyh regeneration systems. In most cases, the protocol methods developed for a specific genotype is not effective for other forms of sunflower plants, [2]. Therefore, for each new genotype should develop its own system regeneration. Experimental work on obtaining genetically transformed plants such complex forms in terms of in vitro cultivation of

species, sunflower, covering as a necessary preliminary stage regenerative capacity study of patterns, selection of optimal culture conditions, the option of explants, optimization of growth regulators and others.

The purpose of research - selection of efficient regeneration system for the two genotypes of sunflower, not previously used methods involving cultivation in vitro, for their further genetic improvement.

Materials and methods research. The plant material. It uses two genotypes of sunflower plants Helianthus anuus home selection: 1006BHIC and AV02. Both genotypes provided by the All-Ukrainian Research Institute of selection.

To enter the plants in culture in vitro was performed surface sterilization of seeds. Seeds were placed for 1 minute in 70% solution of ethanol, then transferred to 25 minutes in a commercial solution "Lingerie" diluted with distilled water at a ratio of 1: 2 parts water and washed three times for 5 min. in sterile distilled water. Sterile seeds were planted on agar medium MS and germinated in an incubator at 25 ° C.

Cultivation in vitro and regeneration. The experiments were used hipokotylni, kotyledonovi and root explants etyolovanyh three-day seedlings. Regeneration system based on the method described in [3]. In contrast to the report, in our experiments we used silver nitrate as a component of culture media. Explants were placed on three days in liquid medium RMcot this composition: MS salts and vitamins, 30 g / L sucrose, 500 mg / l casein hydrolyzate, 10 mg / L silver nitrate, 1 mg / l benzylaminopurynu (BAP) and 1 mg / L naftylotstovoyi acid (NOC). For 20 explants were cultured in 50 ml conical flasks environment Erlenmeyyera 250 ml at 20 ° C in the light rotary shaker using (90 / min). After culturing in liquid medium explants were transferred to agar medium (12 g / l agar) of the same composition and cultured in the light at 20 ° C. Transfer explants to fresh medium was performed every 10 days. When moving the cut flooded and brown of explants, pasazhuyuchy dense green parts only.

Regenerated shoots were separated from the explants and transferred to MS medium with altered concentrations of phytohormones for their further development and rooting. We used a combination of these phytohormones: 1) 0.15 mg / l NOC and 0.02 mg / l hiberelovoyi acid (HA3) 2) 0.1 mg / l indolylmaslyanoyi acid (IMC) and 0.5 mg / l HA3 3) 1 mg / l IMC and 0.5 mg / l HA3.

Conclusions

Examined genotypes capable of regeneration in vitro, but it is necessary to optimize the system for induction rhizogeny. In further work is necessary to use hipokotylni and kotyledonovi explants, but nekorenevi. The efficiency of regeneration in these experiments was approximately 8%. During further work is necessary to investigate the impact of new factors, developed to optimize system and improve the efficiency of regeneration, as well as attract new genotypes national selection.

Список літератури

1. *Davey R. Michael, Jun Masood*. Sunflower (*Helianthus anuus* L.): Genetic improvement using conventional and in vitro technologies // Journal of Crop Improvement. – V. 24. – 2010. – P. 349-39.

2. *Gurel E, Kazan K.* Development of en efficient regeneration system in sunflower (*Helianthus anuus* L.) // J. of Botany. – V.22. – 1998. – P. 381-387.

3. *Khalid M.B.Chraibi, Castelle J.-C., Latche A., Roustan J.-P., Fallot J. A* genotype-independent system of regeneration from cotyledons of sunflower (*Helianthus anuus L.*) // The role of ethylene//Plant Science. – V. 86. – 1992. – P. 215-221.

4. *Yoko Akasaka-Kennedy, Hidefumi Yoshida, Yoshihito Takahata* Efficient plant regeneration from leaves of rapeseed (*Brassica napus L.*): the influence of AgNO3 and genotype // Plant Cell Rep (2005) 24: 649–654.

5. *Muhammad Ramzan Khan1, Hamid Rashid, Muhammad Ansar & Zubeda Chaudry*. High frequency shoot regeneration and Agrobacterium-mediated DNA transfer in Canola (*Brassica napus*) // Plant Cell, Tissue and Organ Culture (2003) 75: 223–231.

6. *Paterson K.E., Everett N.P*. Regeneration of *Helianthus anuus* inbred plants from callus // Plant Science. – V. 42. – 1985. – P. 125-132.

7. *Burrus M, Chanabe C, Alibert G, Bidney D.* Regeneration of fertile plants from protoplast of sunflower (*Helianthus anuus*)//Plant cell report. – V. 10. – 1991. – P. 161 – 166.

8. *Lupi Maria Clara, Bennici Andrea, Locci Francesco, Gennai Delio*. Plantlet formation from callus and shoot-tip culture of *Helianthus anuus* // Plant cell, tissue and organ culture. – V. 11. – 1987. – P. 47 – 55.

9. *Prathibha Devi, Swaroopa Reni*. Agrobacterium rhizogenesis induced rooting of in vitro regenerated shoots of the hybrid *Helianthus anuus*× *Helianthus tuberosum*//Scientia Horticulrurae. – V 93. – 2002. – P. 179 – 186.