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PRODUCTION AND BREEDING OF JERUSALEM ARTICHOKE SEED IN VITRO

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ABSTRACT

It was studied in-vitro by the method of obtaining high-quality seed material from the cells of the apical meristem and from the sprouts of botanical seeds, as a method of reproduction for faster growth of cells from callus tissue. Rapid reproduction of seedlings in in-vitro, the growth, development and multiplication factor of seedlings in various schemes of planting in the ground, obtaining seed material with various methods in-vitro make it possible to provide the industry with high-quality seed material, raw materials for the food and pharmaceutical industries and has a scientific get out.

KEYWORDS: *Jerusalem Artichoke, Seed And Marketable Tuber, Variety, In-Vitro, Intensive Reproduction, Nutrient Medium, Callus Tissue, Regeneration, Microclimate, Inulin, Dietary Product, Local Raw Materials.*

INTRODUCTION

To provide the population with quality food, grown the crops environmentally cleanly, seed-based and provide high, plentiful and high-quality yields are important.

More than 8% of the adult population of our country suffers from diabetes. It allows the population to increase the range of dietary products to stabilize blood sugar levels, to grow inulin-containing crops to ensure a pure quality harvest throughout the year, and to increase the demand for inulin-containing diet products. Topinamburis one of the inulin-preserving, promising and widely used crops.

In the conditions of the Zarafshan Valley, Professor D.T. Abdukarimov (2002, 2006), T.E. Ostanokulov (2018) Elmuradov A. Berdimuratov (2020) conducted research in the field of planting Jerusalem artichoke varieties in various planting schemes, growing as an annual and perennial crop, processing for various purposes, food, livestock and pharmaceutical industries. In the course of the study, transplanting between plants 35-40 cm in row spacing 90 cm, 30-35 cm in row spacing 60 cm, in the forage field in the Samarkand, Navoi and Jizzakh regions, mountainous terrain. The pharmaceutical industry, obtained and grown in mountainous areas, can store inulin at a level of 12.5-13.6%.

M. Omonova, A. Rustamov (2012) recommended organizing the cultivation of high-quality and high-quality crops of the Mojiz, Fayz-barak varieties in the Fergana Valley and Tashkent region

in March-April, sowing with an interval of 70 cm, primary seed, production and elite cultivation of the Tashkent region in conditions of the Kibray region.

R. Mavlyanova (2013) Faiz-Baraka, author of the book "Wonderful Varieties", opens the possibility of processing Topinamburas a dietary product in the form of a powder and using them in the preparation of various dietary products.

Professor B.Yu. Khodiev, M. Kasimova (2013), taking into account such widespread use, pointed to the problems of increasing the sector of the economy through processing, standardization of Topinambur products and certification.

In soil conditions from QQR species. O. Dzhanabaeva (2020) studied the growth, development, yield and productivity of varieties, and also studied methods of growing large masses and finished crops on saline soils.

V. Dzhamoliddinova (2021) recommends the production of "canned Jerusalem artichoke" from artichoke tubers for dietary salads in local conditions at "Agro Mir" and use for children over 12 years old, as well as older patients with diabetes.

Purpose of the study

Research includes in vitro extraction, propagation and harvest of Jerusalem artichoke seeds.

The research will pursue the following objectives:

- Separation of meristem cells from nodules and seminal vesicles;

- obtaining callus tissue from meristem cells obtained from nodules and seminal vesicles;

- The growth of plant seedlings from callus tissue;

- Study of the duration of regeneration of plant seedlings obtained by various methods;

- The growth and development of seedlings obtained in different ways with different planting schemes in the greenhouse;

-study of productivity and profitability of reproduction of seed material obtained by different methods.

Object of study

Jerusalem artichoke variety Etiraf, stems, botanical seeds.

Research methods: laboratory experiments in vitro in physiological vessels, murasiga-skuga in a nutrient medium, physiological observations in field experiments on biometric measurements, productivity of the All-Russian Institute of Botany, State Commission on Variety Testing by Test Methods. The research was carried out in the in vitro laboratory of the Association “Walnut Growers Association” of the Samarkand region, in their greenhouse (phytotron) and on bush fields.

Research results

In the experiment, a variety of Jerusalem artichoke variety Etiraf was studied, growing seedlings from meristem cells by germination.

The cells of the meristem, taken from the tumor of the tubercles, were selected on February 5, and when inoculated into the Murasiga-Skoog nutrient medium, the callus formed in 27-28 days, that is, on March 3-4. When the cells of the meristem are removed from the seeds of the same variety and inoculated into the culture medium, the callus is formed in 22-23 days, or it turns out to take the callus 5 days earlier than in the meristem of the entire tumor. In the experiment, callus from a complete tumor of callus tissue was transplanted into nutrient medium on March 4, and callus from a seminal tumor on February 28.

Callus was obtained from a tissue-dependent seedling after 28-30 days, from a whole tuber after 32-34 days. The first seedlings were transplanted onto freshly poured nutrient media using leaf cuttings for faster propagation. In this case, 5 cuttings were planted in 25 physiological containers, and 100 seedlings - in 25 containers. The duration of the first regeneration was 22 days in seedlings from endogenous tumors and 18 days in seedlings after seed germination. Initially, 100 cuttings were planted in 25 pots, then 500 cuttings were taken and planted in 100 pots. For 18-22 days, 2,500 cuttings were removed from them and planted in 500 pots.

TABLE № 1 OBTAINING CALLUS TISSUE IN EXPERIMENT

№	Variants	Isolation of cells, day	Callus formation, day	Duration of callus formation, day	Callus cell transplant, day	Date of formation of the first growth point	Seedling ready for propagation
1	In vitro seedlings obtained from nodule tumors	05.02. 2020	04.03. 2020	27	04.03. 2000	21.03.2021	05.04.2020
2	In vitro seedlings obtained from seeds	05.02. 2020	28.02. 2020.	23	28.02. 2020	18.03.2021	01.04.2020

The duration of regeneration of seedlings of meristem cells obtained from the tumor was 22 days at the 1st regeneration, 20 days at the 2nd regeneration, 19 days at the 3rd regeneration, and 18 days at the 4th regeneration. 17 and 15 days were recorded. In both variants, the variety specificity of seedlings was 6-8 points in the case of a complete tumor and 7-8 points in the case of a seed tumor.

For alternative growth and development of seedlings in physiological vessels, ambient temperature, humidity, duration of illumination and intensity were provided. During the study, the regeneration process was monitored in 500 pots (5 seedlings were planted in each pot) in saturated nutrient media in physiological pots. The average number of minitumors in a container was 12%, weighing 5.6 grams.

TABLE № 2 DURATION OF THE FIRST REGENERATION

№	Variants	Average number of seedlings in a sample, pcs.	Hence the number of cuttings, pcs.	The number of the first transplanted cuttings from the average sample, pcs.	Duration and condition of seedlings, days / points			
					1-regeneration	2-regeneration	3-regeneration	4-regeneration
1	In vitro seedlings obtained from nodule tumors	100 (in 25 containers)	500 (in 100 containers)	22 days (2500 pieces in 500 containers)	22/6	20/7	19/8	18/8
2	In vitro seedlings obtained from seeds	100 (in 25 containers)	500 (in 100 containers)	18 days (2500 pieces in 500 containers)	18/7	18/8	17/8	15/7

In the 2nd regeneration, 75-80% of minitumor formation was observed in seedlings grown from seed tumor of Jerusalem artichoke Recognized variety, or 20-30% more mini-tumor formation than in meristem seedlings obtained from tumortumor, their size Increased by 6.0 grams, the average weight was observed to be 3.1 grams higher. It should be noted that there are high phenotypic similarities in callus tissues and laboratory seedlings obtained from meristem cells, but in some samples morphogenetic changes are possible when grown from seed, in which separate selection work is desirable for selection for selection purposes.

It is recommended to grow Jerusalem artichoke varieties from stems and seed seedlings and use them as a material for selection, seed production, ie primary seed production. To increase the number of minitumor by planting 4-regeneration seedlings in laboratory pots of this variety, the growth and development of seedlings grown by the method of obtaining both seed material in different planting schemes (10x10; 12x12; 14x14; 16x16; 18x18; 20x20) productivity was determined.

On the 60th day when planting Jerusalem artichoke seedlings according to the scheme of planting height 98.7-125.6 cm, the number of side branches 4.1-5.8 pieces, the number of leaves 20.1-29.0 pieces The plant is 104.5-134.5 cm, the number of lateral branches is 5.1-5.3, and the number of leaves is 22.4-35.6. was 5.8–8.8 cm higher than the variant, and the number of lateral horns and leaves was almost close to each other. The health of the plants, the morphological form of the variety, was assessed on a 9-point scale. , 6-7 points on day 120, 9 points on cell seedlings obtained from seed tumor on day 30, 8 points on day 60, and 7 points on seed day 120, or phenotypic homogeneity in seed seedlings grown from seed tumor Seed material can also be obtained by cooking and propagating from tumors. In the experiment, the productivity of

seedlings was studied. The number of tubers per type in different planting schemes of cell seedlings obtained from the tuber tumor is 10x10 scheme 9.6 maximum 16x16 scheme 15.3 average weight 28.8 grams 20x20 scheme single crop yield is recorded in this scheme 400.3 grams . The number of mini-plots per m2 is 96.0 in 10x10 scheme, 95.6 in 14x14, 69.5 in 20x20 scheme. provides the area with seeds.

When sowing cell seedlings obtained from seedlings, 15.9 pieces in the highest 16x16 scheme, average weight 33.8 grams in the 20x20 scheme, 473.2 grams in one nest yielded in this variant, the highest per square meter. In the 10x10 scheme, 1 million 20 thousand seeds will be obtained from 102 hectares, which will provide seeds to 32.1 hectares in the future.

TABLE № 3 PRODUCTIVITY OF SEEDLINGS IN THE EXPERIMENT

№	Variants	Number of nodules in one bush, pcs.	Average weight of nodules in one bush, g	crop of nodules in one bush, g	number of nodules obtained from1 m^2, pcs.	Number of seedlings per hectare, thous.	How many hectares give seeds per hectare
Cells obtained from nodule tumors							
1	10x10	9,6	17,3	166,1	96,0	960	30,2
2	12x12	10,8	20,7	223,6	86,6	866	27,3
3	14x14	13,7	21,1	290,4	95,6	986	31,1
4	16x16	15,3	24,1	367,2	91,8	918	28,9
5	18x18	14,6	26,6	388,4	73,0	730	23,0
6	20x20	13,9	28,8	400,3	69,5	695	21,9
Cellular seedlings obtained from cuttings							
1	10x10	10,2	20.2	209,1	102	1020	32,1
2	12x12	12,3	24,6	302,6	98,4	984	31,0
3	14x14	13,7	25,7	352,1	95,9	959	30,2
4	16x16	15,9	28,9	459,5	95,4	954	30,9
5	18x18	14,6	30,2	440,9	73	730	23,0
6	20x20	14,0	33,8	473,2	70	700	22,1

In the experiment, the reproduction of Jerusalem artichoke minitumors in vitro was carried out by in vitro reproduction of seed material, as well as aeroponics of minitumors, taking into account the high content of inulin. a friendly inulin-rich product that can be slightly economical at a high price.

So, in conclusion, Jerusalem artichoke varieties can be used as a method for obtaining the first seed in primary seed materials by inoculating tumor cells from the tumor and inoculating seeds: In addition, the amount of inulin in the minitumor, taking into account the high level of preservation of minitumor, ensures that it will be environmentally friendly dietary product for patients with diabetes.

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