СЕКЦИЯ 3
ЕСТЕСТВЕННЫЕ НАУКИ

Подсекция 3.1 Биология и биотехнология

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INFLUENCE OF PHYTOPATHOGENS ON THE AGRO-INDUSTRIAL COMPLEX

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Introduction

Plant diseases were encountered by mankind back in the days when it moved from nomadic pastoralism to sedentary agriculture. Pathogens that feed on plants and cause diseases have moved from wild plant species to cultured ones and have found themselves in the most favorable conditions for development and distribution: a large number of plants with the same susceptibility over a small area. Therefore, in ancient times was known mass diseases of plants – epidemics [1].

"Studies have shown that the metabolites of pathogens inhibit the germination of seeds of grain crops. Of the four types of fungal pathogens, A. tenuis filtrates showed a strong toxic effect. The filtrate of A. tenuis fungus reduced the germination of wheat varieties by 25-55%, especially the strong toxic effect of the cultural filtrate (CF) of A. tenuis mushroom was manifested in relation to the seeds of the varieties Tselinnaya 3C, Kazakhstan early-maturing and Damsinskaya 90, where the germination of seeds decreased by 50-55%" [2].

Currently, the world market is dominated by chemical means of plant protection and stimulation. However, the rapid spread of such drugs causes irreparable environmental damage. In most countries, there are significant restrictions on the content of chemicals in the human environment. Biological remedies take up only a few percent of the total volume of such drugs. Their disadvantage is their narrow specificity and high losses. One of the ways to solve this problem is to develop effective and environmentally safe protective and stimulating agents of a new generation that have a wide range of actions against phytopathogens and stimulate plant growth processes [3].

Transgenic plants with an antimicrobial gene

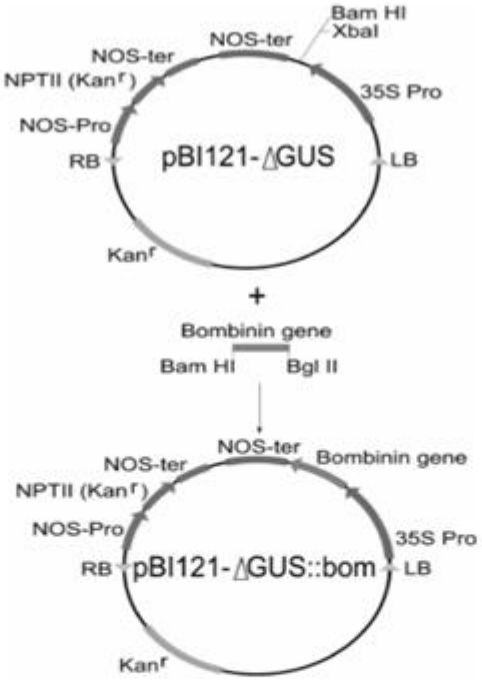
A few years ago, scientists asked whether it is possible to create varieties that are balanced in the composition of amino acids, resistant to environmental factors such as cold, drought and phytopathogens. Today we can say that such plants already exist. Transgenic plants that are resistant to herbicides (chemical compounds that are used to control weeds), viruses and bacteria already exist and some types of transgenic plants that were resistant to various phytopathogens will be considered later [4].

Antimicrobial peptides have been found in all eukaryotic organisms, including birds, mammals, insects, and amphibians as an integral part of their innate immune system. Experiments were conducted to obtain transgenic plants with the antimicrobial peptide Bombin (bom). To do this, a vector with the antimicrobial Bombin gene was isolated, and an agrobacterial transformation was performed using this vector. The presence of an antimicrobial peptide gene was proved by PCR. The plant material used was tobacco Semana Nicotiana tabacum L. The Euruinia carotovora subsp strain was used as a phytopathogenic agent. Carotovora B15.

To obtain structures with the bombinin gene in a direct orientation, a pbi121ΔGus1 plasmid with the Gus gene removed was used . The bom gene was embedded in pBI121ΔGUS1 on the BamHI

website . The resulting design pBI121ΔGUS1:: bom was analyzed by PCR and sequencing. Clones with a direct orientation of the bombinin gene relative to the 35S RNA promoter of the cauliflower mosaic virus were selected. The plasmid was transferred to a strain of Agrobacterium tumefaciens CBE21(pTiBo542) and used to transform tobacco plants. Before plant transformation, Agrobacterium tumefaciens CBE21(pTiBo542) was tested for the presence of a recombinant vector by PCR with primers to the bombinin gene (100 BP). All colonies grown on a selective medium with kanamycin gave a positive signal (Fig. 1) [5].

Figure 1. Scheme for cloning the bom gene into the pbi121ΔGUS vector



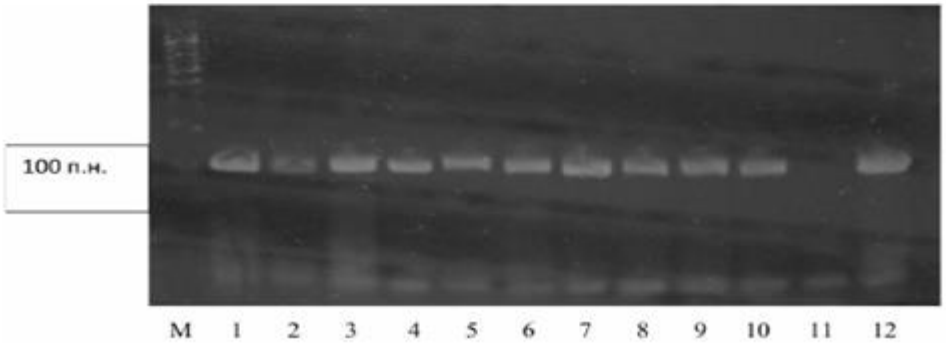


Fig 1 Analysis of transformed agrobacteria A. tumefaciens CBE21 (pTiBo542, rvi121ΔGUS:: bom) for the presence of the bom gene. M-marker molecular weight (Medigen, 100 bp]; 1-10-DNA transforme agrobacteria; 11-DNA of nontransformed agrobacteria; 12-positive control

Resistance of transgenic cabbage plants to phytopathogens

In this work, we studied transgenic plants of generation t0 of the inbred self-compatible parent line B 25 and their seed offspring. The original parent line has a high combinational ability for a complex of economically valuable traits, but it is unstable in relation to most diseases. To eliminate this disadvantage, the radish defensin rs-ap gene was introduced into it by the pK22rs vector

through agrobacterial transformation under the control of the 35S promoter of the cauliflower mosaic virus gene VI.

Transgenic plants were improvised in a phase of 10 real leaves in a winter greenhouse. After passing the period of springization, leaves from diseased plants with clear symptoms of the disease (abundant white powdery coating) were applied to the upper side of the leaves of infected plants and lightly rubbed them against each other. Thus, one sick leaf infected 5 lower leaves of the transgenic plant. The degree of lesion was assessed visually in the phase of seed maturation according to the unified VIR scale.

Assessment of the resistance of transgenic plants of generation t0 to alternariosis.

Disks with a diameter of 15 mm were cut out of the leaves of spring cabbage plants using a cork drill .the center of the disk was damaged by touching a red-hot preparation needle. Disks (10 PCs.) were placed in glass Petri dishes with a diameter of 90 mm on filter paper, which was filled with a solution of kinetin at a concentration of 10 mg/l.2 ml of a suspension of A. bras - sicola conidia with a concentration of 106 spores/ml was applied to the damage site in the center of the disk (calculated by microscopy in the Goryaev chamber). The cups were covered with a polymer food film and kept in a climate chamber at a temperature of +25°C and a 16-hour light day. The lesion was taken into account on the 7th day by measuring the diameter of necrotic zones.

Assessment of keel resistance of seed progeny of transgenic plants of generation t0

Seeds obtained by forced geitenogamous self-pollination of transgenic plants of generation t0 were sown in mid-July in cassettes with a cell side of 4 cm to a depth of 0.5 cm. during sowing, 2 ml of a suspension of spores of kila with a concentration of 107 spores/ml was introduced under each seed.in the phase of one or two real leaves, the seedlings were re-infected with a suspension of spores of the same concentration and plants were planted on the infectious background of kila. The infectability was taken into account 6 weeks after planting seedlings on an infectious background by visual assessment of the root system on a 4-point scale proposed by Buckzacki.

Results

Analysis of plants of generation T, for the presence of the rs-ap transgen.

Thirteen independent kanamycin-resistant regenerants that we obtained earlier were replicated by cloning in vitro and analyzed for the presence of a transgene using PCR. Amplification with primers to the 358 promoter and the rs-ap gene in clones of all independent regenerants resulted in a reaction product of about 600 PP.o. corresponding to a positive control (pk22rs plasmid). No specific amplicons were obtained in the retinal control (DNA ^of the transformed plant). [6]

Conclusions:

Transgenic plants are more resistant than conventional plant varieties. This is due to their built-in genes, they give the ability to resist various environmental stresses. The presence of genes that give resistance to various phytopathogens can be found through immune analysis or PCR analysis. In agriculture, transgenic plants will be more in demand.

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ИЗУЧЕНИЕ НОВОГО ШТАММА МОЛОЧНОКИСЛЫХ БАКТЕРИЙ, ПРОДУЦИРУЮЩЕГО БЕЛОК-РЕЦЕПТОР К ПЛАЗМИНОГЕНУ ЧЕЛОВЕКА

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Введение. Пробиотические препараты на основе молочнокислых бактерий (МКБ) оказывают положительное влияние на организм человека и животных. Так, применение пробиотиков помогает восстановлению кишечной микрофлоры, снижает частоту аллергических реакций, а также риск образования рака толстого кишечника [1].

В настоящее время выяснение молекулярных механизмов, лежащих в основе полезных эффектов пробиотиков, является привлекательным полем деятельности в микробиологии кишечника. Среди различных факторов, ответственных за эти процессы, выделяют белки, секретируемые в окружающую среду пробиотическими бактериями. Внеклеточные белки (ВБ) активно транспортируются в бактериальное окружение через цитоплазматическую мембрану, и могут нековалентно связываться с бактериальной поверхностью. ВБ могут быть посредниками в определенных взаимодействиях, так как они напрямую взаимодействуют с эпителиальными и иммунными клетками [2].

Одним из таких белков является белок-рецептор к плазминогену(Plg-R) человека. Рецепция плазминогена (Plg) стала известна для патогенов более пятнадцати лет назад [3]. Иммобилизация плазминогена на поверхности патогенных бактерий, создает условия для протеолитического перехода плазминогена в плазмин под действием активаторов организма хозяина [4]. Немногим позже было установлено, что ассоциация с Plg также возможна у безвредных комменсальных бактерий [5]. Причем биологические функции такого взаимодействия остаются в значительной степени неизвестными. Хотя некоторые штаммы