



Obtaining potato *Solanum tuberosum* plants that simultaneously express genes *desA* and *thaumatinII*

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Potatoes *Solanum tuberosum* are one of the most common agricultural crops in the world. However, its yield depends on environmental factors. Potatoes are sensitive to the negative effects of low temperatures and frosts during germination. Drought also has a negative effect on the yield of potato tubers. One of the possible mechanisms of plant resistance to abiotic factors is to increase the content of unsaturated fatty acids in the composition of membrane phospholipids. Desaturases are enzymes that promote the formation of double bonds in fatty acids and thus convert them from saturated to unsaturated.

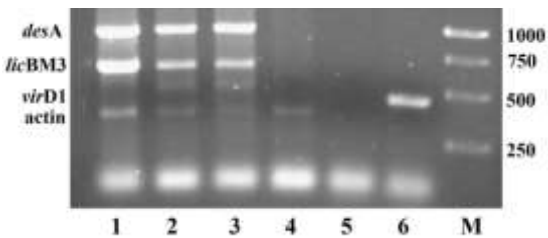


Regeneration of potato plants on a selective medium after genetic transformation

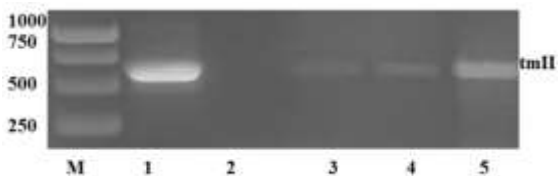


Plants *Solanum tuberosum* aged 3 months

However, the study of infection of plants with pathogens of fungal etiology is relevant. Certain mechanisms of control at the cellular level of pathogens are present in some plants. For example, increased expression of the gene *thaumatin* in *Thaumatococcus daniellii* plants. The gene *desA* encoding $\Delta 12$ -acyl-lipid desaturase of cyanobacteria *Synechocystis sp.* PCC 6803 and the gene *thaumatinII* of the plant *Thaumatococcus daniellii* was used in the work. Carried out the genetic transformation of *Agrobacterium tumefaciens* - mediated method.



PCR for determination of hybrid genes *desA* i *licBM3*:
1,2,3 - DNA of transgenic potato variety "Slavyanka 1";
4 - non-transformed plant; 5 - negative control; 6 - DNA of *A. tumefaciens*; M - 1000 bp DNA marker.



RT-PCR for determination of *thaumatinII* gene:
M - 1000 bp DNA marker; 1- positive control;
2- negative control; 3,4,5 - Potato *Solanum tuberosum* plant with *thaumatinII* gene expression

The expression of two transgenes in a plant organism at the same time was investigated. The expression of the *thaumatin II* gene was proved by RT-PCR. It is known, that during the expression of the gene *thaumatin* there is an increase in the expression of protein kinases, so checked the expression of the desaturase gene indirectly by the activity of the protein of the reporter gene (reporter gene *LicBM3* thermostable lichenase bacterial *Clostridium thermocellum*).



Qualitative lichenase test:
K+ - positive control; K - negative control; 1,2,3,4 - Potato *Solanum tuberosum* plant extract containing genes *desA:licBM3* and *tmII*;

A positive lichenase reaction was observed, which indicates the possibility of using two transgenes in potato plants to increase their stress resistance. Further research is underway.