

Annotation

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Using in vitro methods in adaptive selection of plant (literature review)

Negative environmental factors have a significant impact on the plants. They cause various changes resulting in a decrease of productivity or destruction of the organism.

General adaptative syndrome in the organism occurs under the influence of stress. That is change in physiological and biochemical processes which are aimed at overcoming the effect of stress factors. Using new high-yielding varieties and hybrids adapted to growing conditions is one of the most efficient, cheap and environmentally friendly ways to increase the level of crop yield under the stress conditions.

Recently in vitro culture is used more often in selection. The main type of the material for the production of new genetic forms is callus tissue and cultures created on its basis. Somaclonal variability which is a source of genetic diversity occurs in the process of cells dedifferentiation. Somaclonal variations characterized by the complex of economically valuable features are marked out in many crops.

A great number of biotechnological researches are dedicated to creation of plant forms resistant to abiotic stress factors of the environment.

Nutrient medium modified by osmotic-and-active substances which reduce external water potential (polyethylene glycol, mannitol, high concentrations of sugar) are commonly used in order to simulate a stress effect of drought under in vitro conditions. Salts of NaCl, Na₂CO₃, Na₂SO₄ and sea water are used as a selective factor in plant selection for salt resistance.

Researches by studying the influence of heavy metals upon plant organisms take up a smaller part concerning the total amount of researches in this field. Proliferating cells are the most sensitive to the effect of heavy metals.

Physiological influence of salinity, drought, and heavy metal ions is similar in many aspects therefore complex resistance to negative abiotic factors often appears in the selected cell lines and regenerated plants derived from them.

Protective amino acids, particularly proline are synthesized in the cells of plant organisms by effecting of stress factors on them. Therefore, proline analogs are often used as a selective agent for choice at the cellular level. It appears that the most effective were azetidine-2-carboxylic acid and hydroxyproline.

Simulation of stress system under in vitro conditions makes it possible to research the effect of a selective factor in detail on the biological object and choose resistant genotypes that can be used for further genetic selective studies.

*The issue concerning *Camelina sativa* is unstudied and this fact stimulated us to conduct research in this field.*

Key words: *somaclonal variability, selective factor, salinity, osmotic stress, heavy metal ions, protective amino acids.*