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Research Article

GENE ENGINEERING IN PLANTS

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ABSTRACT

This article talks about the emergence of engineering, its development, its role in commerce, the creation of various plant varieties, the introduction of a new era of science in Uzbekistan, and the achievement of significant results in this regard.

KEYWORDS

Clone, DNA, stress, fragment, vector, Geninmar, herbicide, tissue, cell, differentiation, transgene, immunity, genome, regeneration, protein.

INTRODUCTION

Genetic engineering is a set of biotechnological and medical methods, a branch of the future era that changes the genes in the body. Genetic engineering is not a new direction that was not known before, but a

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new science that has appeared for thousands of years and is still developing. Genetic engineering is actually one of the main areas of biotechnology. If we look at the history of genetic engineering, for the first time in 1972, American scientist Paul Berg, together with his colleagues, obtained recombinant DNA by connecting parts of genetic molecules of viruses and microorganisms in a test tube, which became the basis for the emergence of genetic engineering. After that, in 1989, the experiment of transferring cloned human genes into cells, and in the same year, the treatment of genetic diseases by conducting experiments on animals was launched for the first time.[1-3]

Considerable work is being done in this field in our country from the end of the 20th century to the beginning of the 21st century. With the help of genetic engineering in plants, fruitful varieties of plants resistant to various stresses, pests and diseases and adapted to different climates are being created. The banana fruit, which is cultivated by genetic engineering and creates natural immunity in the human body, and is loved by many people, is also considered a product of this genetic engineering field. Or if not, many experiments are being conducted on the cotton plant, which has been cultivated in our country for several years and is considered as our national treasure. The fact that more than 10,000 fragments were isolated from the cotton genome and some of them were cloned into special vectors is our biggest achievement in this field.

Currently, clones of 433 plant species belonging to 90 families have been created using genetic engineering. In order to achieve success in the use of cell and tissue culture in the creation of plant deposits, first of all, it is necessary to synthesize proteins and hormones against plant pests and herbicides for the normal division, differentiation and regeneration of cells and the formation of a mature plant from them. Currently, about 20 transgenic varieties of herbicide-resistant corn, cotton, rice, soybeans, wheat, potatoes and tomatoes, and flax are used in North America and Europe. allowed. Transgenic varieties and hybrids of strawberries, sugar beets and some flower crops are planted on 34 million hectares of land. This is 80% of the total cultivated area. In general, obtaining transgenic plants is one of the rapidly developing areas of biotechnology.[4-7] By February 2001, 78 transgenic varieties of 18 types of crops were tested in the field and allowed to be used for agro-commercial purposes in countries where the use of genetically modified plants is allowed. In 2000, in countries where the use of genetically modified products of transgenic plant varieties is allowed, insect-resistant crops were planted on an area of 380,000 hectares, including 230,000 hectares of transgenic cotton, 144,000 hectares of corn, and 5,000 hectares of transgenic potatoes planted. As a result of the use of transgenic plants, it was possible to reduce the use of insecticides and increase the productivity of plants. In 1998-2001, along with the transformation of genes that increase the yield and quality of plants, the first four varieties of commercial transgenic flowers were obtained. (two carnations and one chrysanthemum) managed to get the unusual colors of the petals in the rosehip. In genetic engineering (biotechnology), research is being conducted on the creation of new varieties of wheat, tomatoes, rice, carrots, vegetable crops using a number of methods. In recent years, cooperation has been established with many scientific and research institutions of several leading countries of the world, including: Russia, USA, China, Japan, Germany. Geninmar Center is making many innovations in the field, vaccines are being created for the treatment of diseases. Only at the Institute of Bioorganic Chemistry is the study of the structure and function of biologically active substances of high and low molecular nature, as

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well as the development of methods for their synthetic production and their practical application. This institute was one of the first to prove that the natural biologically active substance - gossypol forms a polymorphic complex, and based on it, more than twenty new medicinal substances and other preparations were developed. Examples of these are 3% gossypol liniment used against viruses, immunomodulator-thymoptin, hemostatic "Lagoden", medicine used against chlamydia "Polinil" and others. and low-gossypol cotton gin production technology has been developed and is used under license in most oil-oil extraction plants of the Republic of Uzbekistan. According to the scientific basis, almost 20% of the total volume of products entering the world market at the beginning of the 21st century will be biotechnological products. Most of the innovations in the field of genetic engineering (biotechnology) in our country are related to plant cells. Genes are inserted into plant cells in different ways: for dicotyledonous plants, a natural vector, i.e. plasmid of agrobacteria, is used, and for monocotyledonous plants, the same method is used, but this method causes some difficulty. In plants resistant to agrobacteria, genes are introduced directly by physical means. Examples of these are: "attack" with microparticles or ballistic method, electroporation treatment with polyethylene glycol, transfer of DNA into liposome and other methods. A mature organism is obtained from a plant cell as a result of work on organogenesis and amplification of seedlings using the above-mentioned methods, and then planting them in the soil. Using such plants in agriculture, it is possible to achieve high productivity, which is economically very beneficial. The work of Professor T.Yu.Yusupov should be specially noted in the field of scientific research on gene transformation in plants. Yusupov managed to isolate plasmid-like structures from the cotton plant. Also, together with his students, he introduced the pCaVItoxneo plasmid into the nodule bacteria of the cotton plant and developed a theoretical basis for obtaining transgenic plants resistant to harmful insects.[8-9] Currently, research is being conducted on the cultivation of transformed callus tissue and cell suspension under selective conditions. But the work being done in our country in the field of genetic engineering is just the beginning of the development of this field. Because there are still a lot of tasks and undiscovered opportunities in front of this industry. An example of this is the tasks facing science: finding solutions to problems related to the prevention of food, energy resources, environmental pollution using modern biotechnological methods, studying the characteristics of living and reproduction of cells in the in vitro system, regeneration, plant Examples include the development of drugs, vitamins, and biologically active substances using cell culture. It should also be noted that antibiotics, amino acids, vitamins and hormones are being developed by genetic engineering, clones of breeding cattle are being created, plant varieties that are environmentally friendly and resistant to pathogenic microorganisms are being obtained, transgenic strains of microorganisms that break down toxic pesticide residues in soil and water are being obtained, genetic diagnostic centers were established for rapid diagnosis of diseases, scientific research laboratories were opened. In this short period of time, genetic engineering has made significant progress and is being improved.[10-11]

Today, biotechnology is a rapidly developing field that has proven to be more effective than classical technologies.

Biotechnology is the foundation of our future life.

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