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METHODS OF GROWING MEDICINAL PLANTS IN INVITRO CONDITIONS

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Abstract
Methods for growing medicinal plants in vitro make it possible to reproduce biological processes in laboratory conditions and control the physiological state of plants. These methods play an important role in changing the genetics of plants, quickly obtaining quality crops and protect ix from harmful diseases. Using in vitro technologies, it is possible to accelerate the propagation of medicinal plants, improve various external characteristics and growth rate.

Keywords: Medicinal plants, Plant cloning, Biotechnology. Plant regeneration, Genetic modification, Plant crops, biological diversification, Plant genetic resources.

Introduction

In vitro methods are methods of propagation and development of plants in laboratory conditions in vitro (that is, in glass containers). In vitro cultivation of medicinal plants has become a hot topic in the field of biotechnology in recent years, generating many scientific studies and practical developments. The relevance and advantages of this method are explained by the following aspects:

1. Biodiversity conservation

Medicinal plants are often collected from nature, which leads to a reduction in their species. Using in vitro methods, plants can be propagated in the laboratory and species can be preserved. This is especially important for medicinal plants that are disappearing or may change rapidly.

2. Quality and fast playback.

With the help of invitro technologies, plants are reproduced qualitatively and uniformly. The genetic identity of the plants is guaranteed (no somaclonal variants). This method also makes it possible to quickly propagate plants and, as a result, helps create sufficient supplies of medicinal plants.

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In vitro quality and fast reproduction 1-jadval

Step	Process	Note
Cell Preparation	Selection of New Cells or Microorganisms	New cells or microorganisms usually need to be collected and purified.
Preparation of the nutrient medium	Preparation of the nutrient medium and the food in which it occurs	The composition of the nutrient medium should be favorable for growth and reproduction.
Inoculation	Placing cells in culture medium	The correct number of cells should be added during the inoculation process.
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Proliferation and	Check cell proliferation and pH conditions	Check cell count and culture growth every 24 hours.
Subculturing	Transplantation of cells into a new environment	If multiplication occurs too quickly, the cells must be transferred to a new environment that ensures the continuity of their growth.
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Factors to consider:

1. Cell type specific media. Each cell type requires specific nutrients and conditions.
2. Check conditions regularly: The crop's pH levels, nutrients and temperature should be checked.
3. Sanitation of containers and equipment: All equipment must be clean to prevent contamination.Bu jadval umumiy tavsiyalarni beradi, ammo maxsus hujayralar yoki mikroorganizmlar uchun o'ziga xos sharoitlar yaratish zarur.

3. Resistance to other conditions

In an invitro environment, plants grow under precise and controlled conditions. Therefore, they can be protected from harmful bacteria, viruses or fungi. This is especially important when growing medicinal plants for disinfection and disease control.

4. Transfer of genetic modifications

Plant genetics can be altered using in vitro methods. This makes it possible to improve valuable biological properties of plants, for example, to increase medicinal substances, disease resistance and other beneficial properties.5. 5.Increased efficiency

In vitro propagation of medicinal plants is more effective than other traditional methods. Many medicinal plants multiply quickly in glass containers, and several generations can be obtained in a short time.**6. Dorivor O‘simliklarni Xalq Use in 6.Pharmaceuticals and industry.**

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Medicinal plants grown in Invitra are suitable for use in the pharmaceutical industry, ensuring consistent quality and high efficiency. Using this method, drug production processes become faster and cheaper.

7. Problems and limitations

Technical complexity: In vitro propagation methods require high technical knowledge and precise laboratory conditions.

Price: Invitro technology may in some cases require higher costs than traditional breeding methods.

Reproductive problems: Varieties of some medicinal plants cultivated in vitro may not grow or reproduce well in the wild.

In vitro plant propagation: an overview

The invitro method refers to the process of growing and propagating plants in laboratory conditions, in an artificial growing environment. In this process, a sample of cells or tissue is taken from a part of the plant (such as a root, leaf, seed, or spore) and placed in a special growing medium. This process is often called plant tissue culture. With the help of in vitro technology, plants can be quickly propagated, grow quickly and produce high-quality medicinal substances.

Methods for cultivating medicinal plants in vitro

Tissue culture method

In plant tissue culture technology, the process of propagation of plant cells or tissues is carried out in laboratory conditions, in a special nutrient medium. In this method, a part of the plant (such as a piece of root, leaf, or seed) is taken and placed in a growing medium.

Methods for growing medicinal plants in vitro.

Tissue culture method

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Propagation: New plants reproduce quickly and many explants are produced.

Hardening: Propagated plants are grown under special conditions (temperature, humidity, light) so that they are ready to grow in open ground. When propagating medicinal plants, this method gives quick results, since many plants reproduce in a short time.

Method of organogenesis (organ formation)

In the organogenesis method, cells taken from plants are stimulated to form completely new organs (leaves, roots, flowers) in a special nutrient medium. To carry out this process, special plant growth regulators (such as auxin and gibberellin) are used.

Organogenesis is especially useful in the propagation of medicinal plants from organs that produce high-quality and active substances.

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Somaclonal variation method

Somaclonal variation is a method of artificially introducing genetic changes into plant tissue or cells. Thus, by changing the genome of medicinal plants, it is possible to obtain plants with new valuable properties. For example, some medicinal plants can be genetically improved to produce high-quality metabolites.

1.Benefits of growing plants in vitro

2. High efficiency. Using the invitro method, plants can be propagated very quickly. This makes it possible to grow medicinal plants in large quantities in a short period of time.

3. Better control of genetic traits. Controlling and improving the genetic characteristics of plants is becoming easier thanks to in vitro technology. It is very important to increase the amount of active ingredients of medicinal plants.

4. Disease prevention. Many diseases, driving disorders and aesthetic conditions can be caused by breeding in factory and laboratory conditions.

5.High quality plants. Plants propagated in vitro are of high quality, grow quickly and help increase the amount of medicinal substances.

6.Universal use. Invitro technology is widely used in the pharmaceutical, cosmetic and food industries. This method can also be used to adapt crops to new areas and conduct scientific research in them.

Applications

Pharmaceutical Industry: Medicinal plants are used in the production of many drugs. Modification and propagation of plants using invitro methods increases the content of active substances in them.

Cosmetics: Medicinal plants are used in the cosmetics industry to create various skin and hair products. High-quality plant material can be produced using in vitro technologies.

Biotechnology and genetic modification: Invitro technologies are used to modify plant genomes and create new plant species.

Summary

Invitro technologies play an important role in the fast and efficient cultivation of medicinal plants. Their reproduction and genetic improvement not only help increase the amount of medicinal substances, but also make it possible to obtain new, more effective plants.

The use of Invito methods opens up great opportunities in the field of pharmaceuticals, cosmetics and biotechnology, and also ensures environmental and economic efficiency. Methods for growing medicinal plants in vitro are of great importance not only from an environmental and economic point of view, but also from a scientific and medical point of view. Effective and widespread implementation of these technologies will improve the quality and quantity of medicinal plant production, save natural resources and ensure environmental stability. Medicinal plants are widely used in the treatment of many diseases in nature, healthcare and cosmetic industries. Today, the pharmaceutical industry and science are searching for medicinal plants and developing new methods for identifying and producing their active ingredients. In vitro plant breeding technology

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(that is, in laboratory conditions) provides innovative approaches to growing such plants. This article discusses methods of growing medicinal plants in vitro, the advantages of this method and areas of application.

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