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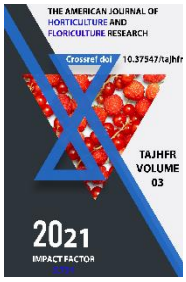

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Introduction Of Endophitic Bacteria Of Plants And Study Of Their Morphological And Cultural Properties

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ABSTRACT

When plants are inoculated with endophytic bacteria, a significant reduction in the harmful effects of pathogenic bacteria and fungi, insects and nematodes has been found [1,4-5]. In particular, endophytic bacteria isolated from medicinal plants form an integral part of their life cycle within plants, biocontrol phytopathogens and reduce their adverse effects [1,6]. Accordingly, one of the medicinal plants, Melissa officinalis endophytic bacteria, was isolated and their morphological-cultural properties were determined as the main goal of the study.

KEYWORDS

Bacteria, Endophyte, Plant, Phytohormone, Microorganism, Bacillus, Pseudomonas, Root, Stem, Leaf.

INTRODUCTION

We know that for many years the meristem tissue of plants was considered sterile. However, it has been found that the conductive tissues of plants contain microorganisms. Most plants have a permanent habitat for bacteria in their roots and leaves, and these bacteria are in symbiosis with the plant. Plants grow quickly, are resistant to phytopathogenic microorganisms. In turn, the plant provides the bacterial cell with the necessary nutrients. Such bacteria are called endophytes. When plants are inoculated with endophytic bacteria, a significant reduction in the harmful effects of pathogenic

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bacteria and fungi, insects and nematodes has been found [1,4-5]. In particular, endophytic bacteria isolated from medicinal plants form an integral part of their life cycle within plants, biocontrol phytopathogens and reduce their adverse effects [1,6]. Accordingly, the main goal of the study was to isolate endophytic bacteria from Melissa officinalis, one of the medicinal plants, and to determine their morphological and cultural properties.

THE MAIN RESULTS AND FINDINGS

While endophytes live long on roots and leaves, the least endophytes are found on stems and fruits. The main reason for this is the abundance of nutrients necessary for the microorganism in the roots and leaves and the convenience of living conditions. Endophytes located in leaves and roots also have the ability to dissolve in water through the outflow and retention currents in the plant. Endophytic bacteria interact with other microorganisms and inhibit plant growth. Endophyte communities can be studied quantitatively and qualitatively.

We used Melissa officinalis as the object of our study. Melissa officinalis is a member of the mint family - Lamiaceae (Labiatae). Representatives of this family consist mainly of annual and perennial grasses, semi-shrubs, shrubs and trees that rarely grow in tropical countries. The stems are 4-sided. The leaves are simple, opposite, without petals. The flowers are arranged in symbiotic inflorescences. The tip consists of 3-flowered dixazii or intricately structured, double-stemmed inflorescences. The flowers are zygomorphic, 5-lobed, inflorescence 5-toothed, sometimes 2-lobed, upper lip 3-leafed, lower 2-leafed. Inflorescence 5-lobed, usually 2-lobed, lower 3-petalled, upper 2-petalled. Changchisi 4 ta. The dust threads are attached to the flower tube. The seed has 2 fruit leaves. The node is upper, 2 cells, each cell has 2 sperm. Rose formula Ca (5),(3+2) Co(2+3) A 4,2 G (2). An early barrier is formed between each seed bud. As a result, the node is divided into 4 parts, similar to those of gavzabondosh. The flowers ripen faster than the proterandria, i.e. the pollinator. The fruit is divided into 4 nuts with one seed. The seed is almost endosperm-free. Pollinated from the outside with the help of insects. The mint family is phylogenetically very close to the system family. The apical root differs in that it faces downwards. Almost all members of the mint family are rich in essential oils. They do not contain milk ducts and potent toxins. Mint is the largest family in the tribe. Its representatives are mainly widespread in countries with hot and temperate climates. This family includes about 200 genera and about 3,000 species. There are 460 species belonging to 53 genera in Central Asia. 210 species of 42 genera grow in Uzbekistan. Peppermint is one of the most common families in Uzbekistan, which differs from other families by its richness in useful species. In particular, from the representatives of such families as Mint (Mentha), Marmarak (Salvia), Kiyikot (Ziziphora), Bozulbang (Lagochilus), Tograyhon (Origanum), Limoot (Melissa), Arslanqulak (Leonurus) have long been used in medicine, food and confectionery used in industry.

Today, one of the urgent tasks is to increase soil fertility and crop yields, ensure plant root development and resistance to various stresses, as well as protect them from various phytopathogenic diseases. In this case, the role of endophytic microorganisms living in the internal tissues of plants, ensuring their growth and development, living in symbiosis with other organisms of the biosphere [1,4,6]. Therefore, in agriculture, plant-microbial symbiosis, i.e. endophytic microorganisms that are part of the vital activity of plants, can live together in their internal tissues and do not

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have harmful effects, is of great interest to many researchers.

Because endophytic bacteria modulate the balance of hormones in plants, synthesize vitamins and indole 3 acetic acid, provide phosphorus nutrition, are directly involved in improving the supply of nutrients to the plant organism, improves their immune system activity and soil fertility, protects against various phytopathogenic diseases and increases their ability to withstand stress [1,6]. The effectiveness of endophytic microorganisms is high in the case of abiotic stresses such as drought, salinity, excessive humidity, low temperature, as well as the content of toxic organic compounds and heavy metals in the soil. Some endophytes have the ability to convert nitrogen and phosphorus to plants in an easily assimilated state. Most importantly, the presence of endophytes in plant tissue indicates that they are effectively resistant to stresses. In addition, endophytic bacteria can synthesize antibiotics. For example, bacteria belonging to the genus Bacillus have been found to synthesize substances such as circulin, colistin and polymyxin [1, 5-6]. Endophytic bacteria belonging to the genera Pseudomonas and Bacillus were identified from the leaf of the pea plant using the method of detection of fatty acids [1, 3-6].

Each of the more than 300,000 plant species on Earth coexists with one or more species of endophytic bacteria. In particular, only endophytic bacteria have been isolated and studied from some plant species today. This in itself is currently finding new species of endophytic bacteria that have a positive effect on plant development, from them opens prospects for creation and production of new generations of effective microbiological drugs used in increase of productivity of agricultural crops [1, 4-6].

Isolation of endophytic bacteria from the plant Melissa officinalis and determination of their morphological and cultural properties.

Endophytic bacteria were isolated from the stems, leaves and roots of the medicinal plant Melissa officinalis. In the separation of endophytic bacteria, the surface part of the roots, stems and leaves of the plant was sterilized, the internal tissue was removed and crushed. The materials under study were thoroughly mixed with separately sterilized distilled water. Bacterial suspensions were cultured in meat peptone agar (GPA) culture medium and incubated for 48 hours at a 370C thermostat. As a result, 7 isolates were isolated from the stems, leaves and roots of the medicinal plant Melissa officinalis. Cultural-morphological features of active isolates of endophytic bacteria were carried out using a general microbiological method. The active isolates were identified using MALDI TOF (MALDI TOF) mass spectrometry.

According to the literature, endophytic microorganisms have been found to be more common in the roots, stems and leaves of plants [1-3]. Because of the abundance of nutrients required for microorganisms in the roots, stems and leaves and the convenience of living conditions for them, endophytic microorganisms located in the leaves and roots of the plant are able to dissolve and move in water through the outflows of plants. Because endophytic bacteria colonize ecological spaces with phytopathogenic microorganisms, they are promising agents for bion control of phytopathogens and they are microorganisms that form part of their life cycle within plants. Endophytic microorganisms live in the internal tissues of plants and colonize their roots. This suggests that endophytic bacteria are biodiversible in the internal tissues of plants [1 - 5].

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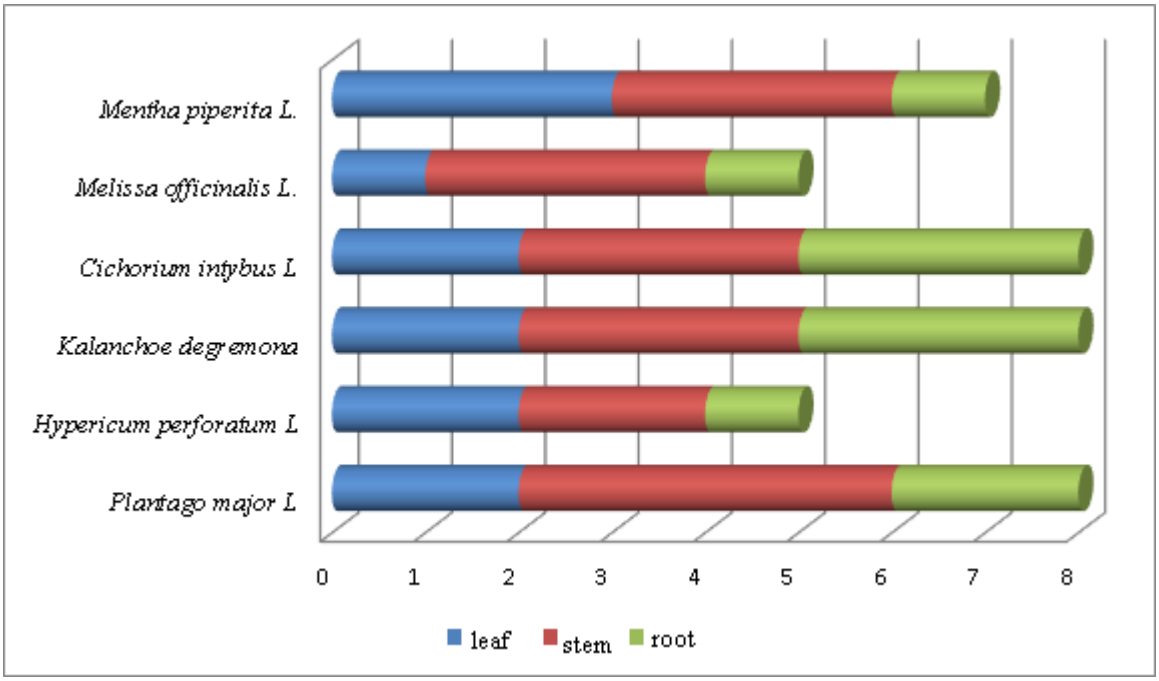
Accordingly, endophytic bacteria of medicinal plants found in the regions of the Republic were studied and medicinal plants such as zubturum, dalachoy, chamomile, sachratki, kalanchoe, lemon, mint were taken as the object. In particular, the biochemical diversity of bacteria living in the internal tissues of plant stems, leaves, and roots was studied (Table 1).

Table 1



Endophytic bacteria of medicinal plants found in the regions of the Republic

According to the results obtained, a relatively higher incidence of endophytic bacteria was observed in the stems and leaves of kalanxon degremona and saccharine plants than in other medicinal plants. Endophytic microorganisms were also found in other medicinal plants in our study (Table 1). Accordingly, one of the medicinal plants, Melissa officinalis, was taken as the object in our study. In the internal tissues of the roots, stems and leaves of the medicinal plant Melissa officinalis, 7 endophytic bacterial isolates were isolated and grown in a meat peptone (GPA) nutrient medium. Considering the biodiversity of endophytic bacteria in the internal tissues of plants, it was found that the medicinal plant Melissa officinalis is found differently in the roots, stems and leaves. According to him, up to 60% of endophytic bacteria were found in the stems, 20% in the roots and 20% in the leaves (Fig. 1).

When studying the cultural-morphological properties of the active isolates isolated from the stems, leaves and roots of the medicinal plant Melissa officinalis using a general microbiological method, some of the isolates are rod-shaped, up to 1.5 x 3 mm, some up to 0.6 x 0.8 mm, spores oval, gram-positive, some were found to be grammatical, mobile.

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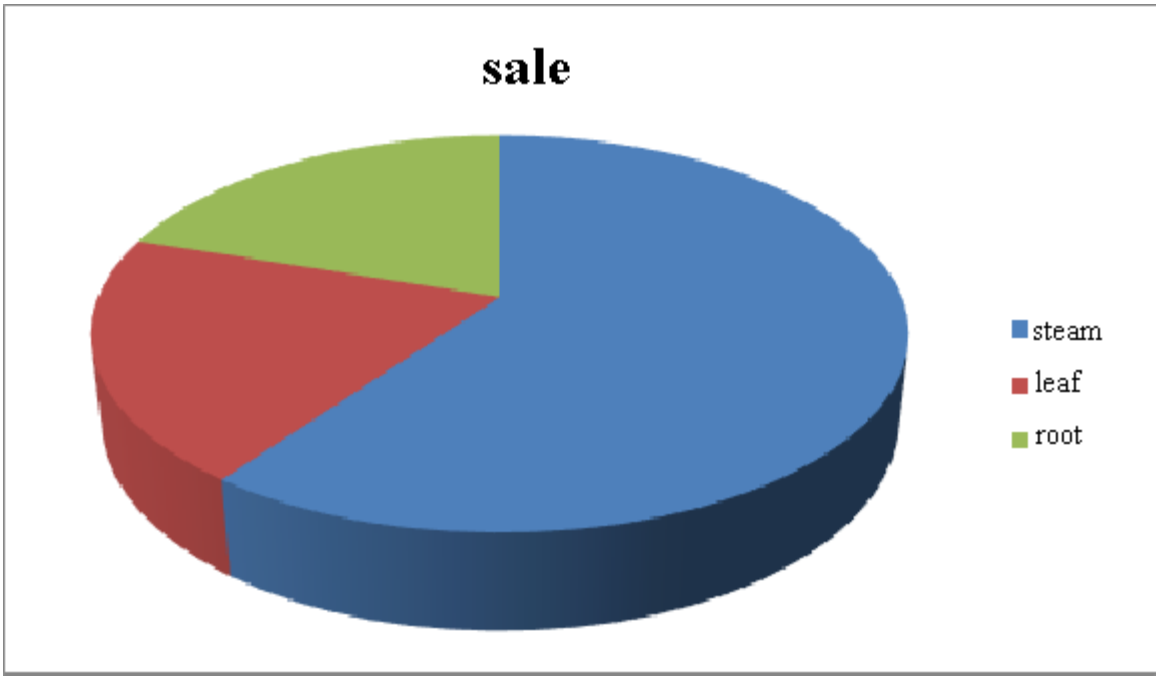

Figure 1. Melissa officinalis is a medicinal plant isolates isolated from stems, roots and leaves

When the meat is grown on peptone agar, the colonies are round, rod-shaped, with smooth or serrated edges, the middle of the colony is convex, some are transparent or white in color, some are white-milky or pale brown, and when grown in a starch-peptone medium, their colonies are round. or rod-shaped, the edges were found to be uneven.

It is known from the literature that Pseudomonas sp., Alcaligenes sp., Enterobacter sp., Acinetobacter sp. and Bacillus sp. such bacteria improve the phosphorus nutrition of plants, synthesize phytohormones, vitamins, indole acetic acid, plants infected with endophytes become more resistant to disease and give high yields. For example, Pseudomonas synthesizes indoliluxic acid in putti and has a positive effect on plant growth and development, while Bacillus subtilis produces gibberellin, which has also been studied to have a positive effect on plant life [1, 5]. Therefore, the active isolates isolated from the roots, stems, and leaves of the MELISSA OFFICINALIS medicinal plant were identified using mass spectrometry. The results of the study show that according to the morphological characteristics of the isolated isolates, the isolates were identified using the mass spectrometry method MALDI TOF (MALDI TOF) and in Pseudomonas puti, Bacillus amyloliquefaciens ssp. Plantarum, Klebsiella pneumoniae, Bacillus subtilis. Hence, the results obtained indicate the biodiversity of endophytic microorganisms living in the internal tissues of plants.

CONCLUSION

Thus, endophytic microorganisms allow plants to grow and develop rapidly, protect against insects and diseases, and create plant varieties that are adapted to adverse conditions. Endophytes form mycelium in the rhizosphere of higher plants and in the spaces between cells in the stem, and unlike pathogenic species, interact with the host plant and are a key factor in the plant's adaptation to external environmental conditions.

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According to the above data and the results obtained, endophytic microorganisms living in the internal tissues of plants are biodiversity, and isolates isolated from roots, stems and leaves of the medicinal plant Melissa officinalis were identified by MALDI TOF (MALDI TOF) mass spectrometry and Bacillus amyloliquefaciens. Plantarum was found to belong to the genus Bacillus subtilis.

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