



COMPARATIVE EVALUATION OF THE MICROBIOME IN THE RHIZOSPHERE OF SOME DECORATIVE PLANTS

Ciochia Anamaria – Elena, Strugari Sebastian-Cristian, Jianu George-Sebastian, Popescu Sorina,
Borozan Aurica

Abstract

University of Life Sciences "King Michael I" from Timisoara, Timișoara, Calea Aradului
119, 300645, Romania

Results and discussions

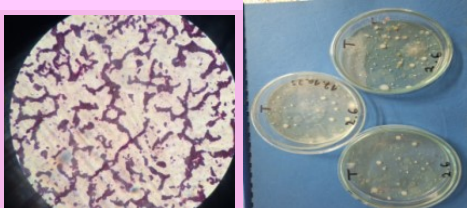
Decorative plants interact with the soil microbiome through their roots. The influence is bilateral. Plants select their microbiome through the compounds released in the rhizosphere. The microbiome, in turn, can stimulate the growth of plants and protect them from phytopathogens. This paper highlights the microbiome present in the rhizosphere of decorative plants dieffenbachia, aloe vera and cactus. The microbiome study was performed on specific media. The number of bacteria, actinomycetes and molds varied depending on the plant. The smallest number was represented by molds. Some identified mold species are considered phytopathogenic. Bacteria dominated in the rhizosphere of plants. The diversity of bacteria and actinomycetes was reduced.

Introduction

Ornamental plants occupy generous spaces inside houses and apartments, but they are also sources of income for floriculture enthusiasts in our country and abroad. Plant roots help grow the soil microbiome (Chauhan et al., 2023), which in turn has a significant influence on plants. In the case of decorative plants, there are many physico-chemical analyzes that follow the nutrient level of the soil and very little the microbiological aspects. In the present study, an evaluation of the microbiome in the rhizospheric zone of three ornamental plants cactus, aloe vera and dieffenbachia is made, in order to highlight the microbial differences recorded between the microbiome in the soils influenced by the roots of the three plants and possible phytopathogenic microorganisms in the area of interference of microorganisms with the plants. This is very important because the microbiological parameters highlight even the smallest imbalances that appear in a soil.

Material and method

The material is represented by 3 soil samples influenced by three decorative plants: dieffenbachia, aloe vera and cactus. The three decorative plants were grown in pots on the same type of soil. The plants were kept in the greenhouse. The soil samples come from the first centimeters of soil (0-20 cm), from the area of influence of the plants. The plants were watered weekly, with the exception of the cactus, which was watered once a month. Isolation of microbial groups and identification of dominant species was carried out on specific nutrient media and with the help of appropriate identification keys. The growth of cultures of bacteria, actinomycetes and molds took place after 24 hours, respectively 5 days for the last two microbial groups.



Conclusions

Plants influence the community and diversity of microorganisms in the soil. Although the number of molds in the rhizosphere was very reduced, some phytopathogenic species were observed among them. Pathogenic microorganisms can compete with them nutritionally and make them sick. Knowing the microbiome helps us find ways to transform the rhizosphere into an advantageous area for plants.

In figure 1, the three groups of microorganism (bacteria number $\times 10^6$; actinomycetes number $\times 10^4$; moulds $\times 10^3$) analyzed are highlighted. The structure of the microbial community in the rhizosphere of the three plants differs. The number of bacteria dominates compared to actinomycetes and molds. The highest number of bacteria was observed in the dieffenbachia rhizosphere, followed by aloe vera and cactus. Among the three groups of microorganisms, molds are found in the smallest number. They are absent in the cactus rhizosphere. Actinomycetes dominate in the rhizosphere of aloe vera plants.

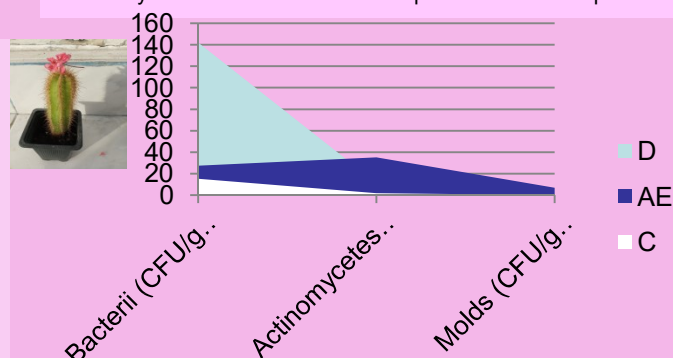


Figure 1 The evolution of microbial groups in the rhizosphere of ornamental plants

Legend: D- dieffenbachia; AE-aloe vera; C-cactus

Table 1 Bacterial and *Streptomyces* species highlighted in the rhizosphere of ornamental plants

Sample	<i>Streptomyces</i> species
D	<i>S. coerulescens</i>
	<i>S. griseus</i>
	an unidentified species
AE	<i>S. albosporus</i>
	<i>S. nigricans</i>
	<i>S. helvolus</i>
	two unidentified species
C	<i>S. albus</i>
	<i>S. nigrescens</i>
	<i>S. aureus</i>

Sample	Bacteria species
D	<i>Arthrobacter globiforme</i>
AE	<i>B. cereus var. mycoides</i>
	<i>Arthrobacter sp</i>
	<i>A. globiforme</i>
	<i>B. cereus</i>
C	<i>Pseudomonas sp</i>
	<i>S. lutea</i>
	Neidentificat

Bacterial diversity was reduced. *Arthrobacter globiforme* and *Arthrobacter sp.* dominates in the rhizosphere of dieffenbachia and aloe vera plants. In the soil influenced by aloe vera, in addition to *Arthrobacter* species, were highlighted *Bacillus cereus*, respectively *B. cereus var. mycoides*. In the area influenced by the cactus roots, pseudomonaceae dominated, followed by *Sarcina lutea* and a species that has not yet been identified. The diversity of actinomycetes was reduced to a few species. *Streptomyces albosporus* was highlighted in the highest number in the aloe vera rhizosphere. The species that dominated compared to the other species was *S. albus*. *S. nigrescens* was the only species present both in the soil influenced by aloe vera and in the soil influenced by cactus. In the soil influenced by dieffenbachia, only two species were observed, of which only one was identified (*S. coerulescens*) (table 1).