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RHIZOSPHERE BACTERIA FOUND IN THE PLANT ROOT AND THEIR ACTIVITY IN THE SOIL

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Abstract: Species representatives such as Acetobacter, Agrobacterium, Alkaligenes, Arthrobacter, Azoarcus, Azomonas, Azospirillum, Azotobacter, Bacillus, Clostridium, Derxia, Herbaspirillum, Enterobacter, Erwinia, Klebsiella, Pseudomonas occur in the plant rhizosphere. Since the rhizosphere contains an area very close to the root of the plant, it is the part Rich in nutrients, where the activity of microorganisms is highest.

Keywords: Rhizosphere, photosynthesis, exudate, population, microorganism, associative, mutualistic, symbiotic, desorption, PGPR, stress, phytopathogenic.

Introduction: When 30% to 60% of the carbon compounds produced by photosynthesis reach the root, nearly 49% of these can be released as root exudates or lost due to the root's use for the respiration process. *Root exudates are rich in nutrients and include polysaccharides, proteins, mucus,* amino acids, organic acids, carbohydrates, vitamins, fatty acids and steroids, nucleotides, enzymes and other components that are high and low molecular compounds, as well as CO2, molecular hydrogen, protons, hydroxides, etc [1; 365-b.]. The divergence of root exudates along the length of the STEM is not uniform: their maximum number can be found in the youngest parts of the stem, that is, in the apex-apex of the root and in the parts where the primary and secondary root are located [2; 330-b.] . Thus, the rhizosphere is a complex space that changes along the longitudinal and radial (nursimon) direction of the root-gradient according to its physicochemical and biological properties and, as a result, affects the development of microbial communities.[3; 74 P.]. Due to its rich content of nutrients, the density of microorganisms in it can be two to three times higher than in the surrounding soil. Among the populations of Pseudomonas bacteria that participate in the colonization of the root rhizosphere, there can be relationships of different types, that is, associative, mutualistic, symbiotic or harmful to the host organism, pathogenic. The specificity of the genes and proteins responsible for the successful activity of bacteria in the root is well studied on the example of a number of Pseudomonas bacteria. They are involved in attachment to the biotic surface and formation of biofilm [4; 118-b.], which includes proteins involved in metabolism processes as well as in the synthesis of specific proteins.

In the scientific literature, rhizosphere bacteria that stimulate plant growth and development are called PGPR (plant growth –promoting rhizobacteria) by the common name, i.e. plant - plant from English, growth - growth, promotion - stimulation, rhizobacteria - rhizosphere bacteria, i.e. root environment bacteria that accelerate plant growth and Development [5; 571-b.]. Common characteristics for rhizosphere bacteria (PGPR) that accelerate plant growth and development are as follows:

1. feature of survival after inoculation to seeds;

2. reproduction in the spermosphere (part on the surface of the seed) as a response to root exudates;

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3. is a solid fixation of the root along the surface and colonization of the growing root system [6; 1477-b.].

PGPR colonizes the rhizosphere of a wide range of agricultural crops and is involved with direct or indirect mechanisms in stimulating plant growth and development, reducing the number of phytopathogens, and increasing resistance to stress

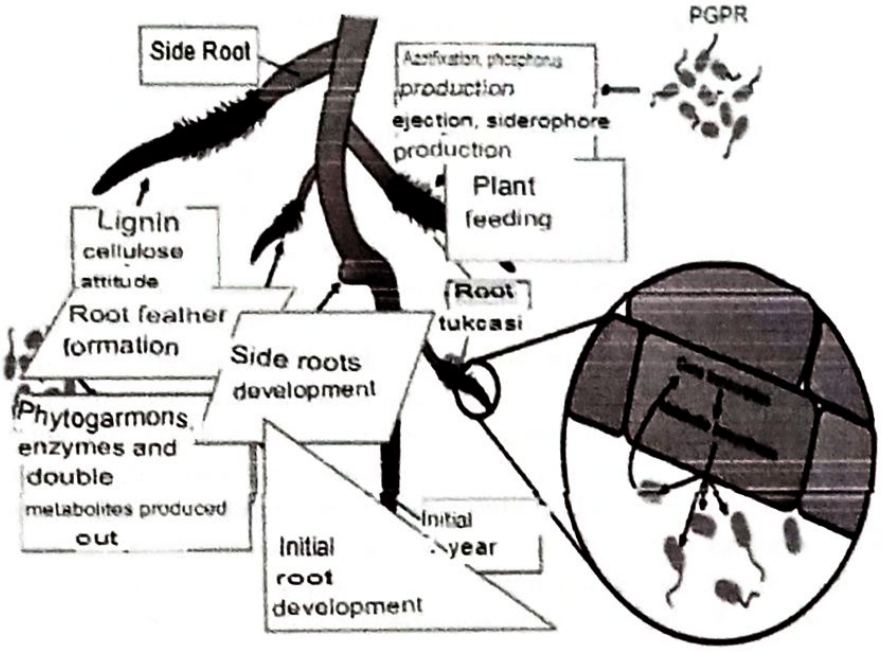

Figure 1.1. Of the main mechanisms of activity of rhizobacteria

schematic expression (figure [198: 3 B] from).

factors.

Figure 1. Schematic expression of the main mechanisms of activity of rhizobacteria

Materials and discussion: The necessary stage of preparatory work for the microbiological analysis of samples is the desorption of microorganisms from soil particles and root surfaces. The methods used by different authors for this purpose, as well as the actual methods of dividing the root zone, are not combined and, therefore, from manual shaking to tissue treatment with an ultrasonic disperser, there are many different options. In sterile water (1-5 g in 100 ml of water), a sample of plant material can be strongly shaken and microorganisms can be desorbed from the root surface. Some researchers argue that it is not in water, but in saline solutions, Ringer's solution or buffer solutions that are shaken. Once microorganisms have been isolated from the rhizosphere soil, the solutions are typically used for further analysis by multisubstrat assay or gene analysis. The ratio of the sample used in the work of various researchers (from 0.1 to 10 g) and the volume of the washing liquid (from 50 to 100 ml) differ.

Among other simple and convenient ways to pre-clean samples of rhizoplana, rhizosphere and soil itself (edaphosphere), a method such as pre-rubbing roots or soil can be used. According to the Tepper method, before planting, the suspension with rhizosphere soil was shaken for 5 minutes.

If the most complete desorption of microbial cells from the surface of plant tissues and soil particles is required, various automatic shakers and homogenizers are used. Before planting in the work of Garcia and others, the root suspension was treated with 4 mm glass beads for 10 minutes.

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In their studies, micro-organisms were also successfully used to chew roots in a MWP-type tissue grinder (7000 rpm) for 25-30 minutes in a flask Shaker (150 rpm) containing samples for desorption of desorbed Micromycetes from Root and soil particles by treating roots in a MWP-type tissue grinder (7000 rpm) for 3 minutes, treated 1-3 times in sterile water in an RT-2 tissue grinder (5000 rpm) for 5 minutes. However, such dispersion was often not enough to fully account for bacteria.

Results: Taking into account the specific soil climatic conditions of Uzbekistan, scientifically based and economically efficient Biotechnology, the use of active microbial collections (populations)to increase soil fertility and plant productivity, improve the phytosanitary condition of agroeconomists is considered an urgent problem in the cultivation of agricultural crops. In finding its solution, biotic (biotic factors associated with living organisms as well as abiotic factors, taking into account the quantitative and qualitative composition of microbial senoses, require methodological approaches adapted to the conditions. To do this, it is recommended to use in a complex way antagonists of microorganisms with high multifunctional activity and strong survival and competitive properties in natural conditions, or their associations. There are various methods of studying rhizosphere bacteria found in plant root, and in microbiological studies, when studying microorganisms in plant root zone, a mixed sample of rhizosphere soil with Root is taken and placed in a sterile water flask for further analysis. The root zone begins with the most fundamental of microbiological studies based on the differentiation of the rhizosphere, rhizoplan (root surface) and endorhizosphere (internal root tissue). The division of the rhizosphere and rhizoplan zones is also common. For example, Zhebrak, and others. at a distance of up to 3 mm from the root, a layer of soil washed in a container with sterile water (at a pressure of 200 atm , 3 minutes) was considered a rhizosphere, and the roots after the rhizosphere was mechanically removed. considered a rhizoplan. Two methods of separating the rhizosphere and rhizoplana are often used: washing the roots from adjacent soil particles and separating the rhizosphere soil without washing. The latter method is mainly used for the purpose of extracting micromycetes. Sequentially washing the roots according to the method of Tepper et al. includes the following operations: tubers are placed in flasks with 100 ml of distilled water and rinsed for 2 minutes (14). With the help of a sterile hook or tweezers, the roots are removed from the flask and transferred to another container with 100 ml of distilled water. The procedure is repeated, the roots are washed in seven consecutive bottles (2 minutes each). Before sterilization in the last (seventh) flask, it is better to add 5-7 g of sand to the water. After the first washing, the suspension is perceived as an example of the rhizosphere. The contents of the remaining six flasks are poured together and taken as a rhizoplan sample.

Conclusion: As can be seen from the materials presented in the review, there is an increasing interest in the rhizosphere as a zone of maximum concentration and functional activity of soil microorganisms. This was manifested, first of all, in the development of various methodological approaches to the study of microbial communities in the root zone of plants. Thanks to the development of methodological support, research is gaining new aspects related to expanding our general understanding of the laws of the organization of soil microbial associations, as well as solving a number of practical problems of Agriculture and Environmental Protection. As a result, several dozen techniques and methods have been proposed that make it possible to carry out a quantitative and qualitative assessment of microorganisms in the root zone of plants. However, none of these methods have been universally recognized and disseminated. Currently, there is no standard method of isolating bacteria associated with the root zone of plants. Methods for comparing microbial biomass in the rhizoplana, rhizosphere and edophosphere are not standardized. The rate of

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microbial growth in the rhizoplan, rhizosphere and controlling soil, as well as the rate of their migration and death, remains unknown.

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