International Journal of
Biological Engineering and Agriculture

ISSN: 2833-5376
Volume 2 | No 6 | jun -2023

Isolation of Rhizobacteria from the Cotton Rhizosphere in Medium Salinity Soils and Creation of a Basis for the Preparation of the Preparation (in the Example of Yazyovon District, Fergana Province)

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Annotation: In this article, special attention is paid to immobilizing cells of microorganisms on various carriers in agriculture today, determining the possibilities of maintaining the physiological properties of immobilized rhizobacteria, forming a new generation of multifunctional high-efficiency biopreparations in the form of dry powder that keep their properties stable, as well as developing a biotechnological strategy for managing biochemical processes in the soil. is being given [5,7,8].

Also, the effectiveness of biopreparations based on rhizobacteria, which accelerate the growth of agricultural plants, was determined.

Keywords: microbiological preparations, flocculant, microorganism, rhizobacterium, biological agent, Bacillus genus, culture, enzyme, stress factors, secondary metabolites, immobilization.

Introduction

The agrarian sector occupies a large part of the economy of our republic, and it is necessary to solve the problems of agriculture. Soil fertility and productivity in the agricultural fields of our republic is one of the future promising results [2,3]. Choosing an effective biological agent as a basis for a biopreparation and the correct selection of an adsorbent-filler is one of the main decisive problems in the development of effective preparations based on living microorganisms [1,4].

In our republic, it is a very responsible task to prevent soil poisoning, water pollution, and extinction of rare plants and animals. One of the main problems in agriculture today is the degradation of soil fertility. Primarily to prevent chemical contamination and salinity, which in turn directly affects productivity. In addition, considering that the quality of agricultural products depends on the quality of the soil and the importance of improving the ecological condition of the soil [5].

In some economically developed countries, a new system of agriculture - sustainable agriculture and organic farming - is being introduced. Its main principles are based on the partial or complete replacement of mineral fertilizers and chemical pesticides with biological ones. Due to the high demand for ecologically safe food products in the countries of the EH organization (market demand in the volume of 100 billion dollars) and in order not to pollute the environment, about 10% of enterprises in Europe have switched to a new system of growing plants [6,7].

RESEARCH METHODS

Rhizobacteria is one of the potential and brilliant tools in creating sustainable agricultural practices and maintaining existing traditions. Therefore, it is necessary to find out whether it is possible to use

the beneficial properties of any bacteria, taking into account the various conditions of the environment and the characteristics of plants. Development of dry powder forms of microbiological preparations [5,6].

When it comes to the effective use of biopreparations intended for various purposes, special attention should be paid to the problems of developing their preparation form, that is, the need to develop high-tech processes that preserve the stability and activity of the preparations.

Local types of microorganisms play a special role in improving soil fertility. They have a significant positive effect on increasing plant productivity and soil fertility

In order to determine the effect of microorganisms inoculated with Hypan on seed seeds, it was determined by the method of inoculation by diluting the suspension of Hypan biopreparation in water at a ratio of 1:1000 to a special cassette. Colonization of rhizobacteria on cotton seedlings in microvegetative and vegetative experiments was carried out according to the general methods developed by I.K Kurdish and others [3,4].

he seed was depilated and sterilized by keeping it in concentrated sulfuric acid for 5 minutes. Then, they were washed 5 times with sterile water and cultivated for 48 hours at a temperature of 28^0C in moistened sterile Petri dishes.

The grown seeds were bacteriized for 1 hour with a suspension of rhizobacteria grown in meat peptone broth and diluted to the level of 10-7 KHB/ml.

When carrying out experiments in field conditions, a working solution was prepared by mixing the composition of microorganisms with water in a ratio of 1:1000. Before planting, the seed was treated with a suspension of the drug (12.0 liters of hairy seed and 10.0 liters of hairless seed per 1 ton of the working solution). During processing, the seeds were cooled for 1-2 hours. The seed was dried in a cool, direct sunlight place and then planted.

During the cotton vegetation, the soil was treated by spraying the working solution in the amount of 500-600 l/ha.

The analysis of vegetative experiments was carried out during the period of seed germination, leaf emergence, tillering, flowering pods. Biometric parameters were compared to the control variant in terms of main stem length, sympodial branches, bracts, flowers, pods and number of opened pods [11,12].

RESEARCH RESULTS AND THEIR ANALYSIS

It is known from the scientific literature that plants tolerant to stress factors have many mechanisms that help to stimulate metabolic processes and limit the effects of stress factors.

According to the literature, it has been shown that the amount of osmoprotector has increased in microorganisms resistant to salinity, and based on them, technologies for the preparation of dry bacterial preparations resistant to NaCl have been created.

It is also worth noting that until now in the agricultural practice of our country monoculture of microorganisms was used to harvest vegetables, but in this study, the use of complex cultures and their effectiveness were tested in the conditions of different salinity soils of Fergana region (Table 1).

Based on several years of screening, strains resistant to chlorine and sulfate salinity (up to 200 mM) were selected from the cotton rhizosphere, it was determined that they belong to *Bacillus subtilis*, *Bacillus megaterium*, and *Pseudomonas stutzeri* species, and a biotechnological basis was formed for the production of the complex "Zamin-M" biopreparation. It was found that domestic strains included in the biopreparation "Zamin-M" show a high level of synthesis of indolyl acetic acid (ISA) even under stress conditions (ph-9).[7,8].

Table 1 Description of the salinity of the irrigated lands of Yozyovon district, Fergana region2022 year

№	Array name	Watered gan land area, ha	By degree of salinity										Field, ga		Including moderately and strongly salted		
			unsalted		weak		average		strong		very strong		saline lands, ha		in relation to the total irrigated area		relative to the total salinity area
			ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	%
1	Uzbekistan	1387,0	546,9	39,4	636,6	45,9	203,4	14,7	-	-	-	-	840,1	60,6	203,4	14,7	24,2
2	Xonobod	1589,3	462,4	29,1	132,0	8,3	575,7	36,2	419,2	26,4	-	-	1126,9	70,9	994,9	62,6	88,3
3	Gulistan	3101,4	237,9	7,7	355,5	11,5	1850,4	59,7	657,6	21,2	-	-	2863,5	92,3	2508,0	80,9	87,6
4	Ishtirxon (Yokubov)	637,6	423,0	66,3	146,3	22,9	45,2	7,1	23,1	3,6	-	-	214,6	33,7	68,3	10,7	31,8
5	Chuliguliston	671,6	325,8	48,5	345,8	51,5	-	-	-	-	-	-	345,8	51,5	-	-	-
6	Yangiobod (Z.Ganiyev)	1509,5	307,5	20,4	58,0	3,8	747,1	49,5	397,0	26,3	-	-	1202,1	79,6	1144,1	75,8	95,2
7	Yangi buston (Sh.Rashidov)	1560,8	600,3	38,5	314,7	20,2	645,8	41,4	-	-	-	-	960,5	61,5	645,8	41,4	67,2
8	Pir Maxmud (Korasokol)	1172,4	608,4	51,9	224,0	19,1	340,0	29,0	-	-	-	-	564,0	48,1	340,0	29,0	60,3
9	U.Toshboyev	1251,1	260,4	20,8	366,2	29,3	300,9	24,0	323,6	25,9	-	-	990,7	79,2	624,5	49,9	63,0
10	Koratepa	1893,8	478,5	25,3	226,0	11,9	722,6	38,2	466,7	24,6	-	-	1415,3	74,7	1189,3	62,8	84,0
11	Katortol	1463,2	-	-	-	-	448,2	30,6	1015,0	69,4	-	-	1463,2	100,0	1463,2	100,0	100,0
12	I.Yusupov	1363,3	382,9	28,1	402,1	29,5	524,4	38,5	54,0	4,0	-	-	980,5	71,9	578,4	42,4	59,0
Total by district:		17601,0	4634,0	26,3	3207,2	18,2	6403,6	36,4	3356,3	19,1	-	-	12967,0	73,7	9759,9	55,5	75,3

CONCLUSION: Globally, salinity is one of the major threats to agricultural production. Nevertheless, the issue of using saline lands to meet the food needs of the growing population is urgent, and the viability and functional properties of immobilized cells have been determined. The technology of obtaining the dry preparation form of "Zamin-M" biopreparation immobilized with flocculant has been developed and implemented.

The ability of soil rhizobacteria to accelerate the growth and development of plants in conditions of salinity stress has been providing great benefits in the field of sustainable development of agriculture in the whole world.

It consists in developing an optimized technology for extracting concentrated microbial biomass from the culture liquid, obtaining the immobilized form of the biopreparation, and obtaining the dry form of the biopreparation. As a result of the research, it was determined that the bacterial isolates isolated from the conditions of saline soils belong to the genus *Bacillus sp*. improving the production technology of dry powder form immobilized with Hypan flocculant "Zamin-M" biopreparation, which increases the productivity of saline soils, will bring great results.

As a result, the effect of the Zamin-M biopreparation inoculated on Hypan showed high results in seed germination, root length, stem length, average dry mass (Fig. 1). [9,10].

Figure 1. Fertilization status of cotton seed as affected by Hypan flocculant

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