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EFFECT OF METABOLITES OF THE TRICHODERMA VIRIDE H13 MUSHROOM STRAIN ON THE GROWTH, GROWTH AND GROWTH OF GROWN SEEDS

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Abstract: Add one line about the importance of cotton. Add one line about the imporatance of Trichoderma viride. Add the mathods which were used in this study.

In the current study, the impact of metabolites of fungus strain Trichoderma viride H13 was investigated on germination energy, germination and cotton seed growth power. Also, given information on action of different development of cultural substance by all indicators Trichoderma viride H13 and indole-3-acetic acid (IAA) auxin in different concentration on cotton seeds.

Keyword: Cotton, biological control and Trichoderma spp

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Introduction

In the recent years, in the Republic of Uzbekistan, the biological method of protecting plants against distractive pathogenic (fungal) diseases has been applied in all branches of agricultural production in growing crops of both technical and food purposes, in particular in vegetable growing, gardening and plant growing. Around the world, many scientists attach great attention to the environmentally friendly biological method of dealing with their diseases (Ref). However, the metabolites secreted by the antagonist fungi have not yet received the attention they deserve, since on the basis of them it is possible to create new highly active ecologically pure biological preparations (reference).

There have been many investigations about the small, studied antibiotic activity of metabolites of the fungus of the genus Trichoderma in various regions

of the world (reference). Sharikov (2011) has confirmed that systematic studies of the biological activity of strains of fungi of the genus Trichoderma, isolated in Central Siberia, and the study of their metabolites in relation to conditionally pathogenic and pathogenic microorganisms were not conducted in the proper amount. It has been confirmed that metabolites and extracts of imperfect fungi have biological activity (Chkhenkeli, and Others 2001). Biological preparations contain living cells of fungi, bacteria, spore structures, as well as their metabolic products, phytohormones, fungicidal and immunizing components that actively suppress a wide range of pathogens (Popo et al., , 2016).

Purposeful search for species with regulatory activity in relation to organisms from different taxa, as well as identifying among them producers for biotechnological production is impossible without a clear understanding of their distribution in ecosystems and the manifestation of functional properties in these conditions. Created collections based on new active strains can be a potential for selecting strains of fungi of the genus Trichoderma and using them in various fields of biotechnology, agriculture and plant growing (Sadykova, 2012).

Alimova (2005) has proved that confirmed that, the genus Trichoderma is one of the most studied in the field of mycology due tothe its great practical and ecological significance of the genus. The species of the genus Trichoderma are able to produceddifferent types of enzymes (cellulases, chitinases, pectinases, xylanases and serine-dependent proteinases,) which plays an important role in the pulp and paper and food industry, in the production of detergents and and in the conversion of waste containing cellulose for biological soil cleaning and for composting waste (Harman et al., 2004.), in obtaining feed preparations. On the basis of antibiotics, toxins, enzymes of fungi of this kind, preparations are obtained for the biological control of diseases and the stimulation of plant growth, the production of transgenic plants (Harman et al., 2004; Grinko, 2004; Gromovs, 2002; Sidorova, 1980;). From the literature it is known that many strains of Trichoderma spp. have a stimulating effect on plants, however, different strains may have a different mechanism of action: release of stimulating phytohormones or other hormone-like stimulants into the environment, stimulation of plant production of phytohormones by themselves and a number of others (Stewart and Hill, 2014).

The current study was designed to investigate the ability of strain Trichoderma viride H13 to stimulate plant growth and development.

Material and methods

Stimulating phytohormones, such as: auxin, cytokinin and gibberellin, are known to increase the germination of seeds that have

initially decreased germination. Therefore, for comparison, these phytohormoneswere used in these tests. In our experiments, we used cotton seeds of the Bukhara-8 variety with high germination (95%) and Kelajak seeds with low germination (50%).

For the experiments, the filtered culture medium (sulfuric acid hydrolyzate BVK 70 mL, glycerin 30 mL; dibasic potassium phosphate 0.5 g, potassium phosphate monosubstituted 0.5 g, magnesium sulphate 0.25 g, ammonium sulphate 3 g, sterile distilled water 1 L) was used, after growing the mycelium and spores of the studied strain in it. As a control, a freshly prepared culture (intact) medium was used. Mean values from 6 experiments ± mean deviation are presented.

Results

The results of this experiment are presented in table No. 1. Graph 1 and 2.

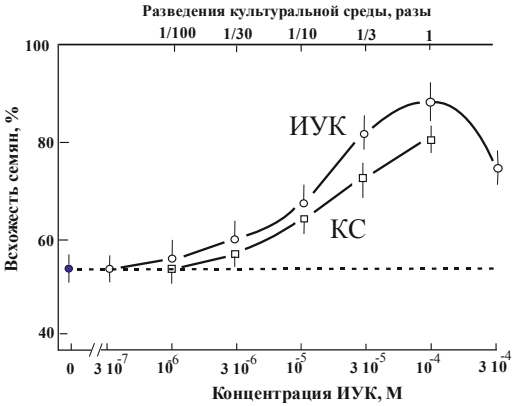
As can be seen from table No. 1, the effect of different dilutions of the medium in all indicators, such as germinating energy, germination and growth force were close when the values after cultivating Trichodermaviride H13 and auxin (Table 1 and Graph 1 &2) IAA Trichodermaviride strains in various concentrations on Kelajak cotton seeds were compared having reduced germination. IAA solutions were prepared on an intact medium, and the pure intact medium was lagging behind in all respects. The table presents the mean values of 6 experiments ë mean deviation.

Table №1

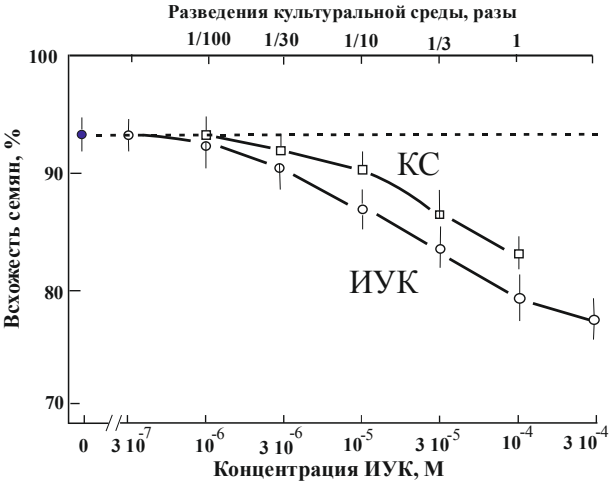
Solutions	Concentration	Energy of germination (number of germinated seeds on 2nd day)	Germination (number of germinated seeds on 7th day)	Power of growth (the number of germinated seeds through 3 cm of sand on 5th day)
Intact medium		49,4 ± 4,7	55,4 ± 4,8	43,2 ± 4,4
Medium after fungi propagation in dilution	1/100	48,2 ± 4,6	55,7 ± 4,3	52,7 ± 4,1
	1/30	51,6 ± 4,9	59,4 ± 3,5	52,2 ± 4,6
	1/10	57,1 ± 3,8	65,2 ± 3,9	59,9 ± 4,5
	1/3	63,8 ± 4,1	73,3 ± 4,4	51,1 ± 4,5
	1	72,5 ± 3,3	80,6 ± 4,4	61,8 ± 4,6
IAA in intact medium	$3\ 10^{-7}$ M	46,5 ± 4,7	57,7 ± 3,8	49,1 ± 4,0
	10^{-6}M	49,5 ± 3,7	58,3 ± 3,5	54,4 ± 3,9
	$3\ 10^{-6}$ M	57,7 ± 3,9	61,5 ± 4,5	54,7 ± 4,4
	10^{-5} M	58,2 ± 4,8	67,5 ± 3,4	57,8 ± 4,5
	$3\ 10^{-5}$ M	80,8 ± 4,1	83,3 ± 4,9	76,9 ± 4,0
	10^{-4} M	75,2 ± 4,3	89,4 ± 3,8	77,5 ± 3,6
	$3\ 10^{-4}$ M	59,6 ± 4,5	77,1 ± 4,9	60,9 ± 4,1

The effect of various dilutions of the medium (Graph 1) after the cultivation in it of the Trichoderma viride H13 strain and auxin IAA in various concentrations on the germination of cotton seeds of Kelajak variety with low germination. Solutions IAA prepared in an intact environment. On the graph, the maximally acting undiluted medium was conventionally equated to the maximally effective concentration of IUK - 10-4 M. The dotted line indicates the germination rate in the intact environment.

Graph 1



Graph-2



The effect of different dilutions of the medium (graph 2.) after the cultivation in it of Trichoderma viride H13 strain and auxin IAA in various concentrations on the germination of cotton seeds of the Faravon variety with high germination. Solutions IAA prepared in an intact environment. On the graph, the maximally acting undiluted medium was conventionally equated to an IUK concentration of 10-4 M. Mean values from 6 experiments are presented ë mean deviation).

As can be seen from the table and graphs, the medium after cultivating the Trichoderma viride H13 strain in it, Trichoderma viride H13, stimulated the germination of cotton seeds with reduced germination and inhibited the germination of seeds with high germination. In the same way acted on the germination of these seeds IAA solutions. This suggests that the culture medium may contain components with hormone-like action. Therefore, in further experiments, the effect of the culture medium was tested in physiological tests for stimulating phytohormones.

Discussion?

Conclusions.

Metabolites of the strain of the antagonist mushroom Trichoderma viride H13 have the ability to stimulate the growth and development of plants due to the release of stimulating metabolism producers.

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