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INFLUENCE OF WATER EXTRACT OF VERMICOMPOST ON GERMINATION TOMATO SEEDS

[1]T. R. Madjidova,[2]D. E. Nurmuradov
Samarkand State University 140104 Uzbekistan, Samarkand, University Boulevard 15[1,2]
zarina9393@inbox.ru

ANNOTATION

This article discusses the definition of the influence of biohumus norms on the agrochemical index of soils when used together with mineral fertilizers, the effect and aftereffect of biohumus on growth processes, and the formation of tomato crops when used together. Study of the effect of vermicompost on the content of NPK in the vegetative organs and chemical composition of tomato fruit, the optimal dose of the vermicompost in greenhouses, determination of economic efficiency of application of vermicompost for growing tomatoes in greenhouses.

Keywords: tomato, vermicompost, mineral fertilizers, agrochemical properties of the soil, yield, NPK content.

INTRODUCTION

The most important task of agriculture in Uzbekistan is to better meet the needs of the population in food. A significant place in solving this problem is occupied by increasing the production of vegetables, expanding their range, increasing yields and improving quality. Therefore, meeting the needs of the population of the Republic with fresh and environmentally friendly vegetable products in the winter and spring period of the year is one of the important and urgent problems.

It is known that vermicompost is a natural high-humus raw material, which in its physiologically active state contains humates and fulvates of sodium and potassium, amino acids, vitamins, natural phytohormones, etc. These compounds can actively influence the germination and germination energy of seeds, stimulate root formation in plants,and so on. If the majority of researchers were limited to studying the effect of mineral and organic fertilizers on the yield of vegetable crops, the question of the influence of vermicompost on the germination and germination energy of vegetable seeds remains insufficiently studied. Therefore, the purpose of this work was to study the effect of vermicompost extracts on the germination and germination energy of tomato seeds.

METHODS

The source material was used for tomato seeds hybrid F1, verlioka TmCF.

Vermicompost, for 6 weeks, was brought to an air-dry state, and then crushed and sifted through a 2 mm sieve. Then distilled water was added to 200 g of vermicompost to the final volume of 1 liter. The suspension was periodically shaken for a day, and then, after filtering, it was poured into 50 ml flasks and stored in a dark, cold place. To obtain working suspensions, the filtrate was diluted with distilled water.

The content of water-soluble dry matter in the vermicompost extract was determined as follows. The suspension obtained after soaking in vermicompost water for a day was filtered first through two layers of

gauze, and then through filter paper. To determine the concentration of substances dissolved in water, the resulting filtrate was evaporated in a sand bath at a temperature of 75-85°C.

Tomato seeds, 30 pieces in a sample, were first soaked for 24 hours in the appropriate extract solution (see table.1) and then placed on sterile Petri dishes with filter paper, where the same solution of vermicompost extract was taken to moisten. Distilled water was used as a control. Tomato seeds were sprouted for 7 days at a temperature of 25°C.

Experimental data were processed using Dospekhov (1985)

Results. The measurements showed that the extract of vermicompost, in the form of its water-soluble fraction, contains about 24.69, and in manure 20.41 mg/ml of dry matter, respectively.

Thus, it was shown that the extract of vermicompost and manure contains 25 and 21 mg/ml of dry matter, respectively.

The results of the study showed that depending on the concentration of vermicompost extracts, the nature of the growth processes of the studied seeds differs. For example, under the action of 6 and 8% concentration of extracts from vermicompost, 6 days after seed germination, the germination rate is 78.3 % and 32.6%, respectively, while in the control it was 96.5 %. It should be noted that at a concentration of 6% extract, vigorous and almost simultaneous germination of tomato seeds was observed (table 1). On the 7th day of observation, the germination energy of the studied tomato seeds under the influence of a 6% concentration of extract was 83.4% and did not differ much from the control (table 2).

Table 1

Effect of different concentrations of organic fertilizer extract on the germination of tomato seeds %

Option	Days of germination							
	1	2	3	4	5	6	7 M±m	t_d
Control	52,1	65,4	76,3	82,6	88,4	92,3	96,5±4,8	
Water extract of vermicompost								
6% exhaust	10,3	26,1	38,6	50,8	65,4	78,3	78,8±4,7	2,6
8% exhaust	14,6	16,4	21,3	24,1	28,5	32,6	38,4±3,1	10,2
10% exhaust	10,6	13,2	15,5	18,2	23,1	25,2	28,3±1,7	18,1
50% exhaust	8,3	10,4	10,8	15,5	18,3	21,4	25,3±1,5	14,2
90% exhaust		3,7	6,4	8,5	9,2	11,3	11,8±0,9	17,3
An aqueous extract of manure								
6% exhaust	10,2	24,2	30,4	46,5	62,5	74,6	76,3±4,6	3,1
8% exhaust	12,4	14,3	18,3	21,2	26,4	30,2	34,3±1,7	12,2
10% exhaust	9,1	13,3	14,4	19,1	21,1	26,1	27,6±1,4	13,8
50% exhaust	3,8	8,4	9,1	13,5	16,4	18,6	22,1±1,6	14,7
90% exhaust		2,8	4,6	6,7	8,1	8,6	9,3±0,5	18,1

With an increase in the concentration of extracts to 8% or higher, there is a decrease in the intensity of seed germination and root growth. At a concentration of 10% or more of the extract extract in both vermicompost and manure, the seed germination energy slows down significantly and the germination rate is 28.3-11.8% and 27.6-9.3%, respectively (Table 1)

Thus, from the data presented in tables 1 and 2, it can be seen that high concentrations of vermicompost extract negatively affect the germination and germination of tomato seeds. The negative effect of high concentrations of vermicompost extract on germination, seed germination energy and root formation in tomato seedlings is explained by the fact that the extract in the form of its water-soluble fraction contains a lot of sodium and potassium salts, which have a toxic effect on the growth processes of seeds. It was found that the most optimal solution is a 6% solution of vermicompost extract, which increases the germination rate and energy of seed germination, as well as accelerates root growth in tomato seedlings. In practical terms, the use of a 6% concentration of vermicompost extract reduces the preparation time for seedlings when they are grown in the autumn-winter growing season of tomatoes, which is economically beneficial for intensive vegetable growing in protected ground conditions.

Table 2.

Effect of different concentrations of organic fertilizer extract on the energy of tomato seed germination (%)

Option experience's	Days of germination							
	1	2	3	4	5	6	7 M±m	t_d
Control	13,3	20,4	30,6	36,6	72,4	82,0	84,8±5,1	
Water extract of vermicompost								
6% exhaust	7,8	11,3	25,2	34,3	68,1	75,6	83,5±5,0	0,2
8% exhaust	13,8	15,1	28,4	32,3	68,7	72,5	81,3±5,7	0,5
10% exhaust	8,5	12,4	27,6	40,2	68,7	74,2	80,1±5,6	0,6
50% exhaust	12,2	14,8	26,2	30,1	65,8	70,4	78,2±4,7	1,0
90% exhaust	10,8	13,5	23,3	27,4	38,3	58,2	67,6±4,8	2,5
Водный экстракт навоза								
6% exhaust	11,3	12,6	21,4	35,1	64,3	71,5	78,4±4,5	0,9
8% exhaust	9,3	11,8	18,4	28,3	58,4	65,6	72,1±3,6	2,0
10% exhaust	12,1	12,4	23,8	30,6	66,2	65,3	69,4±4,8	2,2
50% exhaust	10,4	11,2	18,5	26,2	58,4	60,1	61,2±3,7	3,8
90% exhaust	8,4	9,6	15,3	21,4	48,5	52,4	58,6±3,5	4,2

Table 3.

Effect of different concentrations of organic fertilizer extract on the root growth rate of tomato seedlings (mm)

Option	Days of germination				t_d
	The first	Second	third	Fourth M±m	
Control	6,1	13,2	26,5	32,6±2,3	
Water extract of vermicompost					
6% exhaust	8,2	18,3	28,2	35,6±2,1	1,0
8% exhaust	7,3	10,5	21,4	30,6±1,5	1,9
10% exhaust	4,6	10,8	20,3	26,4±1,3	3,7
50% exhaust	4,4	8,2	16,1	20,3±1,2	6,3
An aqueous extract of manure					
6% exhaust	5,2	7,3	16,4	21,2±1,5	5,6
8% exhaust	4,3	5,1	7,6	14,1±1,1	9,0
10% exhaust	3,4	5,1	8,6	13,2±0,7	10,2
50% exhaust	3,1	3,8	6,2	12,1±0,7	10,6

Data on the intensity of root growth of tomato seedlings (table 3) show that in comparison with the control, root growth was observed at a concentration of 6% vermicompost extract. A similar trend about the intensity of growth of the roots of seedlings is also observed at a concentration of 6% manure extract. If on the fourth day of germination, the average growth rate of the roots of seedlings in the control was equal to 32.6±2.3 mm, then in the case of a 6% concentration of vermicompost extract, it was equal to 35.6±2.1 mm.

According to literature data, tomatoes in greenhouses are usually applied from 70 to 100 t/ha of manure. Due to the fact that the dose of the optimal amount of vermicompost for applying under the tomato is practically not determined, the corresponding calculation was based on the amount that is practically harmless to the sprouting tomato seed. In this case, we took as a basis the concentration of 6% extract of water extract of vermicompost, which contains 150 mg of water-soluble dry matter and its effect on seedlings is almost identical to the control. Therefore, based on the fact that one square centimeter of the area will receive 150 mg of water-soluble dry matter of vermicompost, in terms of 1 ha (108 cm2) of the area, it was determined that the dose that will not have a toxic effect on the root system of tomato plants in the open ground is 15 t/ha (150 mg * 108 cm2).In further calculations of the dose of the amount of biohumus applied to tomatoes, we assumed that no more than 15 t/ha of biohumus can be applied to vegetating plants once. It should be noted that in laboratory experiments with tomato plants dived into garden pots, the latter practically differed in their growth and

development rates even based on a single dose of vermicompost of 45-60 t/ha (data are not provided due to the fact that there was only one plant for each dose and, therefore, the data obtained cannot be statistically justified).

CONCLUSION

One of the main objectives of this study was to study the possibility of using a new highly efficient and environmentally friendly organic fertilizer of vermicompost as an additional main source of nutrition for growing tomato plants in closed ground conditions. Food, dietary and phytotherapy properties of tomato products have made this plant one of the most profitable crops, both in the domestic and foreign food markets.

Thus, based on the data obtained, as well as the amount of water-soluble fraction of vermicompost, we calculated the corresponding norms of vermicompost, which we introduced into the soil under closed ground production conditions.

Biohumus can be used as a source of nutrients when growing tomatoes in protected ground conditions.

The 6% concentration of water-soluble substances of vermicompost has a positive effect on the germination and germination energy of tomato seeds, as well as the formation of the root system of seedlings.

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