THE EFFECT OF THE FERTILIZATION WITH VINASSA ROMPAK PRODUCT ON THE BIOLOGICAL ACTIVITY OF THE CULTIVATED SOILS

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ABSTRACT

The product Vinassa Rompak, resulted in the yeast obtaining technology process, can be a good fertilizer for agricultural crops and a factor for maintaining the balance between the microorganisms populations from the soil. The experiment regarding the influence of fertilization by using the Vinassa Rompak product was made on two permanent growing; a permanent pasturelands and fodder beet.

The results presents the influence of the fertilization process emphasize a variation of the total number of microorganisms, of the report between the main groups (bacteria and fungi), and of the micromycetes spectrum determined in each variant of experiment.

KEYWORDS: fertilisation, unconventional products, biological activity, bacteria, micromycetes

INTRODUCTION

The actual orientation towards new protection measures for the agricultural systems requires, among other, the utilization of some unconventional elements in the agricultural technologies. In our country, the food industry can supply a series of byproducts, which can replace the conventional products (chemical fertilizers and pesticides) that are now used in agriculture. The utilization of these byproducts will be possible after the tests, which will reveal their impact on the plants, on the soil's mycoflora and on the environment. Generally, these are not environment polluting materials, but their influence on the plants and microorganisms must be studied in order to use them on a larger scale.

From all these, the by-product Vinassa Rompak, resulted in the yeast obtaining technology process, can be a good fertilizer for agricultural crops and a factor for maintaining the balance between the microorganisms populations from the soil.

MATERIAL AND METHODS

The experiment regarding the influence of fertilization by using the Vinasse Rompak product was made on two permanent growing; a permanent pasturelands and fodder beet. At each experiment, the fertilization factor was observed in six different variants, as follows: V_1 – unfertilized control variant; V_2 – 2 t/ha Vinasse Rompak; V_3 – 4t/ha Vinasse Rompak; V_4 – 6 t/ha Vinasse Rompak; V_5 – 4 t/ha Vinasse + P_{80}; V_6 –N_{100} P_8 K_{80}.

In order to determine the number of microorganisms for 1 g soil the method of Petri dishes colonies was used. The soil samples were put in paper bags with a metallic spatula, and the material was preliminary sterilized. The samples were taken from a 10 cm depth and afterwards they were processed through crumbing and homogenizing in a sterile mortar.

From each sample, 1 g of soil was weighed and used for the decimal dilutions from 10^{-1} to 10^{-6}, to obtain an optimal number of colonies.

For an easy identification of the colonies there were used differentiated culture substratum, specific for each systematic group. Thus, for the total number of the microorganisms was used the simple PDA substratum, for the determining of the number of micromycetes the PDA substratum in mixture with streptomicine sulphate (35 ppm) was used and the nitrogen fixers such as Azotobacter were emphasized by using the Ashby medium.

The inoculation was realized with 1 ml of dilution in each Petri dish with melted substratum at 45^0C.

The inoculated dishes were incubated at 37^0C, for the bacteria and at 28^0C for fungi. The determining of the total number of bacterial colonies was made after 24 hours, and of the fungi colonies, after 5 days.

RESULTS

The evaluation of the biological activity from the cultivated soils of the permanent lawns and fodder beet under the influence of the fertilization process emphasize a variation of the total number of microorganisms, of the report between the main groups (bacteria and fungi), and of the micromycetes spectrum determined in each variant.

Important differences are observed between the two experiments, based on the specificity of the applied technology, an experience being placed in a permanent lawn, where the soil's working system is decreased, and the other being placed in a fodder beet growing, where the working system is much more complex. This includes, apart from the basic works of the soil (plowing, preparing the germinative bed), two handmade plows during he vegetation period, which positively influences a good airing of the soil and facilitates an intensified activity of the microorganisms.

In the permanent pasturelands cultivated soils, the highest number of microorganisms was registered by the unfertilized control variant , 3.535.000/g soil, and the lowest at the 6 t/ha Vinassa Rompak variant (1.105.000/ g soil) (Table 1). In this case, it is noticed that the total number of microorganisms lowers as the Vinassa Rompack uncombined quantity increases on the hectare (V2, V3 and V4). At the V5 and V6 variants to which the Vinassa was combined with P80 and mineral fertilizers, the total number is close to the one registered at V2 and V3 fertilized with doses of 2t/ha and 4t/ha Vinassa. We might say that the Vinassa product determinates a gradual decrease of the microbiological activity of the soil as the dose increases.

Regarding the involvement of the micromycetes, it was observed that the lowest participation average is registered also at the V4 (6 t/ha Vinasse) – 2.8 %, and the highest, at the V2 – 7.6%, fertilized also with Vinasse. At V2, the number of microorganisms and their participation average are the most equilibrated.

The nitrogen fixers, belonging to the Azotobacter type, were noticed in a small number only at V3 and V6. Their reduced number is explained by the fact that, as microorganisms, in the soils that have minimal works they do not meet the best developing conditions.

In the soils cultivated with fodder beet, some resemblances with the latter experience are met, regarding the evolution of the number of microorganisms according to the fertilization factor. Thus, the lowest values of the total

Table 1 The biological activity of the soils from the cultivated permanent pasturelands under the influence of the fertilization process

Variant	Permanent pastureland cultivated soil						Fodder beet cultivated soil					
	Total number /g. soil	Fungi		Bacteria		Nitrogen.	Total number /g. soil	Fungi		Bacteria		Nitrogen.
		No.	%	No.	%			No.	%	No.	%	
V_1 – martor nefertilizat	3.535.000	230.000	6,6	3.305.000	93.4		6.250.000	500.000	8,4	5.725.000	91,6	x
V_2 – 2 t/ha Vinassa Rompak	1.975.000	150.000	7,6	1.825.000	92,4		5.850.000	200.000	3,5	5.650.000	96,5	x
V_3 – 4 t/ha ha Vinassa Rompak	1.680.000	80.000	4,8	1.600.000	95,2	x	4.150.000	115.000	2,8	4.035.000	97,2	x
V_4 – 6 t/ha Vinassa Rompak	1.105.000	30.000	2,8	1.075.000	97,2		4.600.000	120.000	2,7	4.480.000	97,3	
V_5 – 4 t/ha ha Vinassa Rompak + P_{80}	1.890.000	105.000	5,6	1.785.000	94,4		5.950.000	260.000	4,4	5.690.000	95,6	x
$V_6 – N_{100}P_{80}K_{80}$	1.615.000	50.000	3,1	1.565.000	96,9	x	8.100.000	170.000	2,9	7.870.000	97,1	x

number of microorganisms were registered at V3 4t/ha Vinassa (4.150.000 microorganisms /g soil) and V4 6t/ha Vinassa (4.600.00 microorganisms /g soil), compared to the unfertilized control variant, to which the number was 6.250.000 with V5 and V6. The participation average of the fungi is reduced in this experiment, at V3 and V4 also, fact which may be determined by the high doses of Vinassa on the surface.

The bacteria predominate as a group of microorganisms being registered with values between 91.6 % at V1 and 97.3 % at V4.

In the soils cultivated with fodder beet the nitrogen fixing bacteria are present, at all the variants except for the variant fertilized with 4t/ha Vinassa, where they were not present.

The determining of the existent micromycetes in the two experiments evidenced the non-uniform presence of the fungi, as participation average. There were noticed some fungi of the types: Cladosporium, Verticillium, Phoma, Penicillium, Rhizopus, Trichoderma, Aspergillus, Gliocladium, Mucor, Fusarium, Alternaria and the species Mastigomycotina (Table 2).

It has been also noticed that the observed micromycetes are included in the mycroflora specific to the soil (Mucor, Rhizopus, Penicillium, Cladosporium and others), and also some antagonistic species are met (Trichotecium, Trichoderma) that have the role to reduce the activity of the pathogenic species in the soil.

The most frequently noticed types having a high participation average are Cladosporium (2- 55.2%), Penicillium (16.1 – 82 %) which were present at all variants, and Trichoderma (2.2 – 67.7 %), present at eight variants.

The determining of micromycetes and of the participation average did not emphasize any significant modifications between experiments and fertilized variants and non-fertilized ones.

CONCLUSIONS

1. The biological activity inside the soil is closely related to the working system of the soil and to the applied fertilization.

2. The Vinassa product simply applied in high doses (4-6 t/ha) reduced the biological activity of the soils, compared to the non-fertilized variant and to those fertilized in combination with mineral fertilizers.

3. At the variants fertilized with the Vinassa product, simple or combined, (V2, V3, and V5) in moderated doses did not produced important modifications in the biological activity or in the balance between the microorganisms' groups.

Table 2 The micromycetes spectrum and the average participation (%)

Or. No.	Type	Permanent pastureland cultivated soil						Fodder beet cultivated soil					
		V1	V2	V3	V4	V5	V6	V1	V2	V3	V4	V5	V6
1	*Cladosporium*	10,5	8	5,8	20	5,1	9,1	6,5	11,5	5,7	20	2	55,2
2	*Verticillium*	2,6	6						15,3		20		1
3	*Phoma*	5,2	6	5,8	20	2,5	3,1			5,7			
4	*Penicillium*	73,6	64	64,7	35	74,3	27,2	16,1	53,8	71,4	35	82	40,8
5	*Rhizopus*	2,6	4		5	2,5	6,1	6,5	3,8	2,8	5	2	1
6	*Trichoderma*	2,6		8,8		10,2	54,5	67,7	7,6	5,7		4	
7	*Aspergillus*	2,6	4	5,8									
8	*Gliocladium*		8						3,8				
9	*Mastigomycotina*			8,8	10	2,5		3,2	3,8	8,5	10	2	2
10	*Mucor*				10						10		
11	*Fusarium*					2,5							
12	*Alternaria*											8	

4. The determined micromycetes spectrum and the average participation did not registered negative modifications under the influence of the fertilization process.

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