

## INFLUENCE OF FERTILIZATION OF SOIL WITH WORM COMPOST ON THE QUALITY OF PEAS

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### Abstract

*Worm compost is one of the final products obtained as a result bioconversion technology of organic waste by worm cultivation. The product obtained is a natural organic fertilizer ecological, composed of grains of various sizes, color dark brown, odorless, hygroscopic with long acting.*

*In this article are presented the results of research obtained in the field experiment during the period of three years. The experiment was organized in field conditions of Technological-Experimental Station 'Maximovca'. As research material was used worm compost-organic fertilizer and peas variety 'Renata'. In experiment were included 3 groups, with a surface such (two-experimental, one-control). Experimental on the batches before sowing, was incorporated organic fertilizer dose of 4t/ha and 3t/ha from dejections of cattle, as a result of use of technology bioconversion of organic waste by worm culture. The control group was grown peas with natural background. The research was conducted in order to assess the influence worm compost on the quality of peas.*

*In the outcome research found that worm compost influences the beneficial the development at the phases phenology of the agricultural crops. Early development of agricultural crops at different phases phenology conditional increasing the quality of production the harvest, resistance in the adverse climatic conditions and at different maladies, allowing obtaining output ecological agricultural.*

*Analysis of research results obtained revealed that worm compost has a positive impact on the quality of output of pea by increasing total nitrogen, crude protein and the decrease content of nitro compounds. The nitrogen content as total and crude protein in the samples of pea grown with fund worm compost, increased by properly with 42,38%-126,50% si 42,37%-127,50% and nitro compounds diminished by 5,76%-65,11%.*

*Thus, into results of the investigations it was found improve the quality of peas intended grown with fund worm compost compared with the cultivated fund natural.*

**Keywords:** fertilizer organic, peas, quality, nitro compounds, protein gross.

### INTRODUCTION

To obtain ecological production both as animal feed and for human alimentation, it is necessary to use certain technologies to improve the environment. Branches of the national economy are important producers of organic waste that pollutes components of nature (soil, water, air).

In science and practice of world were performed research directed at reducing negative influence of organic waste on the environment, paying special attention to their performance methods of bioconversion. An effective method is considered bioconversion of organic waste by worm cultivation that as the new direction of agrobiological science and practice worth fundamental research. The purpose of this biotechnology is to obtain worm compost-ecological organic fertilizer, the

use of which help increase of soil fertility, harvest and improving the quality of agricultural production.

In worm compost considerable are concentrated qualities of enzymes, vitamins, stimulators of growth, non-pathogenic microflora. Worm compost rests role in the development of ecological agriculture (Cremeneac, 2003).

As a result of the investigations it was found that in the worm compost is well balanced content of macro-and microelements, which allows dose reduction of incorporation into the soil, which is 8-12 times lower than dose of ordinary compost. It was found that a tonne of worm compost contain 270-300 kg of humus. It allows to significantly decreasing period for completing the amount of humus in the soil, thus restored soil fertility and resistance to wind and alluvial erosion.

Worm compost can be used in cultivation of all agricultural crops (greenhouse and open field). Influence on their development at different phenological stages, harvest and quality of agricultural production. According to research found that using worm compost is welcome in the greenhouse practice of vegetable growing, where of rule uses considerable amounts of mineral fertilizers, chemicals for pest and disease destroying crops. This hampers to obtain ecological agricultural production, thus reducing demand for agricultural products on the market (Cosolapova et al., 1996). As a result of previous studies found that worm compost had a positive effect on the quality of forage crops (maize alfalfa and fodder beet) grown with worm compost fund. Quantity of nitro-compounds in maize alfalfa and fodder beet grown with worm compost fund reduced corresponding from 2,10 to 2,66, 3,47 to 3,76, 1,10 to 1,14 times compared with plants grown with mineral fertilizer (Boclaci et al., 2012). So, incorporation of worm compost in the soil improves soil fertility, influence early development of agricultural crops in different phenological stages, increasing yields and improved quality of obtained production.

## MATERIALS AND METHODS

To appreciate the influence of worm compost on quality of peas experiment was organized under the field of Technological-Experimental Station 'Maximovca'. As research material was used organic fertilizer and peas variety 'Renata'. In experiment (Table 1) were included 3 groups, with a surface such (two-experimental and one-control).

Table 1. The scheme of the experiment

No	Type of culture	Lots	Condition of experiment
1	Peas	I-experimental	Worm compost, 4t/ha
2	Peas	II-experimental	Worm compost, 3t/ha
3	Peas	III-control	Natural fund

On experimental lots before sowing, was incorporated organic fertilizer dose of 4t/ha (experiment I) and 3t/ha (experiment II) from cattle manure as a result of use bioconversion technology of organic waste by worm growing.

On control lot was grown peas with natural fund. The research was conducted over three years, including the first, second and third year of action of worm compost.

During the experiment was determined by using the usual methods, total nitrogen content and crude protein (Petuhova et al., 1989), and nitro-compounds content-electro-colorimetric method (Razumova et al., 1986). All analyzes were conducted using samples of peas in their natural state. In order to assess the influence of soil fertilization with worm compost on quality of peas in different phenological stages, research has been carried out over three years. Each year was conducted investigations over phases: early flowering, total flowering, pod formation and total ripening. During the experiment has been observed that in all phenological phases of the experimental plants I and II growing by worm compost fund, total nitrogen content, crude protein and nitro-compounds was higher than in the control group cultivated naturally fund. As a result of studies found that incorporation of worm compost in the soil, at a dose of 4t/ha-3t/ha, the quality of peas has improved in all phenological stages.

During the experiment the dependence of phenological stages of development samples of peas were taken in order to assess its quality.

## RESULTS AND DISCUSSIONS

Analyzing the results of research conducted in the first year of action of organic fertilizer (Table 2) revealed a significant increase of total nitrogen and crude protein content in plants of experimental groups.

This increase constituted duly 126,50% 127,50% in plants of the experimental group I and 65,66%, 65,58% in plants of the experimental group II. Regarding the content of nitro compounds in the first year of action of worm compost in peas samples collected from experimental group I, the nitrate content decreased by 53,69%, and nitrite 53,70% compared with control group. In peas samples collected from the experimental group II nitrate and nitrite content decreased, corresponding to 53,74% and 52,67%.

Table 2. Assessing the influence of worm compost on quality of peas from the experiment

No	Indices	Variant of experiment		
		Control	Experiment I-4t/ha	Experiment II -3t/ha
1	Total nitrogen,%	1,66	3,76	2,75
2	Crude protein,%	10,40	23,66	17,22
3	Nitrites, mg/kg	289,80	134,20	138,20
4	Nitrate, mg/kg	4,86	2,25	2,30

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So the results obtained show beneficial influence of worm compost on quality of peas in the first year of action of fertilizer, increasing total nitrogen and protein content and diminished content of nitrates and nitrites.

The same regularity was followed in the second year of action of fertilizer on peas cultivation with fund of worm compost (Table 3).

Table 3. Assessing the influence of worm compost on quality of peas from the experiment

No	Indices	Variant of experiment		
		Control	Experiment I-4t/ha	Experiment II -3t/ha
1	Total nitrogen,%	3,15	4,76	4,88
2	Crude protein,%	19,69	29,75	28,63
3	Nitrites, mg/kg	265,00	155,00	130,24
4	Nitrate, mg/kg	3,12	-	5,00

Total nitrogen and crude protein values?? both in samples of plant collected from the control group and in the-in the experimental groups increased corresponding to 89,80%, 89,33% (control group), with 26,60%, 25 70% (experimental lot I) and 66,55%, 66,26%

(experimental lot II). The content of nitro-compounds decreased the exception of the nitrate content in peas samples collected from experimental group I and nitrite content in plants of the experimental group II. Compared with control lot in the second year of action content of crude protein and of total nitrogen increased corresponding by 51,11,% and 51,09% (experimental lot I) and 45,40% (experimental lot II). Comparing the amount of nitro-compounds in plants of experimental groups with those of their control group was found reduction with 41,51,%-50,85,% exception being nitrite content of peas samples collected from the experimental lot II.

So the results obtained and in the second year of action worm compost quality of peas was directly related to the influence of worm compost.

Table 4. Assessing the influence of worm compost on quality of peas from the experiment

No	Indices	Variant of experiment		
		Control	Experiment I -4t/ha	Experiment II -3t/ha
1	Total nitrogen,%	3,02	4,34	4,30
2	Crude protein,%	18,88	27,13	26,88
3	Nitrites, mg/kg	190,00	66,30	72,30
4	Nitrate, mg/kg	-	-	-

The results presented in Table 4 show that the values of total nitrogen and crude protein in peas, in the third year of action of worm compost, compared to their plants collected in second year both the control lot and the experimental decreased as corresponding with 4,13%, 4,11% (control group), 8,82%, 8,81% (experimental lot I) and 6,11% (experimental lot II). Comparing the results obtained in the third year with those obtained in the first year of action of worm compost was found that the value of these indices has increased accordingly but it has exceeded that of the first year of action of worm composting with 81,93%; 81,54% (control group), 15,43%, 14,67% (experimental lot I) and 56,36%, 56,10% (experimental lot II).

In peas collected from the control lot, experimental I and II experimental, in the third year of action of worm compost nitrate value decreased, corresponding to 34,44%, 50,60%

and 47,61% in comparison with the results in the first year and corresponding to 28,30%, 57,23% and 44,48% compared with the results obtained in the second year of action of worm compost.

In comparison to the control group in samples of peas, the experimental lot I, total nitrogen content and crude protein increased, corresponding to 43,71% and 43,70%, and the ones collected from experimental lot II-with 42,38% and 42,37%. The amount of nitrates in samples of peas from the experimental group decreased by 65,11% I and experimental group II-with 61,95% compared to that in samples collected from the control lot. In samples of peas from all groups, in the third year of action of worm compost nitrite were not detected.

So, researches that were made in the third year of action of worm compost found the influence of fertilizer on quality of peas.

## CONCLUSIONS

Fertilization of soil with worm compost in doses of 3t/ha and 4t/ha improved quality of peas over three years:

total nitrogen and crude protein content in peas plants in experimental groups increased by 42,38% 126,50% and 42,37%-127,50% compared to that in the control lot plants; the value of nitro-compounds diminished on experimental plants with 5,76%-65,11% compared to the control group of plants.

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