

# THE STUDY OF INFLUENCE ORGANIC FERTILIZER OBTAINED FROM WORMS COMPOST, ON THE QUALITY AND HARVEST OF FODDER BEET

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## Abstract

The purpose of the research targeted on the influence of liquid organic fertilizer on the quality and harvest of fodder beet. For this purpose the experiment was organized under field conditions of Technology Experimental Station "Maximovca". As the material for the research was used variety of fodder beet seeds Ekkendorfskaya, worm compost and aqueous extract obtained from him. In experiment was used three lots (one - control, two - experimental). Fodder beet seeds were macerated in aqueous extract obtained from raw worms' compost, prepared in the ratio 1:100. The same extract was used as supplementary food administered in two rounds on experimental group I. Results of analysis demonstrated that biochemical indices of fodder beet in samples on experimental loads I and II outperformed, respectively with 33.97% and 19.62% - total nitrogen; 34.00% and 19.68% - raw protein; 6.73% and 1.78% - active acidity active acidity of plants on the witness lot. The content of nitrates in the experimental groups I and II decreased by 57.37% and 53.15% compared to the witness lot. Fodder beet harvest collected from experimental loads I and II was higher with 50.12% and 3.78% compared to that on the witness lot. Therefore, liquid organic fertilizer in proportion (water : worms' compost) 1:100, obtained from gross worms compost, has a positive impact on the quality and harvest of fodder beet.

**Key words:** Biochemical indices, quality, fodder beet, liquid extract, worms' compost

## INTRODUCTION

Obtaining organic agricultural production is a social problem of global importance.

A special role in improving the environmental situation lies with the bioconversion of organic waste by worm culture technology and use of its products in order to solve problems in the agricultural sector branches [3].

It is known that a serious problem in livestock is the insufficiency of proteins in feed ration of animals and birds. The resources of animal protein in livestock are limited. For this reason, in recent years, in many countries is increases the interest in technology of bioconversion of organic waste by worm culture, which is an additional source of obtaining animal and vegetable

protein for balancing feed ration of animal, poultry, fish, etc. [2].

Bioconversion technology of organic waste by worm culture opens new perspectives and opportunities for implementation the technology of obtaining feed with high protein content. It can become the basis of effective production of organic feed [1].

Worm compost is one of the final products obtained as a result of organic waste bioconversion technology by worm cultivation (organic waste processing process by using rhymes, especially the hybrid rhymes Red California). The product obtained is a natural organic fertilizer, ecological long-acting [2]. As a result of investigations it was found that worms' compost is well-balanced macro-and micronutrients content, are concentrated considerable qualities yeast, vitamins, growth stimulants, non-pathogenic microflora. Worm compost lays crucial role in the development of organic agriculture [3].

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From worms to compost worms in cutting cultivation sector was prepared liquid organic fertilizer. It is noted that liquid extracts "Vermistim" and "Gumistar" [4] are natural organic fertilizers, organic with high efficiency, which have light tan or dark (depending on concentration), odorless with a transparent texture. Using liquid organic fertilizer influences positive on the process of growth, photosynthesis, increasing productivity and quality of agricultural production.

In the literary sources is mentioned that the, fodder beet in Moldova is the main source of succulent feed, which is used extensively in the livestock sector and consumed in the fresh form, and preserved by silage. Besides roots are also used in animal feed and fresh leaves or silage [5].

Fodder beet enriched the ration of animals with vitamins, lipids, nitrogen, protein, cellulose, lignin and others. Fodder is well consumed by all animals, it increases caloric energy and has favorable effects on milk production.

Purpose of the research is targeted the influence of organic fertilizer liquid obtained crude worm compost on quality and harvest of fodder beet.

## MATERIAL AND METHOD

Based on the analysis results obtained in experiments concerning the liquid organic fertilizer influence obtained from crude worm compost on the seed germination process it was organized under the field experiment resort's experimental technology "Maximovca". As the material for the research was used variety of fodder beet seeds Ekkendorfskaya, worm compost crude and aqueous extract obtained from him. To obtain organic fertilize aqueous liquid was used proportion of crude worm compost and drinking water in the ratio of 1:100 at recital, worm compost 10g in 1 liter of drinking water. Extract of worm compost crude was made in natural water and air temperature. Separation of worm compost extract was performed after 24 hours.

Before sowing, for a period of 12 hours, fodder beet seeds were subjected to the leaching process the crude aqueous extract worm compost and drinking water, prepared in the ratio of 1:100.

The influence of liquid organic fertilizer on the quality and harvest of fodder beet, according to the scheme of the experiment (table 1) were used three experimental lots with an area of 0.5 ha (one – control, two - experimental).

Table 1 Scheme of experiment

Experimental lots	Type of crop	Investigations during the experiment
Lot I (control)	Macerated seeds and plants grown in our natural environment.	Was determined: total nitrogen, crude protein, nitrogen compounds and crop productivity
Lot II (experimental II)	Seeds macerated in aqueous extract from crude worm compost in the proportion 1:100, and plants grown in a natural environment.	
Lot III (experimental I)	Seeds macerated in aqueous extract from crude worm compost in the proportion 1:100 and sprayed the plants with same aqueous extract from worm compost	

In group I (control) were used macerated seeds and plants grown in our natural environment and the group II (experimental II) seeds were macerated in water extract from crude worm compost in the ratio of 1:100 and plants grown in the wild. For group III (experimental I) seeds have a valuable macerated in water extract from

worm compost gross ratio of 1:100 was administered to plants in the same proportion (1:100) as an additional feed (from recital 4/ha) on two occasions (first half - early formation crops stern, second half - period when fodder beet leaves covered the earth). In all phenological stages of vegetation was determined quality fodder beet. At the end of

the growing season was determined by weighing, the harvest. The duration of the experiment depended on fodder beet during the growing season.

Thus, it is evident influence was appreciated liquid organic fertilizer obtained from crude worm compost on the quality and fodder beet harvest.

## RESULTS AND DISCUSSION

Research carried out to determine the influence of liquid organic fertilizer obtained from crude worm compost on the quality and harvest of fodder beet were carried out in three directions: determining the quality of worm compost study and determine the quality of harvest of fodder beet obtained.

The results of the investigations to determine the quality of crude worm compost and aqueous extract made from it (in a ratio of 1:100) found that the active acidity was respectively 7.20 and 7.24 units, and total nitrogen content – 3.14% and 0.10%. The crude worm compost content of humus, potassium, magnesium and phosphorus was respectively 22.8%; 1.90%; 0.85% and 1.83%.

During the experimental period were subject of research crops stem and fodder beet leaves four phenological phases: beginning formation of crops stem, average development of crops stem, intensive development of crops stem and the end of phenological phase. In order to assess the quality of fodder beet during the growing season, depending on phenological phases, samples were taken for determination of quality indicators: total nitrogen, crude protein and nitrogen compounds.

Analyzing the results of research regarding the quality of fodder beet found that total nitrogen content in crops stem from plants on experimental I and II in all phases of phenological development has increased with 32.26% accordingly; 31.26%; 25.84%; 33.97% and 9.68%; 16.00%; 17.70%; 19.62% compared to the control group. Crude protein also in the experimental groups I and II surpassed that of the control group with 34.00% and 19.68%. The amount of nitrate decreased in the experimental groups I and II with 57.37% and 53.64% compared with controls (table 2).

Table 2 Quality rating fodder beet (crops stem) cultivated with liquid fertilizer fund

Lots	Indices	Phenological phases			
		I	II	III	IV
Control	total nitrogen	1.86±0.043	2.00±0.048	2.09±0.025	2.09±0.026
	crude protein	11.62±0.043	12.50±0.048	13.06±0.025	13.06±0.026
	nitrate	611.25±0.19	490.46±0.95	411.10±0.80	264.68±0.24
Experimental I	total nitrogen	2.46±0.086	2.48±0.0056	2.63±0.037	2.80±0.014
	crude protein	15.40±0.086	15.5±0.0056	16.43±0.037	17.50±0.014
	nitrate	260.54±0.60	230.50±1.91	192.28±0.32	122.70±0.44
Experimental II	total nitrogen	2.04±0.011	2.32±0.042	2.46±0.014	2.50±0.00
	crude protein	12.75±0.011	14.50±0.042	15.40±0.014	15.62±0.00
	nitrate	457.50±0.88	249.68±1.23	220.14±0.25	123.92±0.25

Note: phenological phases: I- beginning formation of crops stem; II mean crops stem development; III intensive development the crops stem; IV the end of phenological phase

In samples taken from plant fodder beet leaves, the experimental group I, total nitrogen and crude protein content of which exceeded that from the control group corresponding to 27.94%; 16.59%; 23.37%; 21.13% to 30.98%; 16.70%; 23.93% 20.90% and in the experimental group II denied creep total nitrogen and crude protein increased by

14.70% and 14.45% 72.70% and 78.78% compared to the control group (table 3). The amount of nitrate decreased in groups I and II of experiment.

The amount of nitrite in the plant crops stem and fodder beet leaves in all the samples subjected to research during the experiment was not essential.

Table 3 Quality rating fodder beet (leaves) cultivated with liquid fertilizer fund

Lots	Indices	Phenological phases			
		I	II	III	IV
Control	total nitrogen	2.04±0.011	2.29±0.034	2.34±0.048	2.46±0.011
	crude protein	12.75±0.011	14.31±0.034	14.62±0.048	15.40±0.011
	nitrate	495.36±0.71	395.46±0.78	358.40±1.27	280.38±1.20
Experimental I	total nitrogen	2.67±0.026	2.67±0.025	2.85±0.042	2.98±0.0085
	crude protein	16.70±0.026	16.70±0.025	18.12±0.042	18.62±0.0085
	nitrate	360.14±0.25	270.58±0.92	177.50±0.65	94.72±2.16
Experimental II	total nitrogen	2.34±0.077	2.46±0.014	2.46±0.014	2.67±0.026
	crude protein	14.6±0.077	15.34±0.014	15.34±0.014	16.7±0.026
	nitrate	390.24±2.62	305.36±0.07	240.44±0.72	170.22±0.28

Note: phenological phases: I- beginning formation of crops stern; II mean crops stern development; III intensive development the crops stern; IV the end of phenological phase

### Analysis of Income

During the experiment, fertilizer organic liquid obtained worm compost raw and drinking water in a rate of 1:100 was administered in two halves (half first - early formation crops stern, second half - period when the leaves fodder beet covered the earth) as additional feed fodder beet plants in the experimental group I administered supplementary feeding fodder beet plants in

the experimental group I of fodder beet influence on quality not only in comparison to the control group and experimental group compared to II. Total nitrogen and crude protein content in fodder beet crops stern the experimental group I surpassed that of the experimental group II with 20.59% and 20.62% and fodder beet leaves their content was three times higher in the experimental group I compared the experimental group II.

Photo 1



a) control

b) experimental II

c) experimental I

The amount of nitrates in forage crops stern and beet leaves decreased by 43.05% to 92.28% in the experimental group and I compared the experimental group II.

At the end of the experimental period was determined fodder beet harvest (table 4) which demonstrates us that the amount of

fodder beet was higher in the experimental groups compared with controls. In experimental groups I and II to harvest crops stern and leaves surpassed that from the control group with 50.12%; 3.78% and 63.52%; 4.98%.

Photo 2



The fertilizer organic liquid obtained worm compost profit in ratio 1:100 administered as supplementary food plants in the experimental group I had an influential beneficial effect on harvest crops stem and leaves, which demonstrates that the harvest was higher not only than the control group and compared with the experimental group II 44.65% and 55.76%.

Therefore, organic fertilizer liquid obtained worm compost profit and drinking water in the ratio of 1:100, which have undergone maceration seeds of fodder beet, managed to land the experimental groups to improve quality of fodder beet increasing its productivity in all phases of phenological compared with controls.

Table 4 Evaluation harvest of fodder beet

Lots	Crop	Harvest	
	fodder beet	kg	Compared with controls, %
Control	leaves	110.000	100.00
	crops stern	593.680	100.00
Experimental I	leaves	179.870	163.52
	crops stern	891.240	150.12
Experimental II	leaves	115.480	104.98
	crops stern	616.120	103.78

Administration of aqueous fertilizer as additional food on two occasions, from recital 4 t/ha, fodder beet plants in the experimental group I, improved quality and increased yield compared to control group and experimental group II.

## CONCLUSIONS

So as a result of investigations it was found that the liquid organic fertilizer obtained from crude worm compost and drinking water in the ratio 1:100:

- improved quality of fodder beet, increasing total nitrogen and crude protein content, and diminishing nitro compounds content.

- increased fodder beet harvest collected from experimental groups I and II compared with controls.

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