European Journal of Agricultural and Rural Education (EJARE)
Available Online at: https://www.scholarzest.com
Vol. 2 No. 10, October 2021,
ISSN: 2660-5643

THE RESULTS OF THE USE OF BIOLOGICAL AGENTS PRODUCED IN GEORGIA FOR THE RESTORATION OF DEGRADED LANDS

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Article history:

Received August 10th2021
Accepted: September 7th 2021
Published: October 8th 2021

Abstract:

A decrease in soil fertility or its degradation is one of the most important problems of our time. The importance of this problem is that it poses a danger to the world's population in the provision of food products and ecological safety of the environment.

Keywords: Sulfur, sulfite anhydride, sulfite acid, sulfites, bisulfites, sulfitation

In Georgia, the process of soil degradation is proceeding with sufficient intensity and represents the main problem for the development of agriculture.

In order to restore soil fertility in 2018-2019. in three regions of Georgia, experiments were carried out using organic-bacterial fertilizer - "organic" and biological products - "bio camera" and "photographic picture," produced by the center for biological plant protection, the company "Biogro."

Telavi, Kutaisi and Akhaltsikhe. 0.5-0.5 hectares of Telavi and Kutaisi areas were treated with organics and biological products, and 1 hectare in Akhaltsikhe.

The results of the study showed that after the introduction of a combined mixture of fertilizer and biological products, the composition of the existing basic nutrients (NPK) in the soil improved significantly. The fertility of the soil is increased accordingly, which is the main indicator of the turn of the nutritional value of the soil.

Our righteous experiments have shown that the use of a combined mixture of liquid organic-bacterial fertilizers of organic matter and biological products from an economic point of view is effective.

Modern biotechnologies for soil protection and fertility restoration are an urgent issue today all over the world, including in Georgia.

Georgia is a small-land country, its territory is 69.2 thousand square kilometers, of which the area of used land is 30.2 thousand square kilometers. kilometers, of which land plots occupy 10.7 thousand square kilometers.

In Georgia, 48 soil types are widespread. 6.7% (205 thousand hectares) of agricultural land used is acidic soils, 7.3% (210 thousand hectares) are swampy soils. In terms of fertility in Georgia, 62.2% are of average quality, 3.4% are below average quality, and 0.1% are the best soils.

The soil, as a natural body, is characterized by the property of fertility, which depends on soil-forming conditions. In the process of education, this property is worn out, both due to natural factors and due to human pressure - it increases or decreases depending on what are the factors acting on fertility, which ultimately determines the farming system.

A decrease in soil fertility or its degradation is one of the most important problems of our time. The importance of this problem is that it poses a danger to the world's population in the provision of food products and ecological safety of the environment.

In Georgia, the process of soil degradation is proceeding with sufficient intensity and represents the main problem for the development of agriculture.

As a result of the above, it is necessary to restore soil fertility, increase its productivity, but so that there is no pollution of the environment with various chemical preparations, that is, modern biotechnological methods should be applied.

In order to restore soil fertility in 2018-2019. in three regions of Georgia, experiments were carried out using organic-bacterial fertilizer - "organic" and biological products - "biocamera" and "phytocatena," produced by the center for biological plant protection, the company "Bioagro."

Telavi, Kutaisi and Akhaltsikhe. 0.5-0.5 hectares of Telavi and Kutaisi areas were treated with organics and biological products, and 1 hectare in Akhaltsikhe.

At the test plots, we applied liquid organic-bacterial organic fertilizer on an area of 1 hectare (Akhaltsikhe) with a consumption rate of 20 liters, biological products: biocatena-10 liters and phytocatena-10 liters, respectively on

0.5 hectares (Telavi and Kutaisi) fertilizer 10 liters and biological products 5 liters each, the areas were treated with a combined mixture of fertilizer and biological products.

Organic-bacterial fertilizer - organic is a complex of natural organic compounds, microorganisms and biodynamic preparations that can solve the problem of providing an imitation of natural processes of restoration of soil fertility, improvement of ecological processes and soil biocenosis, which in turn contributes to the process of utilization of agricultural residues. The use of organic fertilizer, as a cheap and affordable preparation, will make it possible to easily restore productivity on devastated lands.

Efficiency: it causes an increase in yield by 20-30%, accelerates the process of disintegration of organic residues in the soil.

Application to the soil - in spring or autumn in moisture conditions, spraying of plants for feeding from +15 degrees at a humidity of 60-70%. The use of fertilizers and biological products is convenient in the early morning or evening, in order to protect the mixture from the sun's rays.

Compatibility with other preparations: mixing with both biological and chemical preparations is possible, except for chemical bactericides and fungicides:

toxicity class-4th is not toxic to humans, animals, fish, birds, bees and other beneficial insects.

Advantage: it is not phyto-toxic, does not pollute the environment, promotes the development of beneficial microflora in the soil.

Storage conditions: keep dry from + 4 to + 30 degrees cessation. protected, place from sunlight, in a tightly sealed full vessel, shelf life 3 years.

Biocatena is a therapeutic and prophylactic remedy for plant diseases, mainly against pathogenic soil fungi. also used for seed treatment.

Composition - culture liquid, which contains spores, fungus Trichoderma lignorum and mycelium, is also more biologically active than substances produced during the cultivation process.

Efficiency: the biological efficiency of its application is 65-70%, and the economic efficiency is 10-15%.

Time and terms of application - for the purpose of prevention, the biological product should be introduced into the soil before sowing or before planting the plant. Also, for the purpose of treatment, it is possible to add it to the soil or sprinkle plants. at a temperature of +18 degrees Celsius and 60-70% soil moisture.

Compatibility with other preparations: Mixing is possible with both biological and chemical preparations, except for some chemical fungicides.

toxicity class-4th is not toxic to humans, animals, fish, birds, bees and other beneficial insects.

advantage: not phyto-toxic; resistance to harmful organisms is not noted. It is not standardized in agricultural products and environmental objects, it is safe for the ecosystem, and provides an environmentally friendly yield.

Storage conditions: store in a dry temperature from +15 +25 degrees. protected, place from sunlight, in a tightly sealed full vessel, out of the reach of children of animals, separate from other products, the shelf life of the drug is 6 months. without changing properties, but including violation of storage conditions, its effectiveness decreases.

Fitokatena is a therapeutic and prophylactic agent against both soil pathogens and aepogenic pathogens; it promotes the processes of transformation of existing phosphorus in the soil.

The composition is a cultural liquid, which contains spores of the bacterium - Psevdomonas Flourescens, as well as biologically active substances formed in its cultivated process.

Efficiency: the biological efficiency of the use of photographic pictures is 65-70%, and the economic efficiency is 12-15%.

Time and terms of application - for the purpose of prevention, the biological product must be introduced into the soil before or after processing. It is also possible for medicinal purposes, its introduction into the soil or spraying the plant during the growing season.

Compatibility with other preparations: Mixing is possible with both biological and chemical preparations, except for chemical fungicides.

Toxicity class-4th is not toxic to humans, animals, fish, birds, bees and other beneficial insects.

Advantage: it is not phytotoxic, in addition to fungicidal and bactericidal properties, it has a stimulating effect, does not limit the viability of the native bacterial microflora. Ecosystem safe for sustainable yields.

Storage conditions: store a sealed vessel in a dry place protected from the sun, at a temperature of +5 to +25 degrees Celsius. the shelf life of the drug is 6 months. without changing properties, but including violation of storage conditions, its effectiveness decreases.

After the introduction of a combined mixture of fertilizer with preparations, soil samples were taken from three experimental localities, over which a laboratory examination was carried out.

In order to establish soil fertility in three samples, some test parameters were determined before treatment (control option) and after treatment (experimental version). We present the results of the main indicators of soil analyzes using the example of the experimental site of the Telavi State University named after Iakob Gogebashvili.

Results of soil analysis at the control site (sample # 1, Telavi, university, vineyards 0-20 cm).

Table N1

Characteristics	Result analysis	Category	limit
pH (cut off water)	7.40	Weakly alkaline	7.3-7.8
organic matter (%)	4.12	Average	4-6
nitrogen (N) mg / kg (available for the plant)	30.81	Very Low	0-40
Phosphorus (P2O5) mg / kg (available for the plant)	3.09	Very Low	0-15
potassium (K2O) mg / kg (available for the plant)	242.59	High	241-400
hydroscopic water (%)	2.67	-	-

Results of soil analysis on the experimental plot (sample N2, Telavi, university, vineyard 0-20 cm).

Table N2

Characteristics	Result analysis	Category	limit
pH (cut off water)	7.35	Weakly alkaline	7.3.-7.8
organic matter (%)	2.87	Average	2-4
nitrogen (N) mg / kg (available for the plant)	46.56	Very Low	40-70
Phosphorus (P2O5) mg / kg (available for the plant)	5.29	Very Low	0-15
potassium (K2O) mg / kg (available for the plant)	266.40	High	241-400
hydroscopic water (%)	2.88	-	-

As can be seen from table N2, after the application of the combined mixture of fertilizer and biological products, the composition of the existing essential nutrients (NPKs) in the soil improved significantly. In particular with table N1, table N2 increases the number of nitrogen (N), phosphorus (P205), and potassium (K20) available forms for the plant. The fertility of the soil has been appropriately increased, which is the main indicator of the turnover of the nutrient value of the soil. In addition, to a lesser extent, but nevertheless, the porous composition of hydroscopic water has increased. The reaction (pH) of the soil is close to neutral, which is a desirable indicator for almost all crops.

It should be noted that, as a result of analyzes of the soil of the nursery plots in other regions, an approximately similar picture is recorded. The experiments carried out have established that as a result of the combined use of organic-bacterial fertilization of organic matter and biological products, along with an improvement in soil fertility, the yield and quality of agricultural products will increase.

Yield of agricultural crops in experimental variants and economic control

Table N3

N	Location	Square Ha	Agriculture Culture	Yield Of Tone		Increase In Yield	
				Trial Version	Proprietary Control	Tone	%
1	Telavi c. Condoli	0,5	Vine	3,3	2,8	0,5	17,9
2		0,5	Vine	3,75	3,1	0,65	21,0
3	Akhaltsikhe c.Клде	1,0	Potato	18,6	16,8	1,8	10,7
4		1,0	Potato	21,4	19,5	1,9	9,7
5	Kutaisi Tskhaltubo	0,5	Corn	2,2	1,8	0,4	22,2
6		0,5	Corn	2,6	2,0	0,6	30,0

Table N4

N	Location	Square	Rural Economic Culture	Whole Harvest Received (In Lars)	Total Cost Received (In Lars)	Increase In Yield (In Tons)	Cost Gain Winning (In Lars)	Organic Costs And Biologics (In Lars)	Rich Income (Profit)	Reimbursement Of Expenses For Organics And	Profitability At 0%
1	Telavi	0,5	Vine	3,3	2310	0.5	350	160	190	2,19	119
2		0,5	Vine	3,75	2625	0,65	455	160	295	2,84	184
3	Akhaltsikhe	1,0	Potato	18,6	9300	1,8	900	160	740	5,63	463
4		1,0	Potato	21,4	10700	1,9	950	160	790	5,94	494
5	Kutaisi	0,5	Corn	2,2	1760	0,4	320	160	160	2,00	100
6		0,5	Corn	2,4	2080	0,6	480	160	320	3,00	200

As can be seen from table N3, as a result of the use of a combined mixture of organic-bacterial fertilizers and biological products, the yield of grapes increased by 17.9-21.6%, potatoes by 9.7-10.7%, and maize by 22.2-30.0%.

Based on the data presented, we have determined the economic efficiency and profitability of the use of fertilizers and biological products for crops.

Our righteous experiments have shown that the use of a combined mixture of liquid organic-bacterial fertilizers of organic matter and biological products is effective, which is confirmed by the data given in Table N4. As can be seen from the table, for each lari spent on the resulting increase in the yield of grapes, the profit amounts to 1.19-1.84 lari, for potatoes 4.63-4.94 lari, for corn 1.00-2.00 lari.

RECOMMENDATIONS

1. A good means of restoring soil productivity is its temporary treatment with a combined mixture of organic-bacterial fertilization of organic matter and biological products (bio-chamber at phytocaten), from the consumption of 20 liters of organic matter per 1 hectare + 10 liters of biocaten + 10 liters of phytocaten.
2. Gradual implementation of the measures stipulated by the rules of the agora as the observance of the correct technological cycle of soil cultivation; correct order of sowing and turnover of crops; compliance with the correct watering regime, etc.
3. Application of green fertilizers together with organic matter to increase the composition of nutrients in the soil.

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At the end, according to the results of our research, recommendations for farmers were developed.