

Agroferment



PURITY AND FERTILITY OF THE SOIL

Agroferment

WHAT FOR?



Increasing
crop
yield



Significant
reduction in the
fruit ripening
period



Suppressing
the growth
and development
of plant pathogens
and root rot



Plant protection
against stress
factors



Protecting soils
from chemical
and physical
factors



Restoring
soil
fertility



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WHAT FOR?

The annually increasing use of pesticides, mineral fertilizers, and chemical plant protection products (PPP) in agriculture, to the detriment of the environment and contrary to common sense, leads to devastating man-made consequences:

ACCORDING TO STATISTICAL DATA:



«As compared to the year of 1957, the humus (fertile) topsoil has been reduced by 80% worldwide.



Over the period of 2009-2015, there was a tendency to the cultivated areas reduction (-5 % against 2009); the most strongly reduced areas are those of cereals and leguminous crops (-10%).

Of the total acreage, 45% of soils are contaminated with pesticides in concentrations exceeding the maximum permissible concentration (MPC) in dozens of times.



During the period of 2005–2015, the growth of phytopathogenic flora was more than 60% against 2005».

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WHAT FOR?

THE SOILS ARE
DEGRADING, AND
THE HUMUS (FERTILE)
SOIL LAYER IS BEING
DESTROYED.

As a result of the use of pesticides and mineral fertilizers, the soil salinity dramatically increases, the content of oxygen and nutrients in the soil decreases, the mobility and erosion of soil-forming elements progresses, which leads to degradation and devastation of the soil cover and destruction of the humus (fertile) topsoil.

THE NATURAL
BIOCENOSIS SYSTEM
OF SOILS IS BEING
DISTURBED.

The intensive use of chemicals in agriculture disturbs the biological equilibrium between the rhizosphere of living organisms, decreases in the amounts of specific saprotrophic soil microflora, inhibits the soil enzyme activity, and leads to a drastic depletion and degradation of the mulch topsoil, which results in a strong fall in crop yields.



THERE IS AN INCREASING GROWTH OF PHYTOPATHOGENIC FLORA
AND ACCUMULATION OF TOXIC SUBSTANCES
IN SOIL AND PLANTS.

The impaired balance and inhibited activity of beneficial soil microflora lead to fatigue and exhaustion of soils, slowing down the decomposition of plant residues and contributing to the accumulation of toxic substances in the soil: lignin, phenols, and other plant toxins. These changes lead to a sharp growth in phytopathogenic flora and root rot. As a result, agricultural crops and seed are increasingly affected by plant pathogens and root rot; crop yields drop sharply; and profitability of agricultural production decreases.

To solve the fundamental problems in the agricultural production: to restore and protect the soil fertility, to protect seeds and crops from plant pathogenic flora and root rot, to increase yields and to improve the agricultural production profitability, innovative research and production group of companies Posad developed and created the enzyme biological product "AGROFERMENT".»

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DESCRIPTION AND CHARACTERISTICS
OF THE ENZYME PRODUCT
"AGROFERMENT"

The soil, which is not poisoned by chemistry, is inhabited by a huge amount of useful microflora – up to 10 tons per hectare and about the same amounts of worms and other «living stuff». The more useful microflora in the soil, the cleaner and more fertile the soil, according to V.I. Vernadsky. This is the «main secret» of high yields!

1986



1ST GROUP

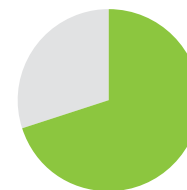
2,500
FARMERS USED
PESTICIDES



got an average yield
of 61 quintals per hectare

2ND GROUP

7,000
FARMERS USED
BIOPRODUCTS



got an average yield
of 74 quintals per hectare

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DESCRIPTION AND CHARACTERISTICS
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INTERESTING SCIENTIFIC FACTS

A large-scale scientific experiment was conducted at the initiative of the Food and Agricultural Organization (FAO) in 1986: 2,500 farmers each applied pesticides (on average 4 times during the growing season); their average rice yields were 61 quintals per hectare. Another group of 7,000 farmers used mainly bioproducts (each of them conducted less than one chemical treatment during the season); the latter got an average yield of 74 quintals per hectare. Following this experiment, the government stopped subsidizing the use of 57 most common pesticides.

(Joyce Ch. Nature helps Indonesia to its pesticides Gill // New Sci. 16 June 1988. P.36)

After an analysis that showed the inefficiency of pesticide application, Pakistan refused government subsidies for the distribution of pesticides back in 1980. In subsequent years, the sale of pesticides was reduced 2–3.5 times without any significant decline in the yields.

(Repetto R. Paying the price: Pesticide subsidies in developing countries // Research Rep. 1985. № 2. P.1-35)

"AGROFERMENT" CONTAINS HIGH
CONCENTRATIONS OF ENZYMES AND
BIOLOGICALLY ACTIVE COMPOUNDS,
ACTIVATING MICROBIOLOGICAL
AND BIOCHEMICAL PROCESSES IN SOIL
AND PLANTS.



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DESCRIPTION AND CHARACTERISTICS
OF THE ENZYME PRODUCT
"AGROFERMENT"

The product restores and activates the soil processes: it contributes to the formation and increases the rate of accumulation (concentration) of useful organic matter and microelements in soil and plants, significantly increasing the rate of biochemical reactions and processes in the soil and plants, improving the assimilation by plants of soil nutrients and microelements.



PHOTO. 1-A



PHOTO. 1-B

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DESCRIPTION AND CHARACTERISTICS OF THE ENZYME PRODUCT "AGROFERMENT"



Photo 2-A. An experience
Photo 2-B. AGROFERMENT



Photo 3-A. Chemical
Photo 3-B. AGROFERMENT



FROM A SCIENTIFIC REPORT:

From the materials of the field research:

«The findings of the scientific study are credible evidence that introducing the enzyme product "AGROFERMENT" in the soil: contributes to the formation and increases the rate of accumulation (concentration) of useful organic matter and microelements in soil and plants. The concentration and activity of soil enzymes significantly

increased, the ability to immobilize molecules of extracellular enzymes improved; therefore, there was a significant increase in the rate of biochemical reactions and processes in the soil and plants.»

«Thus, one-time application of the enzyme product "AGROFERMENT" in the root zone of plants increased the concentration of calcium 1.5 times against the control; that of potassium, 1.3 times; that of magnesium, phosphorus, 1.2 times against the control. The rate of biochemical processes in plants has significantly increased: thus, the intensity of photosynthesis of leaves exceeded the control more than 2 times; the overall growth and the total weight of

plants, relative to control samples, was 75% (Photo 1-A and 1-B); the increase in weight and number of fruits against the control exceeded 1.5 times (Photo 2-A and 2-B).» The fruit ripening period was reduced by 8 days, with respect to the fruit ripening period in the control group.»

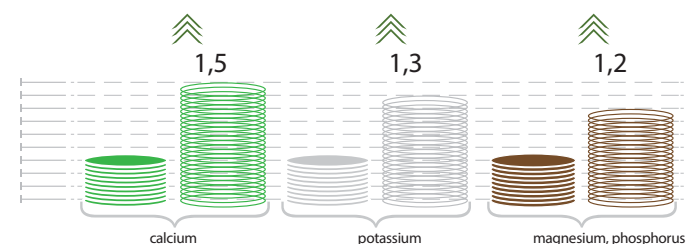


Chart 1. Single application of the "AGROFERMENT" enzyme product

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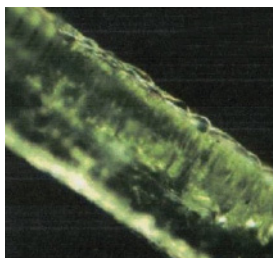


Photo 4-A.
Control
(excessive moisture)

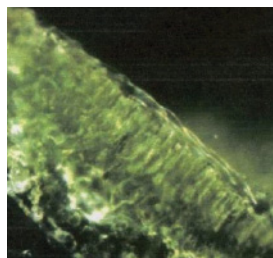


Photo 4-B.
"AGROFERMENT"
(excessive moisture)

FROM A SCIENTIFIC REPORT:

«The findings of the two-year studies conducted at 1. the All-Russian Research Institute of Plant Industry named after I. V. Michurin, revealed the positive effect of the enzyme product "AGROFERMENT" on the functional state, productivity, growth, and development of plants. They convincingly demonstrated its pronounced ability to protect plants from stress factors (excess moisture, drought, rapid changes in temperature, and transplantation). They reliably demonstrated its ability to immobilize molecules of extracellular enzymes, to significantly increase the activity of redox enzymes and biochemical processes in soil and plants, especially under the action of stress factors.»

«One-time application of the enzyme product "AGROFERMENT" in the root zone of plants in the presence of simulated stress factors allowed us not only to preserve, but also to increase the rate of biochemical reactions in plants. Thus, the intensity of photosynthesis in leaves exceeded the control more than 2 times. (Graph 1, p 13).

The parameter of "Photosystem Performance 2" in leaves in the presence of excessive moisture showed that the average Fv/Fm

index over the study period was 0.65 relative units, whereas in the control group it was 0.42 relative units (which corresponds to the plant death condition). The values of dispersion within one plant (which are the main indicator of plant stability) – Fv/Fm – were very low: 0.00009, whereas in the control group they were 0.01.

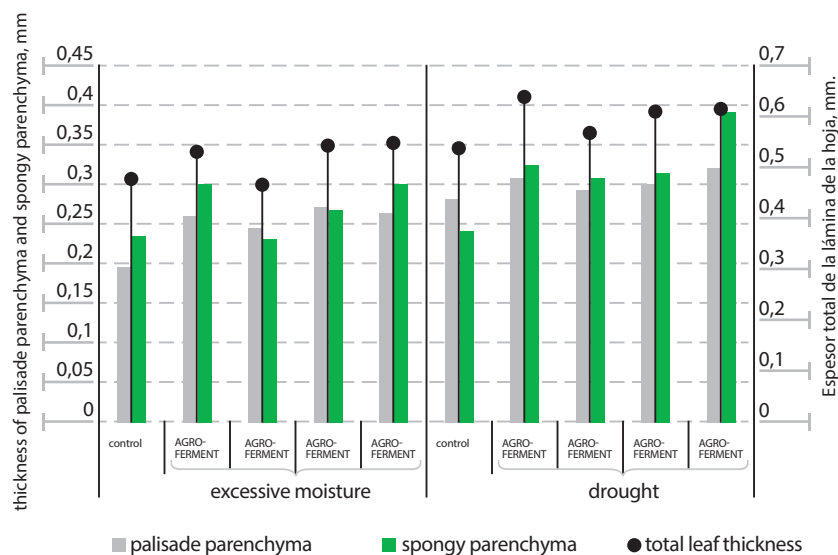
The temperature of the plant leaf blade was by 1.5 degrees lower than in the control group in the "excessive moisture" variant, and by 2.2 degrees higher than in the control group in the "drought" variant.

The percentage of seed germination was 95%, whereas in the control group, this value did not exceed 27% (Photo 3-A and 3-B, Graph 2). The increase in the leaf blade area exceeded more than 2 times the same value in the control group (Photo 4-A and 4-B).»

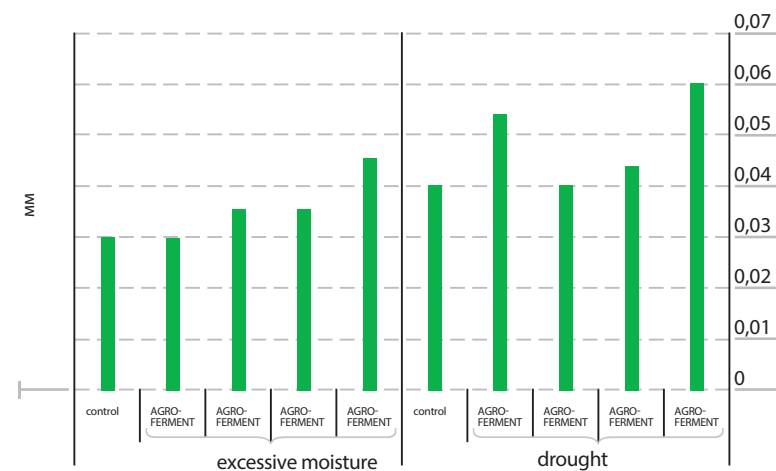
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DESCRIPTION AND CHARACTERISTICS
OF THE ENZYME PRODUCT
"AGROFERMENT"



Graph 1. Anatomic structure of apple rootstock leaf blade exposed to stress factors (excessive moisture and drought)



Graph 2. Thickness apple rootstock leaf blade cuticle exposed to stress factors (excessive moisture and drought)

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DESCRIPTION AND CHARACTERISTICS OF THE ENZYME PRODUCT "AGROFERMENT"

The product restores the fertile topsoil. It prevents degradation and destruction of the soil layer, erosion development, salinity, and soil crust formation. It restores and protects the beneficial microflora of soils from the toxic effects of pesticides, herbicides and other chemicals. It increases the populations and activity of beneficial soil microorganisms in the soil, enhances the soil respiration.

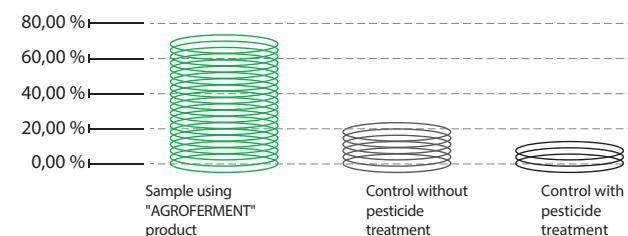
FROM A SCIENTIFIC REPORT:

Based on the materials of the research work carried out at the All-Russian Scientific Research Institute of Biological Plant Protection for the study of the microbiological state of soil microflora in soil samples using the enzyme product "AGROFERMENT", it was convincingly shown that: «The enzyme product "AGROFERMENT" restores and protects the beneficial microflora of soils from the toxic effects of chemicals, including pesticides, herbicides, etc.» «When studying soil samples treated with pesticide preparations, the greatest amount of useful soil microflora (70.5%) was found in

soil samples using of the enzyme product "AGROFERMENT". However, in the first control variant of soil samples (not treated with a pesticide preparation), this value was 13.4%, whereas in the second control variant of soil samples (treated with pesticide), it was 7.2%»

(See chart 2)

Chart 2.
Variants
of soil samples



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DESCRIPTION AND CHARACTERISTICS OF THE ENZYME PRODUCT "AGROFERMENT"

The product inhibits the growth and development of phytopathogens, root rot, especially caused by the pathogen *Fusarium culmorum*, which leads to a sharp decrease in the damage caused by phytopathogens and plant toxins to seeds and crops.

FROM A SCIENTIFIC REPORT:

The materials of scientific research conducted at the All-Russian Scientific Research Institute of Phytopathology on barley, wheat, cucumber, tomato, beet, and other crops, reliably proved the antipathogenic action of the enzyme product "AGROFERMENT" on the causative agents of root rot and phytophthora.

«The analysis of the data obtained during two-year scientific research has shown that high molecular weight fractions of the enzyme product "AGROFERMENT" inhibit the growth and development of phytophthora, root rot, especially caused by the pathogen *Fusarium culmorum*, at a level of 90%.»

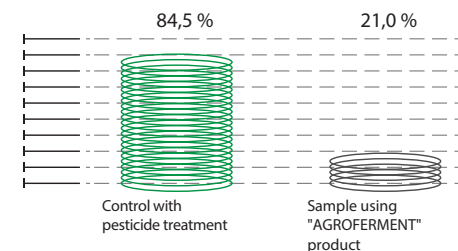
From the materials of a scientific study of the biological state of soils conducted in All-Russian Scientific Research Institute of

Biological Plant Protection:

«The analysis of the obtained data during the scientific study of the soil condition showed that in the control soil samples concentration of *Cephalosporium*, *Rhizopus*, *Alternaria* fungi, as well as *Mucor*, *Penicillium* and *Aspergillus* reached 84.5% and after using enzyme product "AGROFERMENT" was less than 21%.

That clearly indicates the high efficiency of the enzyme product "AGROFERMENT" in suppressing the growth and development of phytopathogenic flora and root rot.» (See chart 3)

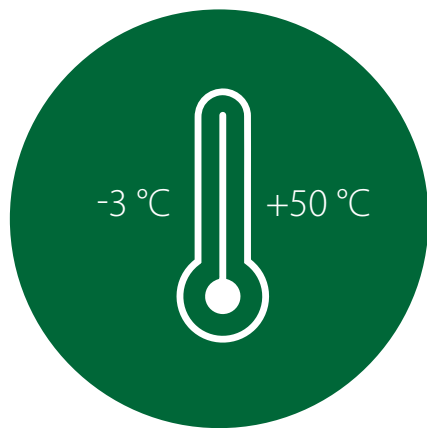
Chart 3.
Variants
of soil samples



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ADVANTAGES
OF THE ENZYME PRODUCT "AGROFERMENT"
WITH RESPECT TO BIOPRODUCTS



Unlike biological products that contain live bacteria and fungi, the enzyme product "AGROFERMENT" is resistant to temperature changes, the state and the chemical pollution of soils.

The effect of the product lasts 4–6 months within a wide temperature range from below zero to +50 °C.



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ADVANTAGES OF THE ENZYME PRODUCT "AGROFERMENT" WITH RESPECT TO BIOPRODUCTS

1

The action of the enzyme product "AGROFERMENT" begins immediately when applied to the soil, whereas biopreparations require a certain time and optimal environmental conditions to start their action (the colonies of living microorganisms must adapt to a new environment; they must have enough nutrients to start their active action – which is virtually impossible, given the current state of soils).

2

The effectiveness and the range of action of the enzyme product "AGROFERMENT" are ten times greater than the effectiveness and the range of action of biopreparations. The reason for this is the amount, high concentration and characteristics of enzymes, in particular, their ability to maintain activity over a wide range of temperature conditions from below zero to +50 °C. In addition, each molecule of the enzyme can react with more than one hundred molecules of the substrate during one second, what makes the enzyme bioproduct particularly valuable for agricultural production, both at low temperatures and during drought

3

Very low consumption of the enzyme product per unit area, in contrast to bioproducts. The reason for this is the amount, high concentration and characteristics of enzymes, nutrients and microelements in the enzyme product. One liter of the enzyme product is used on average for treating 3 hectares of soil.



Photo 5-A. 25.5 tons per hectare

4

Enzyme product "AGROFERMENT" an increase in yield by 2-3 times while improving the quality of products (Photo 5-A и 5-B).



Photo 5-B. 9.5 tons per hectare on the 67th day

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PROCEDURE AND METHOD OF APPLYING THE ENZYME PRODUCT "AGROFERMENT"

The method of applying "AGROFERMENT" does not depend on the plant development phase. It can be used both in pre-sowing soil treatment and during vegetative growth of plants. The best effect is achieved with complex processing: a combination of pre-sowing soil treatment, treatment during vegetative growth of plants and post-harvest soil treatment for soil restoration and acceleration of plant residues decomposition.

1

PRE-SOWING SOIL TREATMENT.

The working solution of the enzyme product "AGROFERMENT" shall be applied onto stubble residues immediately before the 1st or 2nd disk harrowing, or before cultivation using any sprayer with large droplet sprayers, in particular:

- for treatment of cereal stubbles, plant residues of soy, sorghum, maize, sunflower; the product shall be applied immediately during the preparation of the soil, before disk harrowing;
- for the prevention of the Pythium disease of sugar beet;
- before disk harrowing or the main cultivation without soil overturning; application is possible with presowing cultivation, as well as with liquid fertilizers.

2

APPLICATION OF THE PRODUCT DURING THE PLANT VEGETATION PERIOD.

The working solution of "AGROFERMENT" shall be applied during plant vegetation period using any sprayer with large droplet sprayers, or by drip irrigation directly into the root zone of plants.

The enzyme product "AGROFERMENT" restores the natural soil purity, forms and protects from destruction the humus (fertile) soil layer, cleans the soil and restores the soil microflora natural balance after treatment with chemicals, pesticides and herbicides. "AGROFERMENT" contains a unique natural complex of biologically active compounds, phytohormones, macro- and microelements.



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PROCEDURE AND METHOD
OF APPLYING THE ENZYME
PRODUCT "AGROFERMENT"

DOSES AND FREQUENCY OF PRODUCT APPLICATION:

1

SOIL TREATMENT FOR THE RESTORATION OF THE FERTILE TOPSOIL; REMOVAL OF TOXIC SUBSTANCES AND RESTORATION OF NATURAL SOIL MICROFLORA.

The product shall be applied once at a dilution of 1/500. One liter of "AGROFERMENT" is used to prepare 500 liters of the working solution. The working solution "AGROFERMENT" shall be applied onto stubble residues immediately before the 1st or 2nd disk harrowing, or before cultivation using any sprayer with large droplet sprayers.

The product consumption is 1 liter per 1.5 hectares of soil.

2

SOIL TREATMENT TO ACCELERATE THE DECOMPOSITION OF PLANT RESIDUES IN THE TOPSOIL.

The product shall be applied once at a dilution of 1/500. One liter of "AGROFERMENT" is used to prepare 500 liters of the working solution. The working solution of "AGROFERMENT" shall be applied onto stubble residues immediately before the 1st or 2nd disk harrowing using any sprayer with large droplet sprayers.

The product consumption is 1 liter per 1.5 hectares of soil.

3

PRODUCT APPLICATION TO STIMULATE PLANT GROWTH AND DEVELOPMENT.

The product shall be applied once or twice for the whole vegetation period at a dilution of 1/1000. One liter of "AGROFERMENT" is used to prepare 1,000 liters of the working solution. The working solution of "AGROFERMENT" shall be applied using any sprayer with large droplet sprayers over the leaves or in the form of drip irrigation directly into the root zone of the plant.

The product consumption is 1 liter per 3 hectares of soil.



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