HIGHLY EFFECTIVE ENVIRONMENTALLY FRIENDLY ORGANIC-MINERAL FERTILIZER «VITA-FLORA»

2015

Introduction

We present a highly effective organic fertilizer "Vita-Flora". It consists of a complex of natural biologically active polymer substances extracted from lowland peat highly destructured. The fertilizer contains a balanced amount of trace elements important for intensive growth of plants. These microelements are combined in a complex with natural peat polymers and auxiliary substances that improve the solubility of the fertilizer in the water.

The product effectiveness in agriculture

Direct effects

- An increase of growth and germination of seeds
- The formation of a strong root system
- Increased resistance to adverse growing conditions (drought, frost, etc.)
- Improved mineral nutrition
- Acceleration of photosynthesis
- Acceleration of the formation and maturation of the plant
- Strengthening the immune system of the plant
- The growth of mineralization in the plant (vitamins, sugars, oil, gluten, etc.)
- Decrease of the nitrates absorption
- Decrease the pesticides absorption and their effects on the plant

Indirect effects

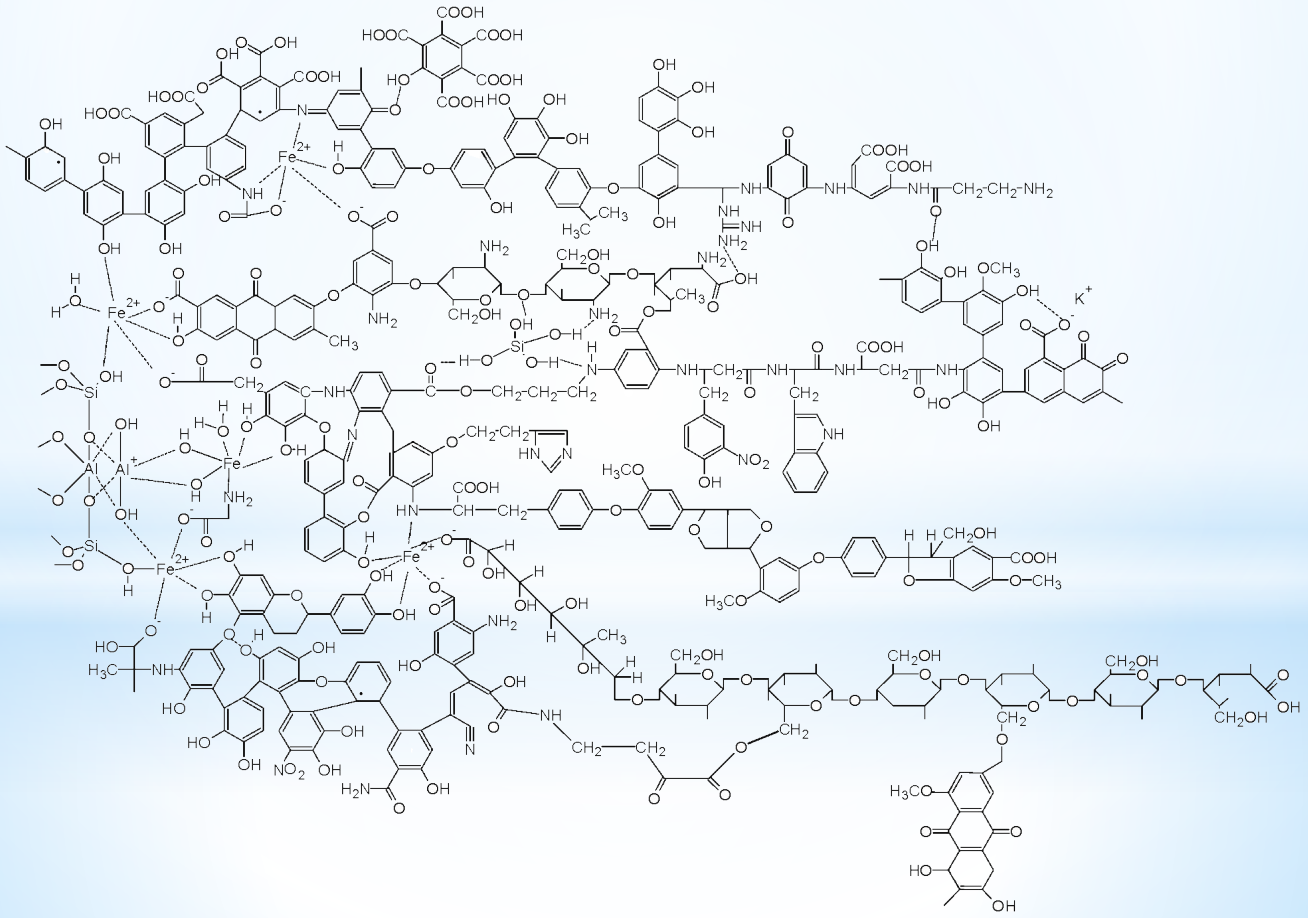
- Activation of soil microorganisms
- Improving the physical and chemical soil properties
- Reduction of minerals ash from the soil upper layers
- Fixation of trace elements in the fertile layer
- Acceleration of the soil recovery process after application of pesticides and toxic chemicals
- Acceleration of the nitrates decomposition
- Acceleration of plant residues humification

The main components of fertilizer "Vita-Flora“

The high physiological activity of fertilizer is caused by the presence of biologically active polymer substances known as humic acids. The formation of humic acids is a result of chemical and biological degradation of plant and animal remains to stable structures which are subsequently combined into macromolecules. Humic acids are widespread in nature and are the basis fertile soil layer.

The structure of turf humic acids

The study found that only humic acids of low molecular weight, in the form of alkali metal salts, exhibit the high biological activity. This knowledge became the basis in the production of fertilizer "Vita-Flora". These active humic acids can be conventionally represented by the formula:



Effect of humic acid on the growth and development of plants

- Impact on the growth phase of plants similar to phytohormones
- Increasing the permeability of the cell membrane
- The use of humic acids as the building blocks of the cell
- Synergism with other biologically active structures, such as enzymes
- Increasing of the ion exchange between the cytoplasm and the soil
- Increasing the number of trace elements available to plants
- Fixation of 2- and 3-valent metal cations (Ca2 +, Mg2 +, Fe3 +, Al3 + ...) at the upper layer of soil
- Fixation of mobile forms of nitrogen in the soil

The use of humic acids salts as independent physiologically active components

The application fields of humic acids

- Plant growth natural stimulants
- Stimulants of soil microflora
- Substances that accelerates natural substances composting
- Detoxicants of soil
- Basis for mineral supplements in animal feed
- Natural immunomodulators for animals
- Cosmetic ingredients

The microelement composition of the fertilizer "Vita-Flora"

Another part of the fertilizer "Vita-Flora" is microelements in an accessible form for assimilation by plants. Microelements play an important role in the structure of plants. Being the components of enzymes and biologically active structures, they take part in many metabolic processes. Therefore, a lack of even one trace element will depress the growth and development of the whole plant. Being in the soil as inorganic salts, microelements can be inaccessible or easily washed out with intensive watering.

For this reason, in the composition of "Vita-Flora" all essential microelements are collected in the form of highly-active organic complexes. They are K, Mg, Fe, Cu, Zn, Mn, Co, Mo, B.

Influence of microelements on plants

The functions of microelements	Microelement							
	Mg	Fe	Cu	Zn	Mn	Co	Mo	B
The effect on the enzyme system		+	+	+				
The effect on photosynthesis	+	+	+		+			
The effect of the synthesis of chlorophyll	+	+						
The effect on energy transfer	+				+			
Involvement in the metabolism of N		+		+	+		+	
Involvement in the metabolism of S		+						
Involvement in the metabolism of carbohydrates			+	+				+
Involvement in the metabolism of proteins			+					
Involvement in the synthesis of phytohormones				+				
Increasing of phytohormones activity								+
Involvement in the synthesis of RNA and DNA								+
Fixation of atmospheric nitrogen						+	+	
Involvement in the synthesis of vitamins						+		

Advantages of microelements in chelate form

In the fertilizer "Vita-Flora" microelements are presented as complexes with natural and auxiliary organic substances, called chelates. Such complexes have several advantages over the salt forms of microelements, the most important of them are:

- High efficiency of microelements metabolizing
- High availability of microelements for plants
- Prolonged time of microelements presence in the fertile soil layer
- Inability of microelements to the transformation into insoluble salt

Safety of fertilizer "Vita-Flora“

Organic fertilizer "Vita-Flora" is absolutely safe when used. It belongs to the lowest - IV class of danger for such indicators as:

- Effect on skin and mucous membranes
- Influence on an organism by ingestion through the gastro-intestinal tract
- Influence on an organism through the respiratory system

This study of toxic effects has been conducted at the **State University "Institute of Hygiene and Medical Ecology of O.M.Marzeyev, NATIONAL ACADEMY OF MEDICAL SCIENCES OF UKRAINE ".**

The effectiveness of the complex organomineral fertilizer "Vita-Flora"

Investigation of the effectiveness of fertilizer was conducted on the basis of **"Institute of Water Problems and Melioration of National Academy of Agricultural Sciences of Ukraine."**
To get the most objective results, the research was conducted at fields in threefold repetition for such crops as:

- Spring barley hybrid "Stalker"
- Sunflower hybrid "Jason"
- Sugar beet hybrid "Portland"
- Tomato hybrid “Kenach”
- Onion hybrid “Rhythm F1”
- Begonia bushes

In all the cases we conducted both pre-sowing seed treatment and triple fertilization (during the period of active growth, flowering and early fruiting).

The field tests results of fertilizer "Vita-Flora"

Crop	Control, t/ha	"Vita-Flora", t/ha	± to control	
			t/ha	%
Spring barley	2,91	4,57	1,66	57,04%
Sunflower	1,89	2,86	0,97	51,32%
Sugar beet	29,7	44,5	14,8	49,83%
Tomato	43,4	59,7	16,3	37,56%
Onion	18,0	24,9	6,9	38,33%

Seed treatment and triple fertilization (1,5 liter per 1 hectare) during period of active growth, flowering and early fruiting was conducted in all cases of “Vita-Flora” research.

The fertilizer's effect on the growth and development of begonia

Variant №	Plant height, cm	The duration to bud period, days	The diameter of the flower, cm
Control	27	54	5,8
"Vita-Flora"	35	48	6,6

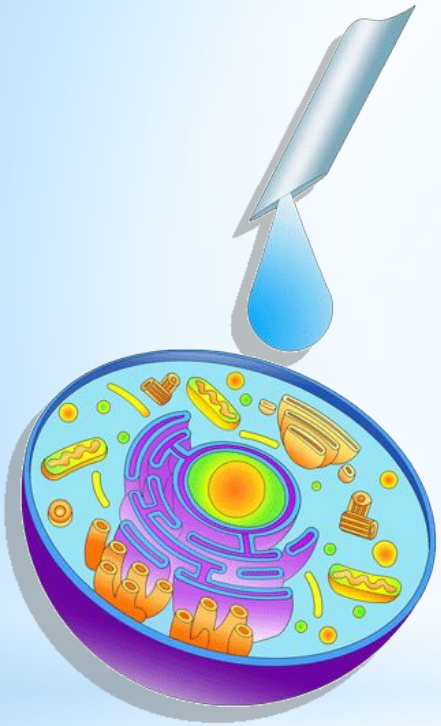
The investigations were conducted on begonia tuberous in containers. 50 ml of working solution was used per 1 liter of container's volume. The working solution contained 1.5 ml of fertilizer "Vita Flora" per 1 liter of water. The fertilization intervals were 14 days.

Analysis of the factors leading to the improvement of the main indicators of agricultural and ornamental crops

Factors, affecting the increase of quality and quantity of the harvest under application of "Vita-Flora“, were analyzed and identified as:

- High germination of plants
- A high proportion of productive plants
- Increased resistance to disease
- Increase in the number of fruits and seeds per plant
- Increase in the average weight of fruits and seeds
- Resistance to adverse growing conditions

Effect of fertilizer "Vita-Flora" on microorganisms



Fertilizer "Vita-Flora" has a significant impact on soil microorganisms and soil structure in general. When applying fertilizer it was noticed the increase in the resistance of microorganisms to such stress conditions as:

- Temperature fluctuations
- The presence of heavy metals
- Soil pH changing
- Pollution of soil by nitrates, pesticides and toxic chemicals

The formation of focal forms of microorganisms is observed in the polluted soil areas under the influence of fertilizer. It promotes rooting of plants and, with time, restores the fertile layer.

The product effectiveness in soil capability recovering

Indirect action

- Stimulation of metabolism of microflora with the soil
- Increasing survival of microorganisms in a stressful environment
- Fast focal growth of microorganisms colonies that are resistant to the conditions of the soil environment
- Absorption of nitrates, chemicals and pesticides by microorganisms in the colony
- The formation of conditions for plant growth in the areas of soil restoration
- Creating conditions for the further development of the soil microflora

Direct action

- Binding of heavy metals into the inactive complexes
- Adjusting the pH of the soil
- Reducing the toxic effects of pesticides and chemicals due to their transformation into the complex
- Retention of moisture in the soil

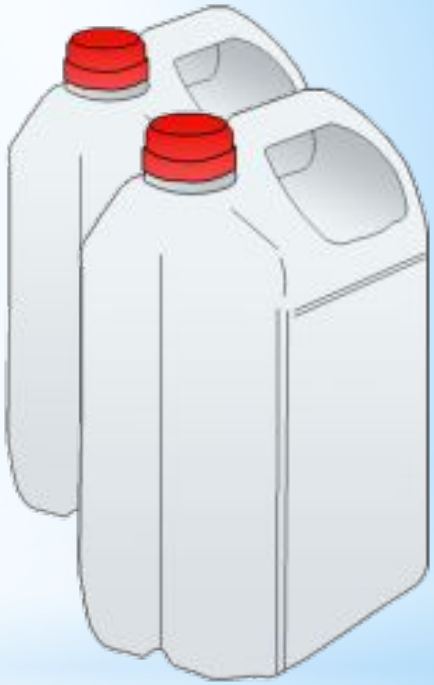
Joint application of fertilizer "Vita-Flora" and mineral fertilizers

Due to the complex influence on the development of plants, microorganisms and soil structure, the use of fertilizer "Vita-Flora" promotes a significant reduction (per 25%) of application of popular nitrogen fertilizers, such as urea and nitrates.
It is connected with:

- Fixation of mobile forms of nitrogen in the fertile soil layer
- Increasing of nitrogen absorption by plants
- Increase of decomposition of nitrogen in nitrate forms by microorganisms
- Removing of the toxic effects of nitrogen fertilizer

The characteristics of fertilizer "Vita-Flora"

Hydrogen index (pH)	7÷9
Density at 20 ^{0}C, g/cm^3	1,025÷1,400
Mass fraction of organic substances (including humic and fulvic acids), %	2,0-8,0
The mass of total nitrogen (N),%, not more than	1,0±0,5
The mass of total phosphorus (P_2O_5), %	0 - 15,0
The mass of total potassium (K_2O), %	0 - 20,0
The mass of magnesium (Mg),%	0 - 0,15
The mass of zinc (Zn), %	0 - 1,5
The mass of boron (B), %	0 - 0,6
The mass of ferum (Fe), %	0 - 0,75
The mass of cuprum (Cu), %	0 - 0,6
The mass of manganese (Mn), %	0 - 0,75
The mass of nickel (Ni), %	0 - 0,08
The mass of cobalt (Co), %	0 - 0,08
The mass of molybdenum (Mo), %	0 - 0,08



The final product is a homogeneous brown suspension. The presence of a slight sediment is allowed.

Depending on the customer needs the product may contain the above spectrum of microelements in any proportion.

The advantages of "Vita-Flora" application

- Universal effect on all plants
- A significant increase in crop yields
- The possibility of applying at any stage of plant development
- Increasing of resistance of plants to such stress factors as temperature stress, toxic effects of agrochemicals, etc.
- The possibility of reducing application of nitrogen fertilizers
- Fertilizer "Vita-Flora" can be used by standard methods without special equipment, for example, at the same time with irrigation
- Fertilizer "Vita-Flora" is absolutely safe for animals and humans
- The absence of toxic effects on plants in the case of overdose
- Application for soil fertility improvement
- The use of fertilizer in the "green agriculture" at cultivation of environmentally friendly products

Conclusions

"Vita-Flora" is a universal fertilizer that is highly similar to the composition of the natural fertile soils. It contains the most complete composition of microelements essential for plant growth in combination with activated natural humic acids and auxiliaries.

Thank you for your attention

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