



*Agrochemicals  
for intensive  
crop production*

**CATALOGUE**



*"The abundance of fertilizers can not replace the lack of knowledge"*  
D.N. Prianishnikov

The group of companies **AgroMaster** is a professional organization dedicated exclusively to the effective and comprehensive nutrition of agricultural crops and other plants. Only a true Master of Agronomy can understand needs and requirements of a plant organism in every period of its life and to achieve a desired result.

All the plants, notwithstanding methods of cultivation, need nutrition, so the activity of the group of companies covers all areas, from field crops in rainfed conditions to the organization of the nutrition of vegetable, fruit and ornamental crops using drip irrigation systems in the open and protected ground.

A comprehensive plant nutrition is not only one of the main factors of high yield of quality products, but it also leads to the comprehensive nutrition and good health of people. It is the harmony of man and nature. Plants, as the first link in the food chain, are a source of protein, fat, carbohydrates, vitamins, minerals and biologically active substances, both for people and for agricultural animals. The malnutrition of plants leads to the need to use synthetic feed and food additives, vitamins and minerals in the diet of humans and animals, violating the harmony of nature.

The professionals working for the company **AgroMaster** have extensive expertise in the use of special agrochemicals of European standards in Russia, which are not manufactured by the national chemical industry. The knowledge of the entire range and the correct use of bio-stimulants, fertigators, leaf fertilizers, chelated trace elements allows to obtain results in the most difficult conditions.

A detailed study of modern agrochemicals and peculiarities of their production has allowed in 2011 for the first time in Russia to build the most modern plant with the European equipment and basing on European technologies, which fully comply with international standards of the fertigators and leaf fertilizers production. All the main raw materials are purchased from leading manufacturers and are fully compliant with standards for chemical purity. The agrochemicals **AgroMaster** and **Plantafeed** do not contain sodium, chlorine and carbonates, fully water-soluble and have a very high content of chelated trace elements in comparison with similar in-class fertilizers.

The production of these fertilizers is based on knowledge and experience with regard to their specific application in Russia, which puts them at a higher level as compared to the traditional European agrochemicals of these standards.

2015 represents a new turn in the **AgroMaster** activity as it started to produce the whole range of special agrochemicals needed in intensive production, including: biostimulators; chelated trace elements; fertigators; leaf fertilizer and adjuvants.

Today the group of companies **AgroMaster** is a team of professionals that develops its own high-tech production and solve the problems of plant nutrition, yield and quality of products successfully, and activity of which have been basing on the following principles for many years:

- high competence of employees;
- high quality of produced and sold products and services;
- honesty and mutual trust;
- mutually beneficial partnership for the long haul;
- the world's best achievements are for the benefit of Russia.



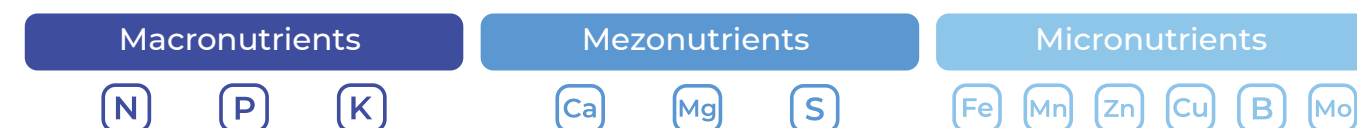


# Important Issues Of Plant Nutrition

For recent years, a huge number of new agrochemicals have been registered, details of which can't be found in the agrochemical handbooks, as domestic standards, which were adopted way back in the Soviet period, don't just contain such taxonomic units. Neither "Leaf fertilizers" and "Fertigators" were produced, nor micronutrients for agriculture chelated in the Soviet Union, and, accordingly, there was not studied effectiveness of agrochemicals in the agricultural production. But what is worse it is the fact, that the new agrochemicals are said to contain some items with supposedly miraculous characteristics and which are advertised, but in fact they have little to do with agricultural chemistry.

A plant, like any living organism, may contain a given amount of almost all the elements of the periodic system (including harmful ones to the plant organism) in its tissues, but not all of them are really needed for the sustenance of the plant. Therefore, the point of view that the more elements in an agrochemical are, the better, is clearly erroneous.

Long ago scientists discovered the fact that for the normal development plants need the chemical elements for their life, which are divided into groups according to the degree of content in plant tissues:



More recently Cl-chlorine and Ni-nickel were included in the list of essential micronutrients. Without these elements the life cycle of any plant can not be properly completed; they are irreplaceable in essential physiological functions and they are directly involved in the metabolism of the plant. Besides the abovementioned elements, there are so-called useful nutrients - Na-sodium, Si-silicium, Co-cobalt, Se-selenium and Al-aluminum, which can stimulate the growth and development of plants, but does not fully comply with the requirements, which the necessary elements do, because mostly they become necessary in certain conditions only, and only for some species of plants. (N.P. Bityutsky. *Micronutrients and plants*. Saint Petersburg University Publishing House, 1999, pp. 11-13)

Without any doubts such main structural elements as carbon (C), hydrogen (H) and oxygen (O), are necessary, but they are absorbed by a plant mostly in a sufficient amount of water and air.



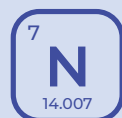
**N.B!** A plant needs all these necessary elements for its nutrition at the same time, but another issue consists in the fact that the degree of consumption is different both in amounts and proportions of NPK depending on phases of vegetation. In addition, there are specific needs of agricultural crops in micronutrients, which require increased application of certain micronutrients in certain phases of development. Therefore, you should be wary of the type of fertilizers such as "grain", "potato", "beet", "tomato", "olive", etc., as with agronomic point of view - this is nonsense. It is impossible to apply the same composition throughout the whole vegetation process.



## Main effect of necessary mineral nutrients On processes of determining the yield and its quality

### Macronutrients

their removal from the harvest is calculated in kilograms per tonne of product

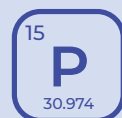


**Nitrogen**

#### Protein metabolism

It is a formation element of organic substance. It adjusts the growth of the vegetative mass. It determines the level of productivity.

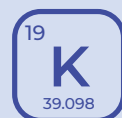
The excess reduces the quality of the fruit, thickness of cell walls, keeping capacity, immunity, drought resistance, winter hardiness and frost resistance.



**Phosphorus**

It is an element of the energy supply (ATP, ADP) and transfer of genetic information (DNA, RNA)

It activates root growth and the processes of formation of generative organs. It accelerates the development of all processes. It increases winter hardiness.



**Potassium**

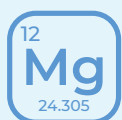
#### Carbohydrate metabolism

It is an element of the cell youth. It maintains and retains water, increasing the viscosity of protoplasm. It enhances the formation of sugars and their movement within the tissues.

It increases the thickness of cell walls, lodging resistance, disease, drought and low temperature resistance. It slows the vegetative growth.

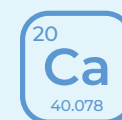
### Mesoelements

their removal from the harvest is calculated in kilograms per tonne of product



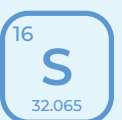
**Magnesium**

It increases the rate of photosynthesis and the formation of chlorophyll, pectin and phytin. It affects redox processes. It activates enzymes and enzymatic processes.



**Calcium**

It stimulates the plant growth and root development. It increases metabolism, it activates enzymes. It strengthens cell walls and "glues" them with each other. It increases the viscosity of protoplasm.



**Sulfur**

It participates in the nitrogen and protein metabolism, is a part of amino acids, vitamins and vegetable oils. It affects the redox processes, activates enzymes and synthesis of proteins and chlorophyll.

### Micronutrients

their removal from the harvest is calculated in grams per tonne of product



**Molybdenum**

It regulates nitrogen, carbohydrate and phosphorus metabolism, synthesis of chlorophyll and vitamins, stimulates the fixation of atmospheric nitrogen. It has cryoprotective function, increases drought resistance.



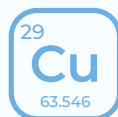
**Manganese**

It regulates photosynthesis, respiration, carbohydrate and protein metabolism. It is included in the enzymes and activates them. It stimulates the synthesis of vitamins and accumulation of sugars. It reduces transpiration.



**Zinc**

It regulates protein, lipid, carbohydrate and phosphorus metabolism and the biosynthesis of vitamins and growth substances - auxins. It protects proteins and lipids from oxidative degradation. It increases the water holding capacity of plants.



**Copper**

It regulates respiration, photosynthesis, carbohydrate and protein metabolism. It is included in the proteins and enzymes. It increases drought -, frost - and heat resistance.



**Boron**

It regulates the formation of generative organs, their pollination and fertilization, carbohydrate and protein metabolism, movement of sugars. It increases resistance to diseases.



**Ferrum**

It regulates photosynthesis, respiration, protein metabolism, redox processes and chlorophyll biosynthesis and growth substances - auxins.

The main volume of the necessary nutrients is absorbed by plants from the soil by the root system, therefore, to obtain the planned harvest is necessary to add required quantity of nutrients into the soil taking into consideration its fertility. At this stage, agronomists have a number of questions and problems.

If phosphorus provides all processes (ATP, ADP) with energy, the nitrogen and potassium in plant nutrition are like two counterweights, balance and proportion of which determine the direction of metabolic and synthetic processes, and an imbalance leads to a significant reduction of quantitative and qualitative indicators of economic yield.



Currently, there are many ways to calculate doses of fertilizers on the planned yield, but they are all, in one way or another, connected with the regulations of removal of economic nutrient elements by cropper, coefficients of nutrients use by plants from the soil and fertilizers and with the content of available nutrients in the soil. The difficulty consists in the fact that all of these measures (except planned yield) are not and can not be fixed even on the same field with single-cropping, since they are affected by a huge number of external factors. Furthermore, the sufficiently different data (and with a huge "gap" among indicators) are contained in various sources subject to these parameters.

A lot of issues is connected with the chemical analysis of the soil on the content of available mineral elements forms to plants, which with regard to a number of points has not been updated since the Soviet times. Can we consider the results of these tests are absolutely correct, if in the late 80-ies of the last century, one of the leading agrochemists of the country, an Academician of the Soviet Academy of Agricultural Sciences, B.A. Yagodyn, in respect of mobility, accessibility and the methodology wrote:

*"The notion of "mobility" has not yet been clearly defined in the scientific literature. Most researchers consider this term as all forms and amounts of micronutrients that go into any extract: water, salt, into dilute strong mineral and weak organic acids, alkalis and other solutions. While they do not often differ mobile and available to plants forms of micronutrients." And further:*

*"The range of the used extracts (in the soil agrochemical analysis, A.H.) is extremely large, from strong acids to aqueous solutions. A large part of them is aggressive and it hardly extracts only micronutrients, which are available to plants. Comparing the size of plant micronutrients consumption with their amount in soil taken by aggressive extract, it was shown that the plants use less than 1% of the extracted soil minerals."*

Therefore, caution should be exercised when we assess the soil provision with micronutrient digestible forms. (Agrochemicals. B.A. Yagodyn, P.M. Smirnov, A.V. Petersburgskiy, etc .; Edited by B.A. Yagodin.- 2nd ed, revised and enlarged - M.: Agropromizdat 1989, s.323-324)

But now the results of chemical analyzes on the content of the available forms of macronutrients in the soil, especially on potassium, cause doubts. Thus, the contents of the rolling stock (exchange) of potassium in the soil remains permanently average, increased, or high from the large-scale agrochemical soil survey in the USSR in 80-ies of XX century. It's resulted in the use of low doses of potassium fertilizers on the farms.

The author, agronomists of many farms, specialists of the Research Institute of Agricultural mark deterioration of the phytosanitary state of crops as compared to the last decade of the last century. It increases the number of expensive fungicide treatments and reduces production efficiency. It is also noted the deterioration of quality indicators and the uneven ripening, reduced keeping quality, drought - and frost resistance, as well as high responsiveness of plants (sometimes even with striking visual effect) on the foliar special potassium-containing fertilizer. **All these signs are a consequence of an imbalance: the excess nitrogen and potassium deficiency in plant nutrition.**

It's interesting that the definition of the content of available potassium in the soil, when using laboratory Lasa 100 Agro (Germany), gives the result on the same sample in 4-5 times lower than the result obtained by traditional (GOST) method.

These circumstances require from agricultural science to develop new methods for defining the available forms of mineral nutrition elements for plants and a clear statement of this concept, and from agronomists - greater attention to potassium nutrition of plants.

"Plants have versatile and close links with the environment. In case of favorable combination of all life factors we get maximum plant productivity and crop quality. The deficiency in one of the plant life conditions inhibits its development and the lack of one results in the death. In farming practice we often face a lack of nutrients, water, alkaline or acidic soil solution, and sometimes a lack of air, especially oxygen therein. Creating good conditions for plant nutrition all issues are important. Underestimating one or another factor inevitably leads to failure. D.N. Prianishnikov meant especially this fact when he said that the excess of fertilizers could not replace the lack of knowledge. " (V.D. Pannikov, V.G. Mineev "The soil, climate, fertilizing and harvest" Agropromizdat M., 1987, p. 40)

The fact is that even in the highly productive soils and fertilized plants may experience starvation from lack of certain essential elements due to different causes. In fact, any soil-climatic conditions and the presence of nutrients themselves can influence on their own mobility and assimilation by plants. **That is, even when there is a sufficient amount of food elements in the soil, the plants are not always able to use them fully, and eating balance disorders (especially during critical periods) are direct losses of yield and quality.**



## Factors reducing mobility and the assimilation of mineral nutrients plant root system

(*Micronutrients in the USSR, Vol. 21, Riga, ed. "Zinatne", 1980, p. 56, updated by the author from various sources*)



Low temperatures, high doses of phosphate and nitrogen fertilizers, excessive chalking or high carbonate content, soil compaction, low in organic matter.



The low temperature of the soil, dry weather, low light intensity or high carbonate content lime soil, high ion content of P, Fe, Cu, Zn, in the soil, high organic matter content.



Low or high temperature, high humidity of the soil, abundance of P and K in the lack of soil, excessive chalking or high carbonate content, the high content of Mn, Zn, Cu, bad aeration, high content of organic matter.



High concentrations of ions Mn, Fe and Cu, and sulfate ions in the soil, higher doses of nitrate nitrogen, high organic matter content, acidic soil.



Hot weather, the high concentration of ions P and N in the soil, high content of Fe, Mn, Zn in the soil, acidic sandy and peaty soils, high in organic matter.



Drought, excessive humidity, light intensity, carbonate or lime soils with a high pH, the abundance of nitrogen and potassium fertilizers.



Cold weather, cold and compacted soil, poor microbiological activities, plowing a large amount of straw, the lack of light and moisture.



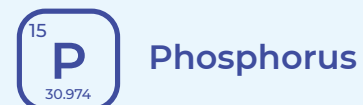
Dry and warm weather, fluctuating soil moisture, abundance of NH<sub>4</sub> ions, potassium and magnesium fertilizers, low pH values.



Low temperatures, excessive doses of phosphorus and nitrogen fertilizers, the high concentration of selenium in the soil.



High doses of fertilizers containing ions K, Na, Ca, NH<sub>4</sub>.



Low soil temperature and air surplus ions Al, Fe, Mn, chloride and nitrate ions in the soil, the low pH.



The warm and dry weather, a high content of Ca and Mg ions in the soil.

This table confirms the law of natural balance and that the "advantages" in its pure form don't exist, every "plus" has a "minus". Thus, liming acid soils, organic fertilizers, nitrogen fertilization or carrying nitrogen application (for which these operations are actually carried out) have a number of "cons," which must be considered within its implementation.

It is known that the use of nutrients from fertilizers by the root system of open ground crops cannot be called high. By using the difference method, it was found that if nitrogen and potassium of nitrogen and potash fertilizers are applied to the soil, the effectiveness of plants' using 50-70% (Petersburgskiy, 1979), and phosphorus on various soils from 15 to 40% (Koren'kov 1980; Shaposhnikova, Listopadov, 1984; Emelyanov, 1986). But that method didn't not take into account the increase of mineralization of soil nutrients when fertilizers were applied.

More recent studies by agrochemical tracer found that plants absorb in field conditions directly from fertilizer: nitrogen - 30-40%, potassium - 25-35%, and 10-15% of total phosphorus. (Agrochemistry. B.A. Yagodyn, P.M. Smirnov, A.V. Petersburgskiy, etc.; Edited by B.A. Yagodyna.- 2nd ed, revised and enlarged – M.: Agropromizdat, 1989, p.244, 265)

It is also known that the smaller dose of fertilizer leads to the better use of its nutrients by a plant. But if nitrogen fertilization allows fractional introduction (with enough moisture in the soil), what should we do with the phosphorus and potassium, especially in cultures of continuous sowing and during critical periods of development?

The lack of adequate nutrition of plants in a particular period of life causes a reduction in yield and deterioration of its quality. It is particularly important to provide the plants with nutrients in the critical period of development, when the size of nutrient consumption is small, but its presence and balance are extremely important, as at this moment the plants manifested the same high sensitivity as a deficiency and an excess of mineral nutrients. Critical period of development of all basic agricultural crops (except for root and tuber crops) is the formation of the rudiments of the generative organs (the actual future harvest). It falls on the early phases of development for annual crops, (for example, for cereals - from the beginning to mid-tillering booting, for maize - 3-5 leaves, to the 7th leaf in late-maturing, for sunflower - 2-4 pair of true leaves, etc.).

High requirements of young annual plants to the conditions of mineral nutrition during this period is due to the high intensity of synthetic processes occurring in the plant body at the time, and simultaneously underdeveloped root system and leaf apparatus.

The provision with all the necessary nutrients is highly important within this period, but the most critical thing is the shortage of phosphorus (energy). Nothing cannot correct it later.

**Taking into consideration the plants high need for balanced nutrition during the critical period of development and difficulties in the assimilation of essential elements by the root system at the time, even if they are in the soil, foliar dressing with special full-component water-soluble complexes of NPK + microelements (Plantafid, Agromaster) and special physiology stimulating agrochemicals (line Aminofol and Maxifol) takes on particular significance.**

(*The section is composed subject to the data: A.B. Khoroshkin "Ways to improve the efficiency of mineral nutrition of agricultural crops", GNU Donskoi Agricultural Research Institute of Russian Agricultural Academy, Rostov-on-Don, 2011*)





Special Agrochemicals Of Directive Effect





# Aminofol Plus

Special high-amino acids antistressant

**Aminofol Plus** – Special high-amino acids antistressant. Appliance of **Aminofol Plus** encourages plants to overcome abiotic stress, to enhance metabolism and to improve nutrient availability, which significantly increases the yield productivity and product quality even in disadvantaged conditions.

Number of amino acids such as **Tyrosine, Arginine, Alanine, Lysine, Proline, Serine, Threonine, Valine** and **Glutamine** stimulate plant physiology and growth, by providing the ready-made energy reserve to the biological processes under adverse conditions (frost, low or high temperatures, hailstorm, chemical burn, osmotic stress, etc.) On addition with foliar feedings **Aminofol Plus** expands the temperature thresholds of its efficiency, increases an ability of plant food element fixation, enacting the role of transport agent as far as the aminoacids are satisfactory chelators of plant food elements. **Aminofol Plus** can be combined with the use of pesticides increasing its productivity. It provides cultivated plants to overcome herbicide stress easily by stimulating nutrient metabolism, while a weedage plants become more sensible for herbicide action.

## Composition (w/v – in 1 liter of product - %):













Total amino acids	59.0
Total Nitrogen (N)	10.5
Organic Nitrogen (N)	9.4
Amide nitrogen (N)	1.1

## Physical characteristics:



Appearance	Liquid
Color	Brown
Density (g/cm <sup>3</sup> )	1.18
pH (1% water aqueous solution)	6.7
Conductivity 1‰ (mS/cm) 18°C	0.13
Crystallization point	-1°C





## Foliar Application

 <b>Sugar beet, table beet, sunflower</b>	1 application at the 2nd leaf stage and further	0.5-3.0 l/ha; consumption of ready-mixed solution – 150-300 l/ha
 <b>Cereals, maize, sorghum</b>	1-2 applications from the beginning of tillering till heading stage (maize from the 3rd – 5th leaf stage)	0.5-2.0 l/ha; consumption of ready-mixed solution – 150-300 l/ha
 <b>Stone fruits</b>	1-2 applications at pre-flowering stage at 7-10 days interval and post-flowering	0.5-1.5 l/ha; consumption of ready-mixed solution – 150-300 l/ha
 <b>Grapes</b>	1 application at pink bud stage, after petal fall, at "walnut" stage and a stage of 6-7 cm	1.0-3.0 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
 <b>Strawberry</b>	1 application at pre-flowering stage, after petal fall and 1-3 treatments during fruit growth at 10-15 days interval	1.0-2.5 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
 <b>Leguminous plants, sinapis, oiled rape, buckwheat, linum</b>	1 application from the 3-5th leaf stage, at the begging of flowering, at the end of flowering and 2-3 treatments during a development and a growth of berries	1.0-3.0 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
 <b>Pome fruits, citrus</b>	1 application at the end of growing season in autumn, at the beginning of growing season, at the beginning of budding stage and further 2-3 treatments at 15-20 days interval	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-400 l/ha
 <b>Cucumber, patty pan squash, melon, summer squash, watermelon, tomato, peppers, eggplant</b>	1 application before transplanting (or at 4-5th leaf stage), after transplanting and further 5-7 treatments at 10-12 days interval	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-400 l/ha
 <b>Potato</b>	1 application at stage of fully sprouted seeds, at the begging of flowering and further 1-2 treatments at 10-15 days interval	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-400 l/ha
 <b>Vegetable crops, cabbage</b>	1 application at the 3rd leaf stage and further 2-4 treatments at 10-15 days interval	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-400 l/ha
 <b>Onion, garlic</b>	1 application at the 3-5th leaf stage and further 3-4 treatments at 10-14 days interval	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-400 l/ha
 <b>All crops</b>	1 application on the threshold and after expectable frosts, at lack or excess of moisture and other stress events 2-3 treatments at 7-10 days at interval	1.0-4.0 l/ha; consumption of ready-mixed solution – 200-1000 l/ha

## Fertigation

 <b>Vegetable crops, cucurbits, fruit and berry crops</b>	soil application during vegetative period	3.0-6.0 l/ha; consumption of ready-mixed solution – Depending on application rate
 <b>Vegetable crops, cucurbits, fruit and berry crops</b>	soil application (Drip irrigation, daily application)	0.2-0.3 l/ha; consumption of ready-mixed solution – Depending on application rate

-  1 liter bottle, box with 20 bottles of 1 liter
-  5 liter canister, box with 4 cans of 5 liters



Don't mix feeding with processing of copper-bearing fungic ides. If required to increase the efficiency of any foliar feeding shall be added – 0.5 l/ha.





# Maxifol Line

Product line **Maxifol** is specially created for farming under extreme conditions in Russia. One of the key-element, which is contained in each of the seven products of this line – extract of brown algae - *Ascophyllum nodosum*. Why especially these algae are better to use for the extracting of biologically active substances?

First and foremost, these plants vegetate at the most extreme conditions of Arctic Basin in tidal zone. Average annual temperature of water is no more than + 4°C, on top of that, during an undertow the algae reside at the water surface and often strand at fatal conditions for a plant's life. It is under the influence of extremely unfavorable environmental conditions the algae *Ascophyllum nodosum* gain the capacity to counter stress due to the highest content of biologically active substances. In addition, it is vitally important that the active obtained components are well preserved in the extract and easily assimilated by other plants which thus gain vitality and stability under extreme conditions.

The super-concentrated extract of seaweed *Ascophyllum nodosum* contains in a naturally balanced form - macro- and microelements, carbohydrates, amino acids, antioxidants, alginic acid and natural phytohormones: cytokinin, auxin, gibberellin and betaine. These active components strengthen the resistance of plants to stresses of different etiology, promote the increase of quantitative and qualitative yield parameters.

Each agrochemical of the **Maxifol** line is additionally enriched with the necessary meso- and microelements, the need for which repeatedly increases in certain periods of vegetation. Thus, the **Maxifol** line represents a number of agrochemicals for sequential use in the phases of growing crops, to increase metabolism and enhance the reactions and processes corresponding to these phases.

Agrochemicals **Maxifol Dinamix** and **Maxifol Rootfarm** are additionally enriched with free specific amino acids increasing the effectiveness of these products.







# Maxifol Rootfarm

## Special agrochemical for the development of the root system

**Maxifol Rootfarm** is special complex containing algae extract *Ascophyllum nodosum*, special amino acids, macro- and micronutrients designed to develop lateral roots and extra, ensuring uniform development of the entire root system of the plant.

**Maxifol Rootfarm** provide a plant to endure injury during transplantation and adverse factors such as high temperature, excess moisture in the air and soil. Plants and seeds, processed **Maxifol Rootfarm** quickly absorb water and nutrients, thereby initiating earlier germination, the formation of a strong root system, increasing the photosynthetic activity and shortening the cycle of ripening.

Algae extract *Ascophyllum nodosum* contains a large number of biologically active substances, among which the most important are:

- **Betaine** - stimulates the synthesis of chlorophyll and enhances the ability of the root system to absorb water, increases plant resistance to low temperatures.
- **Cytokine, auxin, gibberellins** – stimulate growth and development of plants.
- **Alginic acid** – helps retain water in the roots, promotes better nutrients absorption.
- **Zinc** - increases the content of auxin, is involved in the synthesis of indole-acetic acid, which is necessary in the early stages of growth and after transplanting.

In addition, the complex is enriched with special amino acids (**Tryptophan, Arginine, Asparagine, Glutamine, Phenylalanine, Lysine, Methionine and Threonine**), which stimulate the germination of seeds and stimulate the growth tips of the roots, increase cold tolerance and resistance to salinity stress.



### Composition (w/v – in 1 liter of product - %):

Extract of <i>Ascophyllum nodosum</i>	20.3
Free amino acids	13.9
A complex of vitamins (B <sub>1</sub> , B <sub>6</sub> , PP)	0.06
Potassium salt indole-acetic acid	0.29
Nitrogen (N) total:	4.6
- including organic	2.2
- amide	2.4
Potassium oxide (K <sub>2</sub> O)	2.4
Zinc chelate Zn (EDTA)	0.23

### Physical characteristics:

Appearance	Liquid
Color	Brown-black, black
Density (g/cm <sup>3</sup> ) 20°C	1.16
pH (1% water aqueous solution)	5.65
Conductivity 1‰ (mS/cm) 18°C	0.16
Crystallization point	0°C

## Root Fertilizing (Fertigation)

	<b>Fruit and berry crops, decorative crops</b>	Root feeding of plants in spring at the beginning of the growing season (or after transplanting) and 10-14 days after the first feeding	0.2-0.3 l/100 l of water; consumption of ready-mixed solution, depending on norms of irrigation
	<b>Vegetable and flower-ornamental crops</b>	Root feeding immediately after transplanting (or in the phase of full shoots) and 7 days after the first feeding	3.0-6.5 l/ha (concentration is about 0.3 – 0.4%) Consumption of ready-mixed solution
	<b>Cereals, leguminous, technical, fodder crops</b>	Industrial processing of seed material	0.2-0.5 l/per 1 ton of seeds 8-10 liters of water

## Processing of seed material

	<b>Vegetables without fertigation systems</b>	300-400 ml/100 l of water. Watering with a nutrient solution at the root of 0.3 – 0.5 liters under the plant immediately after transplanting and 7 days later. When using a transplanted equipped vehicles - 300-400 ml/100 l
	<b>Processing of seeds of cereals, legumes, forage and technical crops</b>	When carrying out seed treatment: 0.2-0.5 l/t <b>Maxifol Rootfarm</b> (8-10 l of water) + 100-200 g/t <b>Agromix</b> (concentrated complex of chelate microelements).

- 1 liter bottle, box with 20 bottles of 1 liter
- 5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# Maxifol Start

Special agrochemical for stimulation and recovery of vegetative growth

**Maxifol Start** – the innovative formula of active fitogradients containing extract of seaweed *Ascophyllum nodosum*, macro-, meso- and microelements, specially designed for the stimulation and recovery of vegetative growth (growth shock), restarting the growth cycle, after a stressful period and under adverse conditions.

### Composition (w/v – in 1 liter of product - %):

Iron, Fe (DTPA) .....	0.6	Extract of <i>Ascophyllum nodosum</i> .....	12.7
Zinc, Zn (EDTA) .....	1.9	Nitrogen (N) total: .....	18.5
Manganese, Mn (EDTA) .....	0.6	- including nitrate .....	0.9
Magnesium oxide, (MgO) .....	1.3	- amide .....	17.6
Oxide of potassium, (K <sub>2</sub> O) .....	1.5		

### Physical characteristics:

Appearance .....	Liquid
Color .....	<b>Black</b>
Density (g/cm <sup>3</sup> ) .....	1.27
pH (1% water aqueous solution) .....	7.2
Conductivity 1‰ (mS/cm) 18°C .....	0.17



## Foliar Application

	<b>Sugar beet, beetroot</b>	dressing in the phase of 2 pairs of leaves and then 1-2 times with an interval of 10-14 days	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-400 l/ha
	<b>Cereals</b>	foliar fertilization of plants in the phase of the beginning of tillering - booting and early grain filling	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Maize, sorghum</b>	foliar feeding of plants in phase of 3-5 leaves and then 1-2 times with an interval of 7-12 days	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Sunflower</b>	foliar feeding of plants in the phase of 2-3 pairs of leaves and then 1-2 times with an interval of 7-12 days	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Legumes, flax, canola, mustard, buckwheat</b>	foliar feeding of plants prior to flowering and then 1-2 times with an interval of 7-12 days	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Fruit crops, grapes, citrus</b>	foliar feeding of plants 1-2 times before flowering	1.5-2.0 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
	<b>Strawberry</b>	foliar application at the beginning of the growing season and in the budding phase	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Cucumber, squash, melon, zucchini, pumpkin, watermelon</b>	fertilizing plants before transplanting of seedling (or in the phase of 4-5 leaves) and 7-12 days after the first feeding	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Tomato, pepper, eggplant</b>	feeding plants 7-10 days after transplanting, and after the formation of the 6-th sheet	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Potato</b>	foliar feeding of plants in the phase of full shoots and 7-12 days after the first feeding	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Green culture, cabbage</b>	the feeding of plants in phase 3 leaves and 7-12 days after the first feeding	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Onion, garlic</b>	foliar feeding of plants in phase of 3-5 leaves and 7-12 days after the first feeding	1.0-1.5 l/ha; consumption of ready-mixed solution – 150-300 l/ha

- 1 liter bottle, box with 20 bottles of 1 liter
- 5 liter canister, box with 4 cans of 5 liters

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# Maxifol Set


Special agrochemical for improvement of flowering and ovary formation

**Maxifol Set** – the innovative formula of active fitogradient containing extract of seaweed *Ascophyllum nodosum*, macro - and trace elements: boron, zinc and manganese. The need of plants in these compounds increases dramatically during flowering and fruit set. Agrochemical specially designed to stimulate the flowering, improve the formation and preservation of the ovary, even in adverse weather conditions.

## Composition (w/v – in 1 liter of product - %):







Zinc, Zn (EDTA)	1.9
Manganese, MP (EDTA)	0.25
Boron (B)	5,0
Potassium (K <sub>2</sub> O)	1.5
Extract of <i>Ascophyllum nodosum</i>	12.5



## Physical characteristics:

Appearance	Liquid 
Color	<b>Black</b>
Density (g/cm <sup>3</sup> ) 20°C	1.25
pH (1% water aqueous solution)	8.6
Conductivity 1‰ (mS/cm) 18°C	0.16



## Foliar Application

	<b>Sugar beet, beetroot</b>	application in the phase of 2 pairs of leaves and then 1-2 times with an interval of 10-14 days	1.0-2.0 l/ha, consumption of ready-mixed solution – 100-400 l/ha
	<b>Rice</b>	application before flowering	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Maize, sorghum</b>	application before flowering	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Sunflower</b>	application before flowering	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Legumes, flax, mustard, canola, buckwheat</b>	application before flowering	1.0-2.0 l/ha; consumption of ready-mixed solution – 100-300 l/ha
	<b>Fruit crops, grapes, citrus fruit</b>	application 1-2 times before flowering and after the formation of ovaries	1.5-2.0 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
	<b>Strawberry</b>	application 1-2 times before flowering and after the formation of ovaries	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Cucumber, squash, melon, zucchini, pumpkin, watermelon</b>	application 1-2 times before flowering and after the formation of ovaries	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Tomato, pepper, eggplant</b>	application 1-2 times before flowering and after the formation of ovaries	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Potato</b>	application in the stage of fully sprouted seeds, then at the budding stage and 15 days before harvesting	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Vegetable crops, cabbage</b>	application in the phase of 4-6 pairs of leaves and then 1 more application with an interval of 20-25 days after the first	1.0-1.5 l/ha; consumption of ready-mixed solution – 200-500 l/ha
	<b>Onion, garlic</b>	application at the begging of bulb forming and 12-15 days before harvesting	1.5-2.0 l/ha; consumption of ready-mixed solution – 150-300 l/ha

-  1 liter bottle, box with 20 bottles of 1 liter
-  5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# Maxifol Mega


Special agrochemical for growth of fetus

**Maxifol Mega** – the innovative formula of active fitogradient containing extract of seaweed *Ascophyllum nodosum*, macro - and trace elements: iron, zinc and manganese. Agrochemical specially designed to stimulate the flowering, improve the formation and preservation of the ovary, even in adverse weather conditions.

### Composition (w/v – in 1 liter of product - %):



Zinc, Zn (EDTA)	2.5
Manganese, Mn (EDTA)	1.9
Iron, Fe (DTPA)	1.3
Potassium oxide (K <sub>2</sub> O)	1.5
Nitrogen (N) total:	5.8
- including amide	5.8
Extract of <i>Ascophyllum nodosum</i>	12.7



### Physical characteristics:

Appearance	Liquid 
Color	<b>Black</b>
Density (g/cm <sup>3</sup> )	1.27
pH (1% water aqueous solution)	7.4
Conductivity 1‰ (mS/cm) 18°C	0.17



## Foliar Application

	Sugar beet, beetroot	feeding of plants 1-2 times during the growth of root with an interval of 7-12 days	1.0-2.0 l/ha Consumption of ready-mixed solution – 100-400 l/ha
	Cereals	foliar fertilization of plants in the phase of the beginning of tillering	1.0-2.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	Maize, sorghum	foliar feeding of plants in phase of 5-7 leaves	1.0-2.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	Legumes, flax, mustard, canola, buckwheat	foliar feeding of plants in the budding phase	1.0-2.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	Fruit crops, grapes, citrus	foliar feeding of plants 1-2 times during the growing period of fetus with an interval of 7-12 days	1.5-2.0 l/ha Consumption of ready-mixed solution – 800-1000 l/ha
	Strawberry	foliar feeding of plants 1-2 times during the growing period of fetus	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	Cucumber, squash, zucchini, melon, pumpkin, watermelon	foliar feeding of plants 1-2 times during the growing period of fetus with an interval of 7-12 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	Tomato, pepper, eggplant	foliar feeding of plants 1-2 times during the growing period of fetus with an interval of 7-12 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	Potato	foliar feeding of plants 1-2 times after flowering	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	Green culture, cabbage	foliar feeding of plants 2-3 times during the active growing period	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	Onion, garlic	oliar feeding of plants 2-3 times during the active growing period of bulb	1.5-2.0 l/ha Consumption of ready-mixed solution – 150-300 l/ha

-  1 liter bottle, box with 20 bottles of 1 liter
-  5 liter canister, box with 4 cans of 5 liters



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# Maxifol Quality

Special agrochemical for improvement of fetus' quality

**Maxifol Quality** – the innovative formula of active fitogradient containing extract of seaweed *Ascophyllum nodosum*, macro - and trace elements. Agrochemical specially designed for the improvement of maturing process, as well as for the improvement of harvest qualitative and quantitative indicators.


**Maxifol Quality** enhances the color, texture and taste of fetus, increases storability and transportability.

**Maxifol Quality** – is unbeatable product for the final stage of growing high-quality vegetables and fruits.

## Composition (w/v – in 1 liter of product - %):

Extract of <i>Ascophyllum nodosum</i>	12.4
Nitrogen (N) total:	3.1
- including nitrate	3.1
Potassium oxide, (K <sub>2</sub> O)	1.5
Calcium oxide, (CaO)	6.2
Boron, (B)	0.25
Manganese, Mn (EDTA)	0.5



## Physical characteristics:

Appearance	Liquid 
Color	<b>Black</b>
Density (g/cm <sup>3</sup> )	1.24
pH (1% water aqueous solution)	7.4
Conductivity 1‰ (mS/cm) 18°C	0.25



## Foliar Application

	<b>Sugar beet, beetroot</b>	feeding of plants 1-2 times during the growth of root with an interval of 7-12 days	1.0-2.0 l/ha Consumption of ready-mixed solution – 100-400 l/ha
	<b>Fruit crops, grapes, citrus</b>	foliar feeding of plants 2-3 times during the growing period of fetus with an interval of 7-12 days	1.5-2.0 l/ha Consumption of ready-mixed solution – 800-1000 l/ha
	<b>Strawberry</b>	foliar feeding of plants 2-3 times during the growing period of fetus with an interval of 7-12 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Cucumber, squash, melon, zucchini, pumpkin, watermelon</b>	foliar feeding of plants 2-3 times during the growing period of fetus with an interval of 7-12 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Tomato, pepper, eggplant</b>	foliar feeding of plants 2-3 times during the growing period of fetus with an interval of 7-12 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Potato</b>	foliar feeding of plants 2-3 times after flowering	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Green culture, cabbage</b>	foliar feeding of plants 2-3 times during the active growing period	1.0-1.5 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Onion, garlic</b>	foliar feeding of plants 2-3 times during the active growing period of bulb	1.5-2.0 l/ha Consumption of ready-mixed solution – 150-300 l/ha

-  1 liter bottle, box with 20 bottles of 1 liter
-  5 liter canister, box with 4 cans of 5 liters



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# Maxifol Dynamics

High-amino-acid special agrochemical

**Maxifol Dynamics** - is a special complex containing *Ascophyllum nodosum* algae extract and a high percentage of free amino acids. Application of **Maxifol Dynamics** provides plants overcome stressful situations, stimulates metabolism and assimilation of nutrients, which significantly increases the yield and product quality even under adverse conditions.

Number of amino acids such as **Tyrosine, Arginine, Alanine, Lysine, Proline, Serine, Threonine, Valine and Glutamine** stimulate plant physiology and growth, by providing the ready-made energy reserve to the biological processes under adverse conditions (frost, low or high temperature, hailstorm, chemical burn, osmotic stress, etc.)

On addition with foliar feedings **Maxifol Dynamics** expands the temperature thresholds of its efficiency, increases an ability of plant food element fixation, enacting the role of transport agent as far as the aminoacids are satisfactory chelators of plant food elements.

Extract of algae *Ascophyllum nodosum* contains a large number of biologically active substances that provide plants cope with stressful situations.

## Composition (w/v – in 1 liter of product - %):

Extract of <i>Ascophyllum nodosum</i>	11.7
Total Aminoacids	32.8
Nitrogen (N) total	7.7
- including organic	5.3
Amid	2.4
Potassium oxide (K <sub>2</sub> O)	1.4

## Physical characteristics:

Appearance	Liquid
Color	Brown
Density (g/cm <sup>3</sup> )	1.17
pH (1% water aqueous solution)	6.8
Conductivity 1‰ (mS/cm) 18°C	0.12
Crystallization point	-1°C



## Foliar Application

	<b>Cereals, legumes, maize</b>	foliar feeding of plants 1-3 times during the initial growing stages of crop	0.5-2.0 l/ha; consumption of ready-mixed solution – 200-300 l/ha
	<b>Technical crops</b>	foliar feeding of plants 1-3 times during the initial growing stages of crop	1.0-3.0 l/ha; consumption of ready-mixed solution – 200-300 l/ha
	<b>Fruit and berry crops</b>	oliar feeding of plants 2-4 times during the vegetation period	2.0-3.0 l/ha; consumption of ready-mixed solution – 800-1000 l/ha
	<b>Vegetable crops (outdoor planting)</b>	foliar feeding of plants 2-4 times during the vegetation period	2.0-3.0 l/ha; consumption of ready-mixed solution – 300-600 l/ha
	<b>Vegetable crops (under cover planting)</b>	foliar feeding of plants during the vegetation period every 10-15 days	1.0-2.5 l/ha; consumption of ready-mixed solution – 600-1000 l/ha
	<b>Flower-ornamental crops</b>	foliar feeding of plants 2-3 times during the vegetation period with an interval 10-15 days	1.0-2.5 l/ha; consumption of ready-mixed solution – 300-1000 l/ha
	<b>All crops</b>	foliar feeding of plants 2-3 times during the active growing period	1.0 – 3.0 l/ha



Attention! Do not combine feeding with treatment with copper-containing fungicides. Do not combine with treatments where mineral oils are used.

The minimum interval between foliar feedings is 5-7 days.



1 liter bottle,  
box with 20 bottles of 1 liter



5 liter canister,  
box with 4 cans of 5 liters



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# Maxifol Extra

Extract of *Ascophyllum nodosum* – 100%

**Maxifol Extra** – is concentrated natural extract of seaweed *Ascophyllum nodosum*. Contains in a balanced form **macro- and microelements, carbohydrates, amino acids, antioxidants, alginic acid and natural phytohormones: cytokinin, auxin, gibberellin and betaine**. These active components strengthen the resistance of plants to stresses of different etiology, promote the increase of quantitative and qualitative yield parameters.

**Maxifol Extra** – increases the effectiveness of any foliar feedings.

## Composition (w/v – in 1 liter of product - %):

Extract of <i>Ascophyllum nodosum</i>	65
Nitrogen (N) total:	1.3
- including amide	1.3
Potassium oxide, (K <sub>2</sub> O)	7.8

## Physical characteristics:

Appearance	Liquid
Color	Black
Density (g/cm <sup>3</sup> )	1.3
pH (1% water aqueous solution)	9.0
Conductivity 1‰ (mS/cm) 18°C	0.32





## Foliar Application

Strengthening component for any foliar application – 0,3-0,5 l/ha

	<b>Sugar beet, beetroot</b>	feeding in the phase of 2 pairs of leaves and then 1-2 times with an interval of 10-14 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 100-400 l/ha
	<b>Cereals</b>	feeding of plants 2-3 times in the period from the beginning of tillering until booting and early grain filling	0.5-1.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	<b>Maize, sorghum</b>	foliar feeding of plants in phase of 3-5 leaves and then 1-2 times with an interval of 7-12 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	<b>Sunflower</b>	feeding of plants in the phase of 2-3 pairs of leaves and then 1-2 times with an interval of 7-12 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	<b>Legumes, flax, mustard, canola, buckwheat</b>	feeding of plants prior to flowering and then 1-2 times with an interval of 7-12 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 100-300 l/ha
	<b>Fruit crops, grapes, citrus fruit</b>	feeding before flowering, in the period of falling of petals - the beginning of formation of ovaries and further 2-3 times during the period of growth of fruits	1.0-1.5 l/ha Consumption of ready-mixed solution – 800-1000 l/ha
	<b>Strawberry</b>	feeding in autumn (at the end of the vegetative period), at the beginning of the vegetation renewal, in the budding phase, at the beginning of the ovary formation, and then 2-3 times with an interval of 15-20 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Cucumber, squash, melon, zucchini, pumpkin, watermelon</b>	fertilizing plants before transplanting of seedling (or in the phase of 4-5 leaves) and then 5-7 times with an interval 10-12 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Tomato, pepper, eggplant</b>	feeding plants 7-10 days after transplanting and then 5-7 times with an interval 10-15 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Potato</b>	foliar feeding of plants in the phase of full shoots, at the beginning of flowering and then 1-2 times with an interval 10-15 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Green culture, cabbage</b>	the feeding of plants in phase 3 leaves and then 2-4 times with an interval 10-15 days	0.5-1.0 l/ha Consumption of ready-mixed solution – 200-500 l/ha
	<b>Onion, garlic</b>	feeding of plants in phase of 3-5 leaves and then 3-4 times with an interval 10-14 days	1.0-1.5 l/ha Consumption of ready-mixed solution – 150-300 l/ha

## Fertigation

	<b>Vegetable, flower-ornamental crops (under cover planting)</b>	feeding of plants (application with irrigation water) every 7-14 days	0.5-1.0 l/ha Consumption of ready-mixed solution – Depending on the rate of watering
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 1 liter bottle, box with 20 bottles of 1 liter

 5 liter canister, box with 4 cans of 5 liters



Attention! Do not mix with high-acid chemicals. Oxidizers and acids can lead to destruction. Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





## Important components of special agrochemicals

The development of the global agrochemical is not limited to research and development of new agrochemicals based on inorganic salts. The research is based on the knowledge of the plants and the use of plant rather than synthetic materials as environmentally friendly and more efficient nutrient, since it is impossible to create artificial chemical mixture of the same quality as natural extract.

The plant body contains a lot of substances that play an important role in nutrition human, plant and animal species. Modern technologies allow to identify and isolate the active components of the plant material.

These techniques have allowed to allocate from the vegetable kingdom the most "rich" in the active ingredients plant species, extracts of which are used in the manufacture of agrochemicals. This is primarily brown Algae family group Fucaceae - most highly concentrated source of nutrients in the world.

Seaweed Fucus Alga family are used as the main raw material, not only because they are very rich in nutrients, most importantly, that the active ingredients are well preserved in the extract. In addition, selecting only the best species such as *Ascophyllum nodosum*, which are collected in the most appropriate time, since only certain phases of vegetation are characterized by rich content of specific active elements (the phase of active growth, flowering phase, etc.).

The process of extracting the active components from the raw material is not less complex and rich in innovation. First, the plant material is extracted from a great number of substances and active ingredients then comes purification and separation process that ends with the receipt of a specific "class of substances" according to their physiological functions in the plant.



## Amino acids

Amino acids are very important for the enzyme and structural protein synthesis. They play a major role in most metabolic processes. There are the most important amino acids for various metabolic functions: Tryptophan is a precursor of auxin (the presence of tryptophan helps young roots to grow and mature); Arginine and asparagine - the main intermediaries helps penetration of nutrients into the roots, which serve as precursors of hormonal substances to affect the roots.

Amino acids connecting to each other form a protein, the major structural components of plant tissue with various complicated functions in cellular metabolism.

L-amino acids having the spatial shape of the letter L, are able to meet the needs of plants and physiological requirements associated with metabolism.

According to the law commonly known minimum (if at least one reactant is present in insufficient quantities, the reaction slows down), it is extremely important to balance the number of amino acids in the plant to accelerate protein synthesis reaction, the speed of saturation with nutrients and improve product quality. For the effective action of the agrochemical amino acid content should be more than 10%.

It is well known that the amino acids in combination with other active herbal ingredients derived from extracts valuable not only because it increases the production potential with / agricultural crops, but also because it increases the plant's ability to withstand and overcome the stress from temperature changes and other factors. Plant hormones, tryptophan, proline and betaine help overcome stunted.

## Steroids glycosides (saponins)

These substances are the energy growth factors stimulating growth processes and activity of meristematic tissues in the early stages, increasing the permeability of cell membrane for water and nutrients. A lot of them contains in the root tips.

## Betaines

Betaines tend to enhance the permeability of cell membranes for water, increase photosynthesis and resistance to biotic and abiotic stress factors.

## Polysaccharides

Polysaccharides are components of cell walls. Through their decomposition into simpler sugars helping to support the growth of the root, allowing it to grow, as well as improve the dyeing processes and fruit ripening.

In addition, polysaccharides stimulate the development of beneficial soil microorganisms, significantly increasing the fertility of the soil.

The oligosaccharides stimulate the synthesis of phytoalexins, plant nonspecific antibiotic with high protective effect (due to anti-virus reactions).

Glutathione is an important component of self-defense of plants, helping to flush toxins from plant juice formed during the infection process (antitoxic response).

Laminarin and 1,3-Beta-glucane activate the system of the natural protection of plants (SAR) for controlling harmful fungi.

## Alginic acid

Alginic acid, an important component of the cell walls of algae. Algae group consists of chains of guluronovoy and mannuronic acids.

Among their most important features is the ability to influence the process of moisture retention in the roots. In fact, alginic acid chains to absorb water, retaining it for the roots, thereby reducing the potential plant stress due to lack of moisture. Alginic acid is insoluble in the soil forms a gel with calcium and sodium, which is beneficial to soil structure and soil reaction promotes better circulation water, which in turn enhances the growth of roots.

Alginic acid forms a complex with nutrient ions in the soil, contributing to their more complete absorption and assimilation of the plant root system.

## Growth regulators

Algae groups and especially *Ascophyllum nodosum*, unlike normal plants, are extremely rich in plant hormones due to the constant exposure to the harsh environment (tides, low temperature, poor lighting, and so on. D.). Accordingly, extracts from them contain a large amount of main natural hormones, such as:

- Cytokinin (activates cell division);
- Auxin (activates cell division during flowering and the formation of ovaries);
- Gibberellins (activate many important processes of growth and development, but it is especially important to stimulate the growth of the fruit-specific cells, which increases their size);
- Betaines (such as glycine betaine, a similar effect with auxin).







Fertilizer for **foliar application**





# Aminofol NPK

## Special agrochemical NPK with features of immunoprotector

**Aminofol NPK** – a special anti-stress agrochemical containing macronutrients NPK high percentage of amino acids. Application of NPK Aminofol helps to overcome not only stress, stimulating the metabolism, growth and development of plants, but also increases the resistance to many diseases because potassium and phosphorus are present in the form of potassium phosphite, which has preventive fungicidal action stimulating the synthesis of phytoalexins.

**Aminofol NPK** can be applied effectively in a wider temperature range in contrast to the conventional leaf fertilizers because amino acids: **tyrosine; arginine; alanine; Lysine; proline; Serene; threonine; Valine and Glutamine** stimulates the physiology and growth of the plant, providing ready reserve of energy biological processes in stressful situations (frost, low or high temperature, gradoboy, chemical burn, osmotic stress, etc.) and are good transport agents.

Application of **Aminofol NPK** significantly increases the productivity and quality of products.

### Composition (w/v – in 1 liter of product - %):

Total amino acids	43.5
Nitrogen (N) total:	6.8
- including organic	6.8
Phosphorus (P <sub>2</sub> O <sub>5</sub> )	20.4
Potassium (K <sub>2</sub> O)	13.6

### Physical characteristics:

Appearance	Liquid
Color	Brown
Density (g/cm <sup>3</sup> )	1.36
pH (1% water R-R)	5.8
Conductivity 1‰ (mS/cm) 18°C	0.35
Crystallization point	-1°C



## Foliar Application

	<b>Fruit crops and citrus</b>	1.0–3.0 l/ha, in the phase of "rosebud" at the beginning of ovary formation, in the phase of fruit of walnut and in the phase of fruit size 5-6 cm
	<b>Stone fruits</b>	1.0 – 2.5 l/ha before blossoming, at the beginning of ovary formation and 1-3 times in the growth period of the fruit with an interval of 10-15 days
	<b>Grapes</b>	1.0 – 3.0 l/ha at the 3-5-leaf phase, in the phase of beginning of flowering, end of flowering phase and 2-3 times during the formation and growth of berries
	<b>Strawberry</b>	1.0 – 3.0 l/ha, in autumn, at the beginning of the growing season, in the budding phase, at the beginning of ovary formation and then 2-3 times with an interval of 15 days
	<b>Vegetable crops (cucumber, pumpkin, melon, zucchini, watermelon, tomato, pepper, eggplant)</b>	1.0 - 3.0 l/ha, before planting the seedlings, after planting (or after 2 pairs of leaves) and then 5-7 times with an interval of 10-12 days
	<b>Leafy vegetables, cabbage</b>	1.0 – 3.0 l/ha from 3 leaves 3-4 times per season
	<b>Potato</b>	1.0 – 3.0 l/ha, total germination, beginning of flowering and then 1-2 times with an interval of 10-15 days
	<b>Onion, garlic</b>	1.0 – 3.0 l/ha, in the phase of 3-5 leaves and then 3-4 times every 10-14 days
	<b>Cereals and corn</b>	0.5 – 2.0 l/ha, 2-3 times from the tillering phase (3-5 leaf corn)
	<b>Legumes, flax, mustard, rape, buckwheat</b>	0.5 – 1.5 l/ha, fertilizing 1-2 times before the onset of the flowering stage with an interval of 7-10 days after flowering
	<b>Sugar beet, sunflower</b>	0.5 – 3.0 l/ha, from 2 pairs of leaves and then 1-2 times

Note: The minimum interval between foliar feedings is 7 days. Do not combine with treatments of copper-content fungicides.

## Fertigation

	<b>Vegetable crops, cucurbits, fruit and berry crops</b>	3 - 6 l / ha, periodic fertigation during growth period
	<b>Vegetable crops, cucurbits, fruit and berry crops</b>	0.2 - 0.3 l / ha, daily fertilizing

	1 liter bottle, box with 20 bottles of 1 liter
	5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".










# Plantafeed

NPK fertilizers with microelements in a chelate form for foliar application

**Plantafid**, under the criteria of European Standard refers to a number of highly chemically pure and fully soluble fertilizers specially developed for foliar application. In this spectrum there is a full range of N, P, K + micronutrients for plant needs different elements at all stages of development, increasing productivity and quality / crop. **Plantafid** has a rich trace element composition, trace element chelates are stable over a wide pH range. **Plantafid** can be mixed and applied with most pesticides. In the agrochemical composition comprises surfactants and adjuvants that enhance the effectiveness of foliar application.













**Important.** Dry crystalline fertilizer for foliar application have the highest concentration of active substance of batteries, unlike other forms (liquids, creams, suspensions, etc.). Furthermore, these fertilizers are stable and efficiency for a long time, and not demanding in terms of storage temperature.

## Physical characteristics

	10.54.10	30.10.10	5.15.45	0.25.50	20.20.20
Appearance	Crystalline powder 	Crystalline powder 	Crystalline powder 	Crystalline powder 	Crystalline powder 
Color	White	White	White	White	White
Density (g/cm <sup>3</sup> )	1.14	0.97	1.34	1.28	1.07
pH (1% aqueous solution)	4.5	4.8	6.3	7.5	4.5
Solubility (g/100 ml)	30	40	10	30	30
Conductivity 1‰ (mS/cm)	0.80	0.62	1.25	1.33	0.68

Composition, %	10.54.10	30.10.10	5.15.45	0.25.50	20.20.20
Nitrogen (N) total	10.0	30.0	5.0	-	20.0
Nitrate	-	3.0	5.0	-	4.0
Ammoniac	8.0	3.0	-	-	2.0
Amid	2.0	24.0	-	-	14.0
Phosphorus P <sub>2</sub> O <sub>5</sub>	54.0	10.0	15.0	25.0	20.0
Potassium K <sub>2</sub> O	10.0	10.0	45.0	50.0	20.0
Sulfur SO <sub>3</sub>	-	-	11.3	8.3	-
Iron Fe (EDTA)	0.16	0.16	0.16	0.16	0.16
Manganese Mn (EDTA)	0.11	0.11	0.11	0.11	0.11
Zinc Zn (EDTA)	0.08	0.08	0.08	0.08	0.08
Cooper Cu (EDTA)	0.04	0.04	0.04	0.04	0.04
Boron B	0.06	0.06	0.06	0.06	0.06
Molybdenum Mo	0.02	0.02	0.02	0.02	0.02

## Foliar Application

	Fruit - stone fruit	2.5-4.0 kg/ha		Industrial crops	1.0-3.0 kg/ha
	Fruit - pome	2.5-4.0 kg/ha		Tobacco	2.5-3.0 kg/ha
	Grapes	2.0-3.0 kg/ha		Flowers	150-250 g/HL*
	Citrus and olive	3.0-4.0 kg/ha		Decorative plants	150-250 g/HL*
	Strawberries, raspberries	2.5-3.5 kg/ha		Field crops	1.0-3.0 kg/ha
	Vegetables: pumpkin, tomatoes, salad	2.5-3.5 kg/ha		Potato, cabbage	2.0-3.0 kg/ha



\* HL – Hectoliter (100 l) is the rate of consumption of fertilizers per unit of working solution

The recommended consumption rate of working solution for field crops – 150-250 l/ha, concentration of 0.5 – 2.0%.

The effect of each type of **Plantafeed** designed to stimulate physiological processes related to the nutritional needs in certain phases of the development of any plant organism, regardless of the soil and climatic conditions of use, the type and variety of culture. The effectiveness of foliar application is provided in the presence of complexes of nutrients: the macro and micro, as they are involved in basic metabolic processes and digested simultaneously. The main effect of macronutrients perform directing metabolism towards protein (more nitrogen) or carbohydrate synthesis (more potassium), trace elements improve the absorption of macronutrients and work by stimulating the metabolism.





### Plantafeed 10.54.10

Designed to stimulate plant growth during the vegetative phase, when it is necessary to lengthen the developing shoots and leaf apparatus (mainly to flowering and / or early fetal increase phase).



### Plantafeed 30.10.10

High phosphorus helps plants to improve the processes of formation of the generative organs, flowering and fruit ovary. Fertilizer is applied in the initial growth phase, before and during flowering, in all situations when it is necessary to avoid the vegetative development.



### Plantafeed 5.15.45

High potassium content improves carbohydrate metabolism, the processes of filling and maturation, enhances immunity, frost and drought resistance. It is used to improve the quality characteristics of all cultures and / or in all situations when it is necessary to stimulate carbohydrate metabolism.



### Plantafeed 0.25.50

High potassium content improves the ripening process (maturation of shoots, vines), with no effect on the vegetative development of plants (0% nitrogen). It promotes rapid spending of accumulated nitrate forms of nitrogen.



### Plantafeed 20.20.20

The formula is designed to be used in most situations where it is necessary to balance the power (for example, on a background of basal nitrogen application and / or during Bookmark rudimentary generative organs), which significantly enhances the ability of assimilation of nutrients from fertilizers main root system.



As a result of years of research of foliar application with / crop specific fertilizers (fertigatory and leaf fertilizers) it was proved that it is one of the most effective methods of fertilizer application in which there is a rapid assimilation of essential nutrients and their inclusion in the metabolism, while accelerating basic biochemical processes in the plant.

Foliar application is almost the main measures for solving the following tasks:

- increase productivity by improving the balance of nutrition in critical periods of growth;
- improving the quality of agricultural products;
- overcoming stress and violations of root nutrition;
- treatment of chlorosis and prevent shortages meso and microelements;
- meeting the individual needs of agricultural crops in meso and microelements.



## European standard

The name of this group of agrochemicals does not require decryption - Leaf fertilizer - it is **completely water-soluble, chlorine-free complexes of NPK + microelements in chelated form** designed for foliar application.

The basis of these fertilizers (NPK) constitute just completely water-soluble, chlorine-free salt in various combinations, to provide the plants need for appropriate periods of their growth and development:

**AN\*** - ammonium nitrate,  
**AS** - ammonium sulfate,  
**UR** - urea,  
**MAP** - monoammonium phosphate,  
**MKP** - monopotassium phosphate,  
**KN** - potassium nitrate,  
**KS** - potassium sulphate

(\* AN and beyond - European reduction).

The high degree of chemical purity of the starting compounds and combinations provides the maximum content of active ingredient in the fertilizer NPK macrocells and a higher degree of assimilation, and trace elements, unlike fertigatorov, a part of the physiology, but not daily, but higher dosages. Stable chelates of trace elements in a wide pH range. The structure consists of leaf fertilizer as surfactants and adjuvants that enhance the absorption of nutrients through the sheet and providing high efficiency fertilizing.

The effect of each type of leaf fertilizer designed to stimulate specific physiological processes associated with nutritional needs in certain phases of the development of any plant organism, regardless of the soil and climatic conditions of use. The effectiveness of foliar application by the presence of complexes in all nutrients and macro and micro, since they participate simultaneously in all metabolic processes. The main effect of macronutrients perform directing metabolism towards protein (more nitrogen) or carbohydrate synthesis (more potassium), trace elements improve the absorption of macronutrients and work by stimulating the metabolism. For this reason the sheet line fertilizer consists of only 4-5 products with different content of NPK, in contrast to the infinite number of possible formulations fertigatorov (see. Fertigatory section).

From mezoelementov sulfur may be present in the leaf fertilizer (if a formulation using ammonium sulfate or potassium sulfate) but usually no calcium and magnesium, as when using stiff and alkaline water (physico-chemical characteristics of which are rarely monitored in the field) with a high content of carbonate salts (Ca and Mg carbonates) unwanted reactions with phosphorus fertilization can occur.

## - Foliar fertilizers

In recent years it has developed quite a few misconceptions regarding complex leaf fertilizers and fertigatorov. The main thing - leafy subcortical can not replace the primary root nutrition, i.e., We can not do without the traditional fertilizers (organic and inorganic) for soil application. Foliar feeding - is a tool operational impact on the plant, allowing any growing season with / crops, and especially in the critical, quickly affect the processes that determine the future crop and its quality.

Foliar, subject to the application of special fertilizer, it is rapidly absorbed by the body with vegetable (6-8 times faster than through the roots) as a way of nutrients proceeds much shorter than the root system. Therefore, special foliar fertilizers (and similar fertigatorami) allows you to provide the assistance necessary for normal growth and development, including increases the ability of plants to absorb nutrients (from the soil and basic fertilizers), has some anti-stress effect (at normal temperatures) and reduces short-term deficits batteries during critical periods of growth.

The leaf fertilizer is important the presence of all macronutrients - nitrogen, phosphorus and potassium, as they all participate in key metabolic and synthetic processes occurring simultaneously in the plant body, and at the same time essential to the plant, which may not always provide the root system (see Table 1. p.5). For this reason, the leaf fertilizer (NPK + microelements) are effective even in the absence of sufficient amounts of nutrients in the soil. Foliar feeding can be performed and these components of the composite fertilizer (AN, AS, UR, MAP, MKP, KN, KS), but they contain a maximum of two fertilizing elements, and comparative experiments were all in favor of compositions NPK + microelements. Science and practice proved that the nutrition balance and increase the assimilation of NPK root system is influenced by foliar application balanced formulation (Plantafid 20: 20: 20 + micro or Agromaster 20: 20: 20 + micro or Agromaster 18: 18: 18+ 3+ micro).





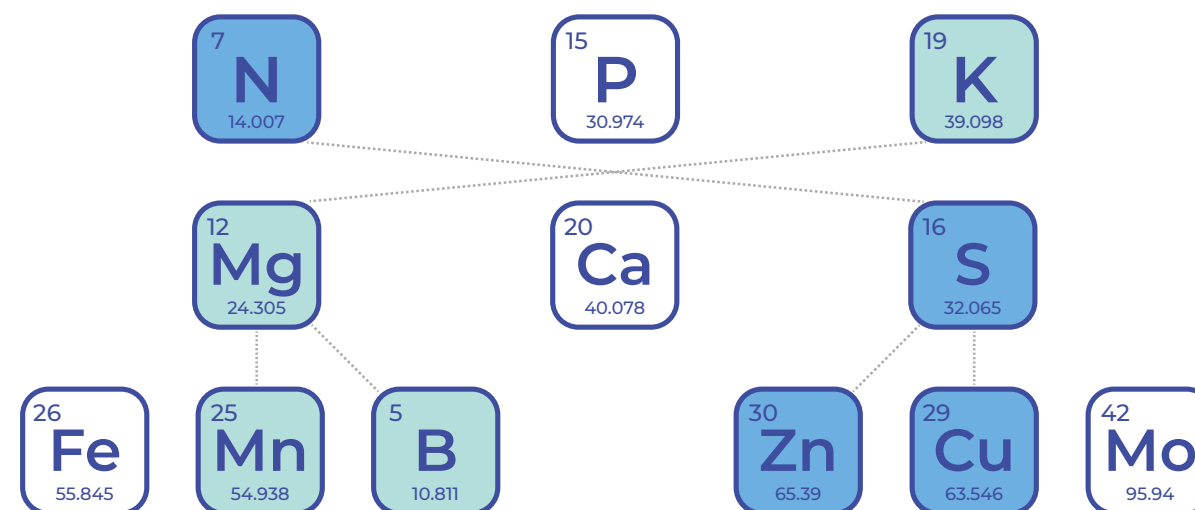
The main role of leaf fertilizers belongs to macroelements. Phosphorus, as energy is required in all cases. Dominance protein synthesis and growth processes provides NPK ratio 3: 1: 1 (Plantafid 30: 10: 10 + micro), but potassium is also needed. Dominance carbohydrate synthesis of protein is provided by the relation NPK 1: 3: 9 (Plantafid 5: 15: 45 + micro), or even 1: 4: 13 (Agromaster 3: 11: 38 + 4 + micro), but the presence of nitrogen for normal carbohydrate exchange as necessary.

Trace elements in these complexes (fertigatory and foliar feed) are not intended to prevent the deficit, therefore wrongly believe that if a formulation of fertilizer to increase by 0.1-0.2% boron or zinc content, they will from this beet or corn. To overcome the deficiencies and especially chlorosis, these trace elements requires much more. For these purposes, there are some concentrated micronutrient fertilizers. Since the presence of chlorosis, i.e. visually diagnosed micronutrient deficiencies, to improve the situation is required to make at least a third part (and sometimes more) from the level of consumption of this trace element culture. Therefore, even 1-2% of the content of a trace element in the fertilizer will not be sufficient to deal with their deficits.

The effect of leaf fertilizers and fertigators (in foliar application) based on the rapid inclusion in the metabolism of the main nutrients (of NPK) and their impact on key metabolic processes, regardless of the root system (and therefore culture, varieties, growing conditions and the availability of nutrients contained in ground). The effect of a significant increase in productivity due to higher root assimilation of batteries by 10-15%.

The dressing can be traced certain dominant role of certain nutrients, especially during their non-root method. So, for protein synthesis, with the participation of phosphorus and potassium, the dominant role of macronutrients, undoubtedly, belongs to the nitrogen, from - sulfur, and micronutrients from - zinc and copper. Accordingly, the dominant chain carbohydrate synthesis, with the participation of all other essential nutrients: potassium - magnesium - boron and manganese. A striking example: Mercantile wheat stimulate protein synthesis corresponding to the dominant chain, and malting barley - the synthesis of sugars.

## The dominant chain of mineral nutrients in protein and carbohydrate synthesis



The presence of a small amount of trace elements in the nutrient complexes greatly increases the efficiency of their use. It is important that the trace elements - metals - Zn, Cu, Mn and Fe, as represented chelates instead of the simple (e.g., sulfate), inorganic salts (no chelating B and Mo). Simple salts in aqueous solution dissociate into ions - charged particles that interfere with normal absorption of other nutrients. Thus, attempts to prepare mixtures of inorganic sulphate salts, trace elements (Zn, Cu, Fe, Mn) and inorganic compounds V and Mo, and lead to competitive antagonism of these elements in the solution that ultimately gave a negative result. In addition, inorganic salts of these metals acted destructively on the structure of organic pesticides, making it impossible to combine treatments. Chelate (in Greek - claw) - a chelate organometallic compound wherein the metal ion, as it is surrounded by an organic shell and held it like a claw. Chelation unlike ions are inert (when the connection is destroyed, all charges are balanced), so they hardly produce antagonism in solution as simple salts, and do not destroy the organic pesticide structure, making it possible as a preparation (and efficient use) themselves complex fertilizers (NPK + minerals) and fertilizing combination pesticidal treatments.

*(The section is composed subject to the data: A.B. Khoroshkin "Ways to improve the efficiency of mineral nutrition of agricultural crops", GNU Donskoi Agricultural Research Institute of Russian Agricultural Academy, Rostov-on-Don, 2011)*





## Characteristics of Leaf Dressing Efficiency

(the section is comprised subject to the following data: A.B. Khoroshkin "How to improve the efficiency of agriculture crops mineral nutrition " GNU Donskoi Agricultural Research Institute of Russian Agricultural Academy, Rostov-on-Don, 2011)

The types of foliar dressing by necessary nutrition elements can be essentially divided into five main groups:

- 1 The stimulation of protein synthesis** (growth processes in the early growing season, increase of leaf surface and vegetative mass - **Plantafeed 30:10:10** + micro and grain quality during filling: Urea + **AgroMaster 3:11:38** + 4 + + micro **AgroMix**). From experience: in the 80s of the last century, a strong wheat was cultivated after leaf dressing by urea in early grain filling. In 2000, such types of dressing did not guarantee the receipt of valuable grains with 23% of gluten even, due to sulfur deficiency. The situations occurred when at post-harvest ripening, instead of increasing the content of the gluten grains passed into the lower categories of quality, which was caused by deficiency of zinc in the period of grain filling;
- 2 Stimulation of carbohydrate synthesis** (inhibition of vegetative growth, thickening of the stem, increase of the productive tillering; increase of drought resistance, winter hardiness, frost resistance and immunity, increase of sugar content and improvement of ripening - **Plantafeed 5:15:45** + micro or **AgroMaster 3:11:38** + micro 4 +);
- 3 The improvement of the power balance during the critical period** of the formation of the rudiments of the generative organs (especially against the background of nitrogen fertilizing - **AgroMaster 18:18:18** + 3 + micro, **AgroMaster 20:20:20** + micro or **Plantafeed 20:20:20** + micro);
- 4 Energy support during the formation of the rudimentary generative organs** (with the emerging phosphorus deficiency - **AgroMaster 13: 40: 13** + micro or **Plantafeed 10:54:10** + micro);
- 5 Provision of essential nutrient elements** in single or complex deficiencies, or with regard to the individual needs of the culture (**AgroMix**, **AgroMix T**, **Boroplus** and **AgroBor** line, **Aminofol** line, **AM chelates** line).

We should consider separately the conduct of foliar dressings by special agrochemicals, which include the biologically active components, allowing to obtain a certain directional effect even under adverse conditions when agrochemicals in its pure form without them just does not work:

- 1** Anti-stress and stimulation of physiological processes (**Aminofol Plus**, **Maxifol Dynamics**, **Maxifol Extra**, **Aminofol NPK**);
- 2** Restore, restart and stimulation of the vegetative growth (**Maxifol Start**);
- 3** Improvement of the processes of flowering and the formation of ovaries (**Maxifol Start**);
- 4** Improvement of the fruit growth (**Maxifol Mega**);
- 5** Improvement of the maturation process, the color of fruits and flowers, the keeping quality and increasing the sugar content and dry matter in the fruit (**Maxifol Quality**);
- 6** Increase of the immunity and the inclusion of the endogenous defense system (**Aminofol NPK**).





- 1 **Chemical purity** of the agrochemical and absence of harmful compounds in it (increase);
- 2 **Full componential composition** (NPK + chelated micronutrients) of agrochemical (increase);
- 3 **Auxiliary substances** (adjuvants, surfactants) (increase);
- 4 **Presence of hair on the leaves and stems** of the treated cultures (decrease);
- 5 **Ambient temperature and water** for treatments, other stress factors (frost, heat, chemical burn, hail damage,, mechanical damage).

1 The effectiveness of the leaf dressing directly depends on the chemical purity and absence of harmful elements and compounds. For example, even if superphosphate or NPK 16:16:16, other similar agrochemicals for the soil are dissolved and filtered, their application to a leaf on the basis of 3.5 kg / ha will not give any results. The usage of potassium chloride on a leaf will not also give any positive results, as 1 kg of this fertilizer contains 0.4 kg of chlorine, which is toxic in such amounts.

2 The usage of one or two-component chemically pure water-soluble salts (fertigators and leaf fertilizer components) has lost to full componential composition NPK + micronutrients according to the criterion of effectiveness in all comparative tests, except urea nitrogen fertilization (when it is necessary to add a large amount of nitrogen) on the quality of the grain, the effectiveness of which, however, has increased with the addition of complexes or certain sulfur-containing micronutrients, zinc and copper. That is why in Europe the agrochemical standard appeared - "leaf fertilizer", containing a full range of NPK + micronutrients, rather than a partial set of the necessary nutrient elements (as it is impossible to guarantee that at the time of leaf dressing this missing element will not be in short supply and will be available to the root system of the plant).

3 Surface active agents (surfactants), by reducing the surface tension, increases the area of drop contact with the leaf, and accordingly the total leaf surface area coverage solution. When this drop adheres to the leaf, the flow of the working solution from the surface reduces and the efficiency of leaf dressing and pesticide treatments increases. Adjuvant is a relatively new term that means – additional substances. First adjuvants were developed to dissolve the lipids of the cuticle and improve the effectiveness of treatments of glyphosate those plants that have a thick waxy coating on the leaf plate. In the future, the company began to look for agrochemical substances that improve the assimilation of nutrients through the leaf, without harm to the plant body (in most cases, these additives are classified, as they can not be patented, due to the popularity and accessibility of the components).

4 The abundant hair on the leaves and stems of plants (soy, sunflower, etc.) prevents full contact of the working solution with the leaf surface, it seems to hang on such hair (due to surface tension). To increase the effectiveness of foliar fertilizing of such crops, surfactants must be present in the working solution. In the case of AgroMaster (in which there is no surfactant) in such cultures, be sure to add to the working solution Optimum Maxifol Dynamics (which has not only basic functions of anti-stress, and but also the transport function and surfactant characteristics).

5 The ambient temperature is the most important factor of the efficiency of nutrient absorption through both leaf and root system. Thus, until 2001 the use of fertigators on a leaf together with the herbicidal treatment of winter and spring cereals provided consistently high performance in all areas of application (the North Caucasus, the CCA, the Volga region, Western Siberia). At the same time except for yield increase anti-stress effect of the agrochemical was recorded. In the future, performance began to delaminate. And what's interesting - the weak businesses received much more significant gain than strong. It turned out that all the fault is the air temperature. The fact is that 2.4 herbicides D were mostly used on grain breads until 2000, with a temperature regulation from + 16-18 °C.

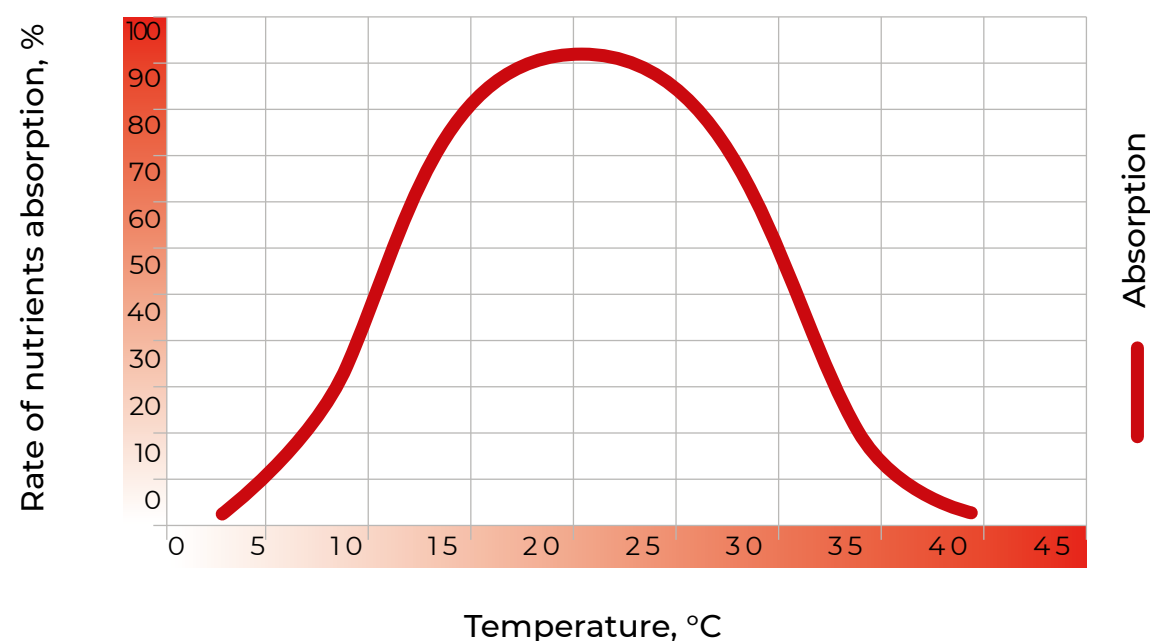




It is physiologically normal for the plant temperature at which nutrients are absorbed well both through the leaf and root. The bundle performance of leaf dressing started with the increasing use of sulfonyleurea herbicides since their use allows regulation from + 5-6 ° C, and at such a temperature level the physiological activity of plants decreases correspondingly nutrients are digested worse. The same thing happens at high temperatures. Over the years, it has developed a certain understanding of the degree of assimilation of nutrients at leaf dressing, depending on the ambient temperature. Physiologically normal lower limit of temperature is at 10-12 ° C, and the upper - 27-30 ° C, then, with each degree of downward or upward from these boundaries a plant physiological activity falls sharply, and correspondingly the degree of absorption of nutrients, and the effectiveness of foliar application, and anti-stress effect decrease. This applies to any agrochemicals containing only nutrients. (See. Figure 1) In order to expand the boundaries of effective temperatures and thus increase the effectiveness of leaf dressing in these circumstances, specific agrochemicals stimulating physiological activity of plants should be added to the working solution (Aminofol Plus, Maxifol Dynamics, Maxifol Extra, Aminofol NPK).

Very cold water (4-8 ° C) not only reduces the solubility of the salts, but also can lead to thermal shock of plants. Hot water (particularly stiff and Ca carbonates saturated Mg) accelerates the reaction between the phosphorus fertilizer salts and rigidity, and can lead to the formation of a precipitate. The optimal water temperature for preparation of working solution is 15-30 ° C.

### The extent of nutrients absorption through a leaf depending on the outside temperature



A similar plot develops in the root system.

Almost any stressful situations (**low or high temperatures, freezing, chemical burn, hail damage and other mechanical damage**) lead to attenuation of metabolism and halt the assimilation of nutrients, and thus stop the growth and development of plants, which significantly reduces the yield and quality of products. In such conditions foliar fertilization by necessary elements is likely to be ineffective. The plant is, in fact, biological factory that through photosynthesis converts chemical elements and their compounds in complex organic complexes of proteins, fats and carbohydrates. The process of assimilation and "processing" of nutrient elements is quite energy intensive, therefore, under stress, to preserve the vitality, it stops, the necessary nutrient elements can not be digested without bioactive compounds stimulating the physiology of the plant organism. Therefore, under stress conditions, to produce the effect from leaf dressing nutrients specific agrochemicals should be added to the working solution stimulating physiological activity of plants (**Aminofol Plus**, **Maxifol Dynamics**, **Maxifol Extra**, **Aminofol NPK**).

The basic principle of the antistress agent is that specially selected biologically active substances of vegetable origin trigger, stimulate and support the physiological processes of the plant body, improve the absorption of nutrients, restoring plant growth and development.

The function of "starter" that means a trigger of the physiological "engine" is operated primarily by **betaines, plant hormones and vitamins**. It betaines that play an important role in the plant response to stress conditions, plant hormones and vitamins stimulate physiological processes. **Amino acids and polysaccharides** are ready building and energy materials, which are used to restore and normalize the functions of assimilation and processing of nutrients, and thus plant growth and development.

Some amino acids have specific functions in overcoming stress, since glutamic acid restores functioning of a plant in stressful conditions. **Arginine, alanine, isoleucine, tyrosine and valine** reduce basic metabolic functions of a plant after stress. **Glycine and glutamic acid** directly affect cell membrane permeability and activate transfer protein associated with the transportation of nutrient elements into the cell.



## LEAF DRESSING

### Under conditions of excess moisture

To avoid burns of the leaf surface from the non-root fertilizing it is necessary to consider the weather and climate characteristics of the region, as well as the specifics of the crop apparatus of the leaf. For example: a corn leaf is more delicate and sensitive than leaf of winter wheat. Therefore, corn withstand 5-6% urea concentration foliar fertilizer, and wheat - 30%. However, in the Tyumen region spring wheat leaf received burns from 10% urea concentration, and in the conditions of the Rostov Region and Krasnodar Territory, in wet years the plant received burns of leaf surface from institutionalized intensive technologies of 30% urea concentration.

Basically, the following trends can be tracked (for one and the same plant, for example - wheat) - the more humid and northern it is, the more delicate and sensitive to the concentration leaf apparatus is, and, accordingly, the drier and southern it is, the thicker cuticular layer is and the less sensitive to the concentration of the agrochemical leaf apparatus is.

A plant leaf is more sensitive to the alkalinity of the solution than to acidity, therefore, for example, calcium nitrate in a leaf dressing is used in a concentration of 1%, in contrast to ammonium and potassium nitrate - 5-10% or urea - 30% concentration.

From practice: fertigator leaf dressing and leaf fertilization at a concentration of 1-2% (both physically and physiologically) do not lead and could not lead to burns of the leaf surface, as well as have a toxic effect on bees.

### Under water shortage conditions

Periodically, drought conditions develop in different regions of Russia, and the air temperature reaches an abnormally high quantities. In such circumstances, to make a decision on holding leaf dressing, it is imperative to carry out a preliminary examination of agriculture crops. If moisture has disappeared from the area where the root system is and the plant are in the early stages of development and (or) experience hard water stress (twisting of the lamina, loss of vegetative turgor), a leaf dressing by any saline is recommended to carry out until the improvement of the situation with the moisture occurs. Since even 0.1% saline solution requires an internal moisture from a plant and with its inability to replenish the stock, it will lead to even greater loss of turgor. In such fields of row crops only "dry irrigation" (inter-row treatment) may be carried out to prevent the development of cracks on the field, and the evaporation of water from the deeper layers. After precipitation, to stimulate the growth of young plants and overcoming deadlock, it is recommended to carry out leaf dressing by **Plantafeed 30:10:10** + micro dose of 1-2 kg / ha in combination with **Maxifol Dynamics** - 1.0 l / ha (or **Maxifol Start**, **Maxifol Extra**, **Aminofol Plus**, with the consumption of the working solution - 200-250 l / ha).

In the fields where plants have reached by their root system to moisture, it is recommended to stimulate vegetation by **Plantafeed 20:20:20** + micro or **Plantafeed 30:10:10** + micro in the dose of 1-2 kg / ha, but always in combination with agrochemicals stimulating the physiology and metabolism of the plant organism (**Maxifol Dynamics**, **Maxifol Extra**, **Maxifol Start**, **Aminofol Plus** - 0.5 - 1.0 l / ha), as they contribute to the removal of deadlock and improves absorption of nutrient elements both at low (below 10-12 ° C) and at high temperatures (above 25-27 ° C).







Mezo- And Micronutrients



# AgroBor Line

**AgroBor** Line (and Boroplyus) has been designed to meet the needs of agriculture crops at any level of profitability in boron, in farms of any level of the financial situation (low, medium, high) and any preferences of experts - agronomists in this matter. Boron is an important micronutrient participating and regulating the processes of pollination and fertilization, carbohydrate and protein substances exchanges. In the carbohydrate metabolism it is boron that promotes the movement of sugar from the vegetative organs to the fetus or other storage organs.

The boron deficiency can occur even with a high level of its content in the soil, it can be caused by drought, excessive moisture, light intensity, abundance of nitrogen and potassium fertilizers, liming.

Many plants are highly sensitive to boron deficit – these are indicator plants: sugar, common beet and beetroot, sunflower, alfalfa, clover, lupine, clover (white), rank, turnips, rape, canola, cauliflower and cabbage, spinach, tobacco, cotton, fruit pome, stone fruit and grapes.

Despite the fact that many Russian soils are rich in boron, during the vegetation period of agriculture crops such situations can arise that can lead to the fact that this element may be no longer available to the root system. The factors reducing the mobility and assimilation of boron include: drought, excessive moisture, light intensity, abundance of nitrogen and potassium fertilizers, liming. These circumstances require leaf dressing by boron microfertilizers during periods of high demand from agriculture crops in this element, and especially in case of crops - indicators. The timely provision of agriculture crops with boron microfertilizers has significant impact on the quality and quantity of the yield.







# AgroBor 21

**AgroBor 21** is a boric acid sodium salt (sodium octaborate) with the highest content of boron. Sodium that presents in the agrochemical substantially improves the efficiency of feeding an agriculture crop with specific needs for this element. In crop production and agricultural chemistry there are **four groups** of plants on demand to sodium:

1. Plants requiring sodium with potassium deficiency in the soil solution (barley, oats, alfalfa, tomatoes, carrots, Brussels sprouts);
2. Plants experiencing low demand for sodium with potassium deficiency in the soil solution (onions, potatoes, lettuce, maize, red clover);
3. Plants experiencing little need for a sufficient amount of sodium potassium (wheat, peas, brassicas);
4. Plants, which are greatly in need of a sufficient amount of sodium potassium (sugar beet, fodder beet and beet root, turnips, celery).

**AgroBor 21** is an agrochemical with a specific application in all cultures, but the highest effectiveness is observed at the sugar, fodder beet and dining. As for potato and onion, pre-harvest dressing provides desiccation effect while increasing the outflow of plastic substances to the organs of accumulation: the tubers and bulbs.

## Composition (w/v – in 1 liter of product - %):

Sodium (Na <sub>2</sub> O)	14,0
Boron (B <sub>2</sub> O <sub>3</sub> )	65,0
Boron (B)	20,0
Manganese (Mn)	0,5

## Physical characteristics:

Appearance	Powder $\Delta$
Color	White
pH (1% aqueous solution)	7,0
Solubility (gr/100 ml)	26



## Foliar Application

	<b>Sugar beet, table beet, feeding beet</b>	2-3 times during the growing season (1st - in the phase of 4-6 pairs of leaves, 2nd - 20-25 days after the first, third - 2-3 weeks before harvest)	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Sunflower, canola, corn, flax, peanut, rice, cereals</b>	1-2 times during the period from the beginning of the formation of generative organs before flowering	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Tomato, eggplant, pepper, cucumber, cucurbits</b>	before flowering, and then 1-2 times with an interval of 15-20 days	0.4 - 1.5 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Carrots, radishes, celery, cabbage (all types)</b>	dressing during a phase of 4-6 leaves and in 20-25 days	0.4 - 0.9 kg/ha; concentration of ready-mixed solution – 0.1-0.15%
	<b>Potato</b>	foliar fertilizing of plants 1-2 times during the phase of full germination to flowering	0.6 - 0.75 kg/ha; concentration of ready-mixed solution – 0.2-0.25%
		processing of plants on the 15th day before harvest	1 - 2 kg/ha; consumption of ready-mixed solution – 300 l/ha
	<b>Onion, garlic</b>	dressing during the period of the bulb formation	0.75 kg/ha; concentration of ready-mixed solution – 0.25%
		dressing on the 10-12th day before harvest	2 kg/ha; consumption of ready-mixed solution – 300 l/ha
	<b>Cotton</b>	dressing at the beginning of the formation of the 8th leaf in the budding stage, and after 30 days	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Fruit and berry crops (pome)</b>	dressing 1-2 times before flowering and after the formation of ovaries	0.6 - 1 kg/ha; concentration of ready-mixed solution – 0.08-0.1%
	<b>Fruit and berry crops (stone)</b>	dressing before flowering and after the formation of ovaries	0.6 - 1 kg/ha; concentration of ready-mixed solution – 0.08-0.1%
	<b>Strawberry</b>	dressing before flowering and after the formation of ovaries	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Grapes, citrus</b>	dressing before flowering, after the formation of ovaries, and for 30-40 days before harvest	1 - 2.5 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Flower crops (rose, carnation, gerbera, etc.)</b>	dressing of plants during the phase of forming buds	0.25 - 0.6 kg/ha; concentration of ready-mixed solution – 0.08-0.1%

1 kg

1 kg bags

5 kg

5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AgroBor K

**AgroBor K** – is a of boric acid potassium salt (potassium octaborate) with a high content of potassium and boron. **Potassium, magnesium, boron and manganese**, which present in the agrochemical, stimulate carbohydrate metabolism and significantly increase the feedings' efficiency of crops used to increase the sugar content in fruits.

**AgroBor K** is a specific agrochemical that can be applied to all crops, both to improve flowering and ovary formation, and to increase the sugar content in fruits and other storage organs. On potato and onion pre-harvest application provides the effect of desiccation with a simultaneous increase in the outflow of plastic substances to the accumulation organs: tubers and bulbs.

### Composition (w/v – in 1 liter of product - %):

Potassium oxide (K <sub>2</sub> O)	19.0
Boron (B <sub>2</sub> O <sub>3</sub> )	56.8
Boron (B)	17.5
Magnesium (MgO)	1
Manganese (Mn)	0.5

### Physical characteristics:

Appearance	Powder
Color	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">White</span>
pH (1% aqueous solution)	8.0
Solubility (gr/100 ml)	60



## Foliar Application

	<b>Sugar beet, table beet, feeding beet</b>	2-3 times during the growing season (1st - in the phase of 4-6 pairs of leaves, 2nd - 20-25 days after the first, third - 2-3 weeks before harvest )	0.4 - 0.75 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Sunflower, canola, corn, flax, peanut, rice, cereals</b>	1-2 times during the period from the beginning of the formation of generative organs before flowering	0.4 - 0.75 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Tomato, eggplant, pepper, cucumber, cucurbits</b>	before flowering, and then 1-2 times with an interval of 15-20 days	0.4 - 1.5 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Carrots, radishes, celery, cabbage (all types)</b>	feeding during a phase of 4-6 leaves and in 20-25 days	0.4 - 0.9 kg/ha Concentration of ready-mixed solution – 0.1-0.15%
	<b>Potato</b>	foliar fertilizing of plants 1-2 times during the phase of full germination to flowering  processing of plants on the 15th day before harvest	0.6 - 0.75 kg/ha Concentration of ready-mixed solution – 0.2-0.25%  1 - 2 kg/ha Consumption of ready-mixed solution – 300 l/ha
	<b>Onion, garlic</b>	dressing during the period of the bulb formation  dressing on the 10-12th day before harvest	0.75 kg/ha Concentration of ready-mixed solution – 0.25%  2 kg/ha Consumption of ready-mixed solution – 300 l/ha
	<b>Cotton</b>	dressing at the beginning of the formation of the 8th leaf in the budding stage, and after 30 days	0.4 - 0.75 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Fruit and berry crops (pome)</b>	dressing 1-2 times before flowering and after the formation of ovaries	0.6 - 1 kg/ha Concentration of ready-mixed solution – 0.08-0.1%
	<b>Fruit and berry crops (stone)</b>	dressing before flowering and after the formation of ovaries	0.6 - 1 kg/ha Concentration of ready-mixed solution – 0.08-0.1%
	<b>Strawberry</b>	dressing before flowering and after the formation of ovaries	0.4 - 0.75 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Grapes, citrus</b>	dressing before flowering, after the formation of ovaries, and for 30-40 days before harvest	1 - 2.5 kg/ha Concentration of ready-mixed solution – 0.1-0.25%
	<b>Flower crops (rose, carnation, gerbera, etc.)</b>	dressing of plants during the phase of forming buds	0.25 - 0.6 kg/ha Concentration of ready-mixed solution – 0.08-0.1%



1 kg bags



5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AgroBor P


**AgroBor P** is an improved **boric acid**.

**AgroBor P** is a specific agrochemical that can be applied on all crops in open and protected soil, both for improving flowering and ovary formation, and for increasing the sugar content in fruits and other storage organs. On potato and onions pre-harvest top dressing provides the effect of desiccation with a simultaneous increase in the outflow of plastic substances to the accumulation organs: tubers and bulbs.

### Composition (w/v – in 1 liter of product - %):



Phosphorus (P <sub>2</sub> O <sub>5</sub> )	0.5
Boron trioxide (B <sub>2</sub> O <sub>3</sub> )	56.0
Boron (B)	17.0

### Physical characteristics:


Appearance	Crystalline powder 
Color	White
pH (1% aqueous solution)	3.7
Solubility (gr/100 ml)	50



## Foliar Application

	<b>Sugar beet, table beet, feeding beet</b>	2-3 times during the growing season (1st - in the phase of 4-6 pairs of leaves, 2nd - 20-25 days after the first, third - 2-3 weeks before harvest)	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1-0.25%
	<b>Sunflower, canola, corn, flax, peanut, rice, cereals</b>	1-2 times during the period from the beginning of the formation of generative organs before flowering	0.2 - 0.4 kg/ha; concentration of ready-mixed solution – 0.075-0.13%
	<b>Tomato, eggplant, pepper, cucumber, cucurbits</b>	before flowering, and then 1-2 times with an interval of 15-20 days	0.2 - 0.75 kg/ha; concentration of ready-mixed solution – 0.075-0.13%
	<b>Carrots, radishes, celery, cabbage (all types)</b>	feeding during a phase of 4-6 leaves and in 20-25 days	0.4 - 0.9 kg/ha; concentration of ready-mixed solution – 0.1-0.15%
	<b>Potato</b>	foliar fertilizing of plants 1-2 times during the phase of full germination to flowering	0.2 - 0.75 kg/ha; concentration of ready-mixed solution – 0.075-0.13%
		processing of plants on the 15th day before harvest	1 - 2 kg/ha; consumption of ready-mixed solution – 300 l/ha
	<b>Onion, garlic</b>	dressing during the period of the bulb formation	0.75 kg/ha; concentration of ready-mixed solution – 0,25%
		dressing on the 10-12th day before harvest	2 kg/ha; consumption of ready-mixed solution – 300 l/ha
	<b>Cotton</b>	dressing at the beginning of the formation of the 8th leaf in the budding stage, and after 30 days	0.4 - 0.75 kg/ha; concentration of ready-mixed solution – 0.1 - 0.25%
	<b>Fruit and berry crops (pome)</b>	dressing 1-2 times before flowering and after the formation of ovaries	0.6 - 1 kg/ha; concentration of ready-mixed solution – 0.08 - 0.1%
	<b>Fruit and berry crops (stone)</b>	dressing before flowering and after the formation of ovaries	0.6 - 1 kg/ha; concentration of ready-mixed solution – 0.08 - 0.1%
	<b>Strawberry</b>	dressing before flowering and after the formation of ovaries	0,4-0,75 kg/ha; concentration of ready-mixed solution – 0,1 - 0,25%
	<b>Grapes, citrus</b>	dressing before flowering, after the formation of ovaries, and for 30-40 days before harvest	1 - 2.5 kg/ha; concentration of ready-mixed solution – 0.1 - 0.25%
	<b>Flower crops (rose, carnation, gerbera, etc.)</b>	dressing of plants during the phase of forming buds	0.25 - 0.6 kg/ha; concentration of ready-mixed solution – 0.08 - 0,1%

## Fertigation

 **Vegetable, fruit and berry crops**

1 kg

1 kg bags

5 kg

5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AgroBor Ca

**AgroBor Ca** is a liquid complex of **calcium with boron**, which is specially designed for prevention and treatment of:

- bitter pitiness of apples;
- Vertex rot of tomato, sweet pepper, eggplant, watermelon and melon fruits;
- frying of the flesh and development of dry and wet bacterial rot of potatoes;
- rot (conducting beams) of sugar beet roots;
- edge burn of leaves in melons, lettuce, chicory;
- cracking of fruits of sweet cherry, peach, nectarine, plum, tangerines, grapes;
- necrosis of the stem.

In addition, the treatment with **AgroBor Ca** fertilizer improves the structure of the fruit, since calcium compounds with pectin substances adhere to each other the walls of individual cells, increasing the shelf-life, transportability and shelf life of the fruit.

**AgroBor Ca** - is a specific agrochemical with the possibility of application on all cultures. Boron in the composition of agrochemical improves the mobility of calcium in tissues.

Composition	w/w-%	w/v-%
Calcium (CaO)	14.0	20.0
Boron (B <sub>2</sub> O <sub>3</sub> )	2.0	2.9
Boron (B)	0.6	0.9

## Physical characteristics:

Appearance	Liquid
Color	Brown
Density (g/cm <sup>3</sup> )	1.45
pH (1% aqueous solution)	8
Conductivity 1‰ (mS/cm) 18°C	0.65



## Foliar Application

	<b>Sugar beet, table beet, feeding beet</b>	2-3 times during the growing season (1st - in the phase of 4-6 pairs of leaves, 2nd - 20-25 days after the first, third - 2-3 weeks before harvest)	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.5-0.75%
	<b>Sunflower, canola, corn, flax, peanut, rice, cereals</b>	1-2 times during the period from the beginning of the formation of generative organs before flowering	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.5-0.75%
	<b>Tomato, eggplant, pepper, cucumber, cucurbits</b>	before flowering, and then 1-2 times with an interval of 15-20 days	0.5 - 1.5 l/ha; concentration of ready-mixed solution – 0.1-0.5%
	<b>Carrots, radishes, celery, cabbage (all types)</b>	feeding during a phase of 4-6 leaves and in 20-25 days	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.2-0.5%
	<b>Potato</b>	foliar fertilizing of plants 1-2 times during the phase of full germination to flowering	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.2-0.3%
	<b>Onion, garlic</b>	feeding during the period of the bulb formation	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.2-0.3%
	<b>Cotton</b>	feeding at the beginning of the formation of the 8th leaf in the budding stage, and after 30 days	0.5 - 1 l/ha; concentration of ready-mixed solution – 0.2-0.3%
	<b>Fruit and berry crops (pome)</b>	feeding 1-2 times before flowering and after the formation of ovaries	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.08-0.15%
	<b>Fruit and berry crops (stone)</b>	feeding before flowering and after the formation of ovaries	1 - 1.5 l/ha; concentration of ready-mixed solution – 0.08-0.15%
	<b>Strawberry</b>	feeding before flowering and after the formation of ovaries	0.5 - 1 l/ha; concentration of ready-mixed solution – 0.1-0.3%
	<b>Grapes, citrus</b>	feeding before flowering, after the formation of ovaries, and for 30-40 days before harvest	1 - 2.5 l/ha; concentration of ready-mixed solution – 0.1-0.3%
	<b>Flower crops (rose, carnation, gerbera, etc.)</b>	feeding of plants during the phase of forming buds	0.5 - 1 l/ha; concentration of ready-mixed solution – 0.1-0.3%

- 1 liter bottle, box with 20 bottles of 1 liter
- 5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".



# Boroplus®

## Liquid microfertilizer based on an organic boron compound

Boron is the most important microelement participating and regulating the processes of pollination and fertilization, carbohydrate and protein substances exchanges. Many plants are highly sensitive to Boron deficit. They are the plants-indicators: sugar, feed and beet, sunflower, alfalfa, clover, lupine, clover (white), rank, turnips, rape, canola, cauliflower and cabbage, spinach, tobacco, cotton, pome fruits, stone fruits and grapes.

Factors reducing the mobility and Boron assimilation include: drought, excessive moisture, light intensity, the abundance of nitrogen and potassium fertilizers, liming. Thanks to liquid form, nourishing Boroplus complex containing boron in an organic form is highly effective both in a foliar application and in drip irrigation systems. Unlike inorganic boron compounds Boroplus has a mild effect and small risk of phytotoxicity.

### Boroplus application allows:

- To prevent and to treat heart rot of sugar, fodder and table beet;
- To improve the flowering and fruit performance, increase yield of sunflower, clover and alfalfa;
- To satisfy the Boron needs and increase the productivity of the cabbage, apples and pears, stone fruits, cotton and other crops;
- To improve the formation of the cluster and prevent "goroshenie" of grapes;

### Composition, %




Boron (B) w/w in 1 kg of product	11.0
Boron (B) w/v in 1 liter of the product	15.0

### Physical characteristics:

Appearance	Liquid
Color	Colorless, yellowish
Density (g/cm <sup>3</sup> )	1.37
pH (1% water aqueous solution)	7.7
Conductivity 1‰ (mS/cm) 18°C	0.19
Crystallization point	-1°C



## Fertigation

	Fruit - berries, ornamental trees and shrubs	4-6 l / ha, at the beginning of the growing season
	Technical crops, vegetables, melons, edible roots	3-5 l / ha before sowing or pre-emergence
	Ornamental crops	3-5 l / ha before planting or during the period of intense flowering

## Foliar Application

	Grapes, stone fruit, citrus	0.5-1.1 l / ha, 3 dressings: before flowering, after flowering and after the formation of ovaries
	Pears, apples	0.4-0.6 l / ha, 3 dressings: before flowering, after flowering and after the formation of ovaries
	Vegetable crops, cucurbits, fruit and berry crops	0.3-0.8 l / ha before flowering and 1 - 2 times with an interval of 10-15 days
	Carrots, radishes, celery, cauliflower	0.4-0.9 l / ha, 4-6 leaves and 20-25 days
	Sugar beet, table beet	0.8-1.0 l / ha 4-6 leaf pair, and then after 20-25 days and 15-20 days before harvesting
	Cereals, maize (corn), linum, sorghum, rape, sunflower, cotton, rice	0.8 - 1.0 l / ha before flowering dressing
	Flower crops	0.2-0.7 l / ha, the budding phase



Attention! The treatment can be combined with the use of plant protection products and complex fertilizers Agromaster or Plantafeed series.

Do not mix Boroplus with white oils, activated oils and other components having an alkaline reaction.



1 liter bottle, box with 20 bottles of 1 liter



5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AgroMix®

## The mixture of micronutrients in chelated form

**AgroMix®** is a soluble mixture of chelated trace elements designed for growing different crops in hydroponics and drip irrigation, the treatment of chlorosis by a foliar application and seed treatment. The balance of micronutrients is specially studied and done to meet the needs of all agricultural crops.

Micronutrients are necessary to plants in small quantities which are different for each element, that's why independent preparation on-field of highly nutritious complex is practically impossible. In addition, optimal dose range is very small, and there may be negative effect due to both exceeding the maximum allowable dosage and the mixture of trace elements inorganic salts resulted from antagonism.

**AgroMix®** is an effective complex for stimulation of germination energy and seed germination, increase the resistance of plants to diseases and adverse weather conditions in the initial phase of growth, which is used during the treatment of seeds. Some trace elements, in addition to the stimulation of the metabolism, fungicidal and bactericidal properties, have specific functions, as **Fe and Zn** stimulate the synthesis of auxin, **Ca** is necessary for the normal development of the root system in the root zone of seedlings, **Mo and Co** stimulates symbiotic and non - symbiotic nitrogen fixation. Chelated trace elements are well combined with seed protectants and are not fixed in the soil.

### Physical characteristics:

Appearance	Powder
Color	White with splashes
pH (1% water solution)	7.1
Conductivity 1‰ (mS/cm) 18°C	0.39
Solubility (g / 100 ml) 20°C	28

1 kg

1 kg bags

5 kg

5 kg bags



## Composition (w/v – in 1 liter of product - %):

Boron (B) water soluble	0.6	Molybdenum (Mo) water soluble	0.15
Copper (Cu) chelated EDTA	0.4	Zinc (Zn) chelated EDTA	2.0
Iron (Fe) chelated DTPA/EDTA	3.5	Cobalt (Co) chelated EDTA	0.02
Manganese (Mn) chelated EDTA	2.5	Calcium (Ca) chelated EDTA	3.0

## Foliage application

	<b>Pome fruits, citrus, grapes</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	80-100 g / 100 l 0.6-1.0 kg / ha
	<b>Stone fruits</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	50-80 g / 100 l 0.4-0.8 kg / ha
	<b>Vegetable crops</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	50-80 g / 100 l 0.3-0.5 kg / ha

## Root feeding (fertigation)

	<b>All crops</b>	Preventive feeding, 1-4 times	6.3 kg/ha
	<b>All crops</b>	To eliminate the existing deficit	10-20 kg/ha

## Hydroponics

	<b>All crops</b>	Preventive feeding	20-50 g / m <sup>3</sup>
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## Seed treatment

	<b>Vegetable, flower crops</b>	Soak the seeds for 12 hours	The solution is based 2 g / l of water
	<b>All crops</b>	Production processing of seeds	100-200 g / 8-10 liters of water per 1 ton of seeds

Leaf feeding field crops using TMA - 100 - 200 g / ha.





# AgroMix T<sup>®</sup>

## The mixture of micronutrients in chelated form

**AgroMix T<sup>®</sup>** - soluble mixture of chelated trace elements, designed for growing different crops in hydroponics and drip irrigation, the treatment of chlorosis by a foliar application. The balance of micronutrients are specially studied and done to meet the needs of vegetable and flower crops.

Trace elements are necessary to plants in small quantities, with different for each element individually, so independent preparation of highly nutritious complex field is practically impossible. In addition, optimal dose range is very small, and there may be negative effect due to both exceeding the maximum allowable dosage and the mixture of trace elements inorganic salts resulted from antagonism

**AgroMix T<sup>®</sup>** - effective complex for stimulation of growth processes, increasing the resistance of plants to diseases and adverse weather conditions, which is used for foliar application. Some trace elements, in addition to the stimulation of the metabolism, fungicidal and bactericidal properties, have specific functions, as Fe and Zn stimulate the synthesis of auxin, Mo stimulates symbiotic nitrogen fixation, Cu improves heat resistance, Zn prevents protein degradation and increases the water-holding capacity of the cells. Chelated trace elements are well combined with pesticides, which allows to combine processing.

### Composition, %:

Boron (B) a water-soluble	0.65
Copper (Cu) chelated EDTA	0.27
Iron (Fe) chelated DTPA	7.00
Manganese (Mn) chelated EDTA	3.30
Molybdenum (Mo) soluble	0.20
Zinc (Zn) chelated EDTA	0.60

### Physical characteristics:




Appearance	Microgranules
Color	Brown, brown-green
pH (1% water solution)	7.1
Conductivity 1‰ (mS/cm) 18°C	0.39
Solubility (g / 100 ml) 20°C	28





## Composition (w/v – in 1 liter of product - %):

Boron (B) water soluble	0.65	Manganese (Mn) chelated EDTA	3.3
Copper (Cu) chelate of EDTA	0.27	Molybdenum (Mo) water soluble	0.2
Iron (Fe) chelated DTPA/EDTA	7.0	Zinc (Zn) chelated EDTA	0.6

## Fertigation

	<b>Pome fruits, citrus, grapes</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	80-100 g / 100 l 0.6-1.0 kg / ha
	<b>Stone fruits</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	50-80 g / 100 l 0.4-0.8 kg / ha
	<b>Vegetable crops</b>	Treat every 15-20 days at the first appearance of symptoms of deficiency, 1-4 times	50-80 g / 100 l 0.3-0.5 kg / ha



## Root feeding (fertigation)

	<b>All crops</b>	Preventive feeding, 1-4 times	6.3 kg/ha
	<b>All crops</b>	To eliminate the existing deficit	10-20 kg/ha

## Hydroponics

	<b>All crops</b>	Preventive feeding	20-50 g / m <sup>3</sup>
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## Seed treatment

	<b>Vegetable, flower crops</b>	Soak the seeds for 12 hours	The solution is based 2 g / l of water
	<b>All crops</b>	Production processing of seeds	100-200 g / 8-10 liters of water per 1 ton of seeds

Leaf feeding field crops using TMA - 100 - 200 g / ha.



# Aminofol Line

## Meso- and trace elements in combination with amino acids

**Aminofol** line - is a series of individual meso- and microelements, in combination with amino acids, which gives a number of significant advantages in comparison with other inorganic and organic compounds. High degree of feed elements' adoption without risk of phytotoxicity is provided by: Glutamine; Cysteine; Glycine; Histidine and Lysine, which combine with trace elements like chelation, and Tyrosine, Arginine, Alanine, Proline, Serine, Threonine and Valine stimulate metabolism and promote better adoption of nutrients in stressful situations (frost, low or high temperature, hail, chemical burn, osmotic stress, etc.). Liquid form of the line Aminofol does not require preliminary dissolution and can be used in any irrigation systems and for sheet dressings.

### Composition, w/v – in 1 liter - %

Name of the indicator	Aminofol Cu	Aminofol Fe	Aminofol Mg	Aminofol Mn	Aminofol Mo	Aminofol Zn
Nitrogen total (N)	5.4	8.0	5.4	5.4	7.1	5.4
- including organic	3.7	5.1	3.7	3.7	7.1	3.7
- amide	1.7	2.9	1.7	1.7	-	1.7
Amino-acids	23.4	31.8	23.4	23.4	44.3	23.4
Copper (Cu)	6.2	-	-	-	-	-
Iron (Fe)	-	6.4	-	-	-	-
Magnesium (MgO)	-	-	6.2	-	-	-
Manganese (Mn)	-	-	-	7.4	-	-
Molybdenum (Mo)	-	-	-	-	8.1	-
Zinc (Zn)	-	-	-	-	-	7.4

### Physical characteristics:

Product	Aminofol Cu	Aminofol Fe	Aminofol Mg	Aminofol Mn	Aminofol Mo	Aminofol Zn
Appearance	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Color	Dark-blue	Brown	Brown	Brown	Brown	Brown
Conductivity 1%(mS/cm) 18°C	0.21	0.24	0.31	0.27	0.17	0.28
pH (1% aqueous solution)	5.9	5.28	6.1	5.9	6.1	5.35
Density (g/cm <sup>3</sup> )	1.23	1.27	1.23	1.23	1.15	1.23

## Foliar application

Product	Fruit and berry crops	Vegetables and flower crops	Field crops
Aminofol Cu	0.5-2.0 l/ha	0.5-1.5 l/ha	0.2-1.0 l/ha
Aminofol Fe	1.0-3.0 l/ha	1.0-3.0 l/ha	0.5-3.0 l/ha
Aminofol Mg	1.0-3.0 l/ha	1.0-3.0 l/ha	0.5-3.0 l/ha
Aminofol Mn	1.0-2.0 l/ha	1.0-2.0 l/ha	0.5-1.5 l/ha
Aminofol Mo	-	0.2-0.5 l/ha	0.2-0.5 l/ha
Aminofol Zn	1.0-2.0 l/ha	1.0-2.0 l/ha	0.5-1.5 l/ha



Note: Feeding is carried out as needed 1-4 times per season. The minimum interval between leaf fertilizing is 7 days. Do not combine feeding with treatment with copper-containing fungicides.

Aminofol Mo - in leguminous cultures is applied with the rate of consumption - 0,4 - 1,0 l / ha. In all crops, fertilizing plants on the eve and after the expected frosts is normally 0.5-1.0 l / ha.

## Fertigation



Vegetables, cucurbits, fruit and berry crops

3 - 6 l/ha, periodic feeding during the vegetation

0,2 – 0,3 l/ha, daily application



1 liter bottle, box with 20 bottles of 1 liter



5 liter canister, box with 4 cans of 5 liters



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies AgroMaster.



# AgroMaster chelate line - AM EDTA

## Chelates of microelements EDTA for low-volume hydroponics and drip irrigation

The line of chelates **AM EDTA** – is a serie of chelates EDTA of individual meso- and microelements in microgranules. Microfertilizers are designed for balancing nutrient solutions with microelements. **AM EDTA** line is completely water-soluble microfertilizers and can be used in any, the most complex irrigation systems (hydroponics, drip irrigation, sprinkling) and for foliar application.

### Composition, w/v – in 1 liter - %

Product/Element	<sup>20</sup> Ca 40.078	<sup>12</sup> Mg 24.305	<sup>56</sup> Fe 55.845	<sup>55</sup> Mn 54.938	<sup>30</sup> Zn 65.39	<sup>63</sup> Cu 63.546	<sup>14</sup> N 14.007
AM EDTA Ca 10%	10	-	-	-	-	-	0.5
AM EDTA Mg 6%	-	6	-	-	-	-	0.5
AM EDTA Fe 13%	-	-	13	-	-	-	0.5
AM EDTA Mn 13%	-	-	-	13	-	-	0.5
AM EDTA Zn 15%	-	-	-	-	15	-	0.5
AM EDTA Cu 15%	-	-	-	-	-	15	0.5

### Physical characteristics:




Product	AM EDTA Ca 10%	AM EDTA Mg 6%	AM EDTA Fe 13%	AM EDTA Mn 13%	AM EDTA Zn 15%	AM EDTA Cu 15%
Appearance	Powder △	Powder △	Powder △	Powder △	Powder △	Powder △
Color	White	White	Yellow-green	Beige	White	Blue
Conductivity 1‰(mS/cm) 18°C	0.37	0.27	0.18	0.39	0.38	0.28
pH (1% aqueous solution)	6.8	6.5	4.5	6.8	5.0	6.1
Solubility (g/100 ml H <sub>2</sub> O) 20°C	70	80	25	70	90	90

## Foliar application

Product	Fruit and berry crops	Vegetables and flower crops	Field crops
AM EDTA Ca 10%	0.5-1.0 kg/ha	0.1-0.25 kg/ha	-
AM EDTA Mg 6%	0.5-1.0 kg/ha	0.1-0.6 kg/ha	1.0-2.0 kg/ha
AM EDTA Fe 13%	0.5-1.0 kg/ha	0.5-1.0 kg/ha	1.0-2.0 kg/ha
AM EDTA Mn 13%	0.5-1.0 kg/ha	0.1-0.6 kg/ha	1.0-2.0 kg/ha
AM EDTA Zn 15%	0.5-1.0 kg/ha	0.1-0.3 kg/ha	1.0-2.0 kg/ha
AM EDTA Cu 15%	0.4-1.0 kg/ha	0.1-0.3 kg/ha	1.0-1.5 kg/ha

! Note: Feeding is performed until the symptoms of deficiency disappear, with an interval of 7-14 days.

## Fertigation

	Fruit and berry crops	feeding of plants during the growth season	3-30 kg/ha, consumption of the ready-mixed solution - depending on the rate of irrigation
	Vegetable and flower-decorative crops	feeding of plants during the growth season	3-6 kg/ha, consumption of the ready-mixed solution - depending on the rate of irrigation
	Vegetable and flower-decorative crops (hydroponic method of cultivation)	preparation of nutrient solution	0.01-3 kg /1000 l of mother liquor



1 kg  
1 kg bags

5 kg  
5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AM DTPA Fe 11%

## Iron in DTPA chelated form

Iron chelate DTPA **AM DTPA Fe 11%** - powder microfertilizer, which contains iron in the chelate form of DTPA. Fertilizer is characterized by high stability, complete absence of phytotoxicity in foliar applications and high efficiency when used in low-volume hydroponics systems.

### Composition (w/w, %):

Iron (Fe) DTPA	11
Nitrogen (N)	0.5

### Physical characteristics:

Appearance	Powder $\Delta$
Color	Yellow
Solubility (g/100 ml) 20°C	10
pH (1% water aqueous solution)	3.0
Conductivity 1‰ (mS/cm) 18°C	0.4



## Foliar Application

	Cereals, legumes, industrial crops	feeding of plants during the growth season	0.5-1.5 kg/ha Consumption of ready-mixed solution – 100-300 l/ha
	Fruit and berry crops (pome fruits), grapes	feeding of plants during the growth season 2-3 times	0.25-1.5 kg/ha (Concentration of ready-mixed solution up to 0.15%)
	Fruit and berry crops (stone fruits)	feeding of plants during the growth season 2-3 times with an interval of 7-10 days	0.25-1 kg/ha (Concentration of ready-mixed solution up to 0.1%)
	Vegetable, flower-decorative crops	feeding of plants at the beginning of the growth season and then 2-3 times with an interval of 7-14 days	0.03-0.15 kg/ha (Concentration of ready-mixed solution up to 0.1%)

## Fertigation

	Fruit and berry crops	root feeding of plants during the growth season (application with irrigation waters)	5-10 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Vegetable and industrial crops	root feeding of plants during the growth season (application with irrigation waters)	5-7 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Flower-decorative crops, strawberry	root feeding of plants during the growth season (application with irrigation waters)	20-30 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Flower-decorative crops (potted)	root feeding of plants during the period of active growth with an interval of 7-14 days	Up to 1 g/plant Consumption of ready-mixed solution – before wetting an earthy clod
	Vegetable, flower-decorative crops (hydroponic method of cultivation)	preparation of nutrient solution	0.01-3 kg /1000 liter of mother liquor

1 kg

1 kg bags

5 kg

5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".





# AM EDDHA Fe 6%

EDDHA chelated form of iron

**AM EDDHA Fe 6%** –is a special, highly effective chelated form of EDDHA iron, for the treatment and prevention of chlorosis caused by iron deficiency. **AM EDDHA Fe 6%** is produced using a technology that allows to bind a high percentage of iron (4.8%) to the most stable form (ORTO-ORTO). For this reason, **AM EDDHA Fe 6%** is highly effective in alkaline soils (because it is stable in a wide pH range of 3.0-9.0).

## Composition (w/w, %):

Iron (Fe) EDDHA	6
Nitrogen (N)	0.5

## Physical characteristics:

Appearance	Powder
Color	Dark-brown
Solubility (g/100 ml) 20°C	30.0
pH (1% water aqueous solution)	8.0
Conductivity 1‰ (mS/cm) 18°C	0.49

## Fertigation

	Fruit and berry crops	root feeding of plants during the growth season (application with irrigation waters)	5 - 10 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Vegetable and industrial crops	root feeding of plants during the growth season (application with irrigation waters)	5 - 7 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Flower-decorative crops, strawberry	root feeding of plants during the growth season (application with irrigation waters)	20 - 30 kg/ha Consumption of ready-mixed solution – depending on the rate of watering
	Flower-decorative crops (potted)	root feeding of plants during the period of active growth with an interval of 7-14 days	Up to 1 g/plant Consumption of ready-mixed solution – before wetting an earthy clod
	Vegetable, flower-decorative crops (hydroponic method of cultivation)	preparation of nutrient solution	0.01 - 3 kg /1000 liter of mother liquor



**AM EDDHA Fe 6%** shall be applied during the period of the most intensive absorption of nutrients and high photosynthetic activity of the plant.



1 kg bags



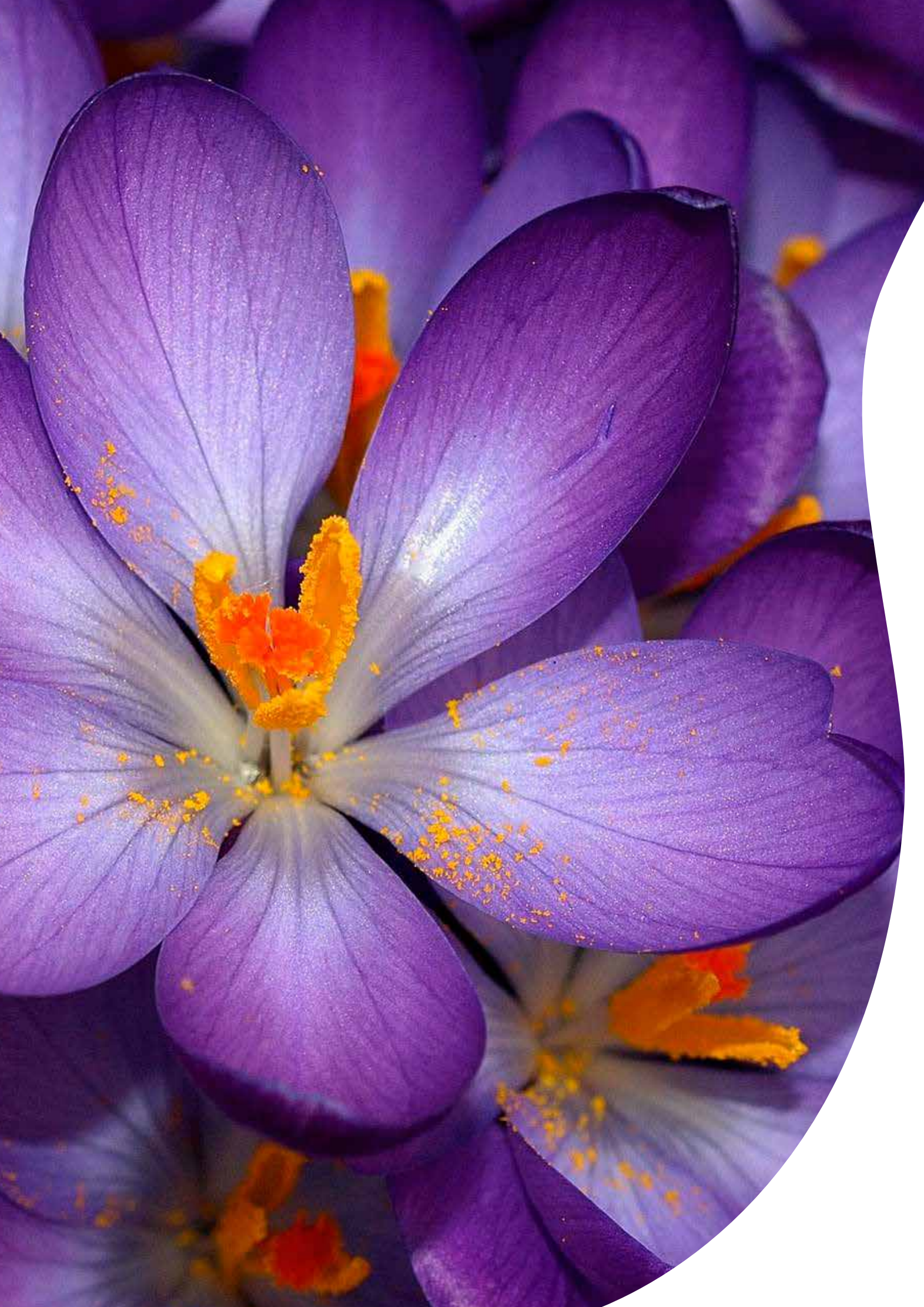
5 kg bags



Usage Guidelines shall be regarded as general advice. If the issues to increase the effectiveness of the product according to the different conditions of use occur, please, contact the office of the Group of companies "AgroMaster".







# EUROSTANDART Fertigators

The lack of certified industrial chelated trace elements, and such European standards like fertigatory agrochemicals and foliar feed in Russia leads to speculation these concepts by unscrupulous traders, and falsification of information to the end user of agrochemicals.

Eurostandard Fertigators are **complex, fully water-soluble, chlorine-free (low titer chlorine) fertilizers** with various combinations of NPK + (Mg) + trace elements intended for the organization of the mineral nutrition of agricultural crops throughout the growing season, in hydroponics and drip systems irrigation (fertigation). The invention of drip irrigation systems caused the appearance of the term and the standard, and literal translation means: fertilization and irrigation.



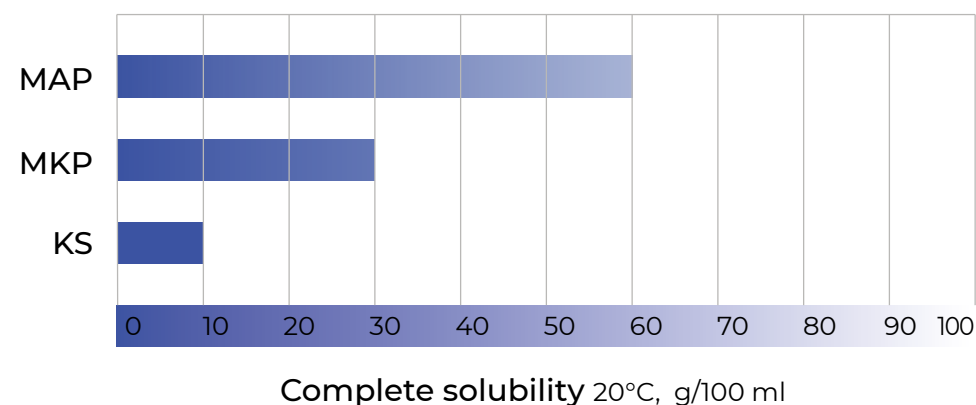
The base of all these fertilizers (NPK + Mg) includes a water-soluble, chlorine-free salt in various combinations to provide the plants need within the appropriate periods of their growth and development:

- AN\* - ammonium nitrate
- AS - ammonium sulfate
- UR - urea
- MAP - monoammonium phosphate
- MKP - monopotassium phosphate
- KN - potassium nitrate
- KS - potassium sulfate
- Magnesium in the form of MgN - magnesium nitrate or
- MgS - magnesium sulfate (if present)

(\* AN and further - European reduction)



These salts are completely soluble in water and have a high degree of chemical purity. The lack of chlorine is important as well as the lack of sodium and carbonates. Some companies are trying to promote their product saying that it is more soluble, but it is falsehood. All products certified as fertigatory are fully water soluble (otherwise drip systems would be clogged) but to different degrees. The rate of saturation of the solution varies at all salts, moreover, the degree of solubility depends on the water saturation temperature and its other salts. The physico-chemical characteristics should contain fertilizer solubility in grams per 100 ml of deionised (desalted) water at a temperature of 20°C. Since complete solubility **monoammonium phosphate** in these conditions is 60 g per 100 ml, **monopotassium phosphate** - 30 g per 100 ml, and **potassium sulphate** - 10 g in 100 ml, it is therefore a formulation N-13, P-40 K-13 perfectly dissolve before 5 kg per 10 liters of water, because the basis of fertilizers monoammonium phosphate and monopotassium, formulation and N-P-3 11 K-38 are not more than 1 kg per 10 liters, as are based on potassium sulfate. If more than these amounts, it remains part of the crystals non-soluble (due to saturation of the solution) in a solution as fine sand. The **degree of saturation solubility and solution rate is greatly influenced by the water temperature and the total content of other salts**. The solubility of these complexes reduced in cold and hard water.



The fertigators comprise of **six essential trace elements: iron, manganese, zinc, copper, boron and molybdenum**, which perform auxiliary functions, improving metabolism and stimulating the uptake of major nutrients - nitrogen, phosphorus and potassium. The concentrations of trace elements are biological and represent the approximate average daily requirement of the plant. Companies - manufacturers allow slight variations in hundredths or thousandths of a percent to identify the trade mark. Such trace elements content can be conditionally sufficient only in the case of daily using and is not intended to meet fully the needs of plants in them, moreover to deal with deficiencies and chlorosis.

**Micronutrients Fe, Mn, Zn, Cu** are part of fertigators in chelated form, usually **EDTA** (chelating agent - ethylenediaminetetraacetic acid) or **DTPA** (for iron), which must be specified in the characteristics, for example - Fe (EDTA), or Fe (DTPA). Chelating shape makes good use of the whole complex nutrients in one mixture as simple inorganic salts (sulphate, or others) of these minerals have a high degree of aggressiveness and antagonism in solutions, which significantly reduces the efficiency of absorption of nutrients. Included fertilizer boron and molybdenum are not chelating. All these fertilizers, manufactured in different plants are very similar, as they are based on the same standard and are made with the same set of salts. There are only different manufacturing plants and, therefore, trademarks.

In developed European countries fertigators are used for its intended purpose (in systems for drip irrigation and hydroponics). As a foliar application Fertigators are used only in some countries of the former Soviet Union and the socialist community. The first foliar fertilization of field crops by Fertigators was held in Russia in 1999. It was caused foremost by the economic situation of agriculture. However, over 15 years of scientific testing and industrial use in all agricultural regions of Russia and in various agricultural cultures, it was shown that Fertigators can be effectively (considering and understanding the specifics of the agrochemical) applied to non-root fertilizing, Although unlike leaf fertilizer, they have a lower DV %, and do not contain surfactants (surface - active substances) and adjuvants.

*Getting to the production of Agromaster fertigators line, the company has not just copied European products, but created agrochemicals taking into account the Russian experience and the fertigators specific application for foliar dressing. Therefore, "Agromaster" is maximum close to European standards of leafy fertilizers both with regard to chemical purity and content of microelements.*





# AGROMASTER

Fully soluble microcrystalline fertilizer - NPK + micro

Due to its ability to completely dissolve, **AgroMaster** can be used in the most complex irrigation systems and for foliar applications. **AgroMaster** does not contain sodium, chlorine and carbonates, and has a very high degree of chemical purity, which is a decisive factor in the effectiveness of nutrition and foliar feeding. Contains microelements in the chelate form of **EDTA (Zn, Cu, Mn, Fe)**. It has a rich trace element composition.

Composition, w/v – in 1 liter - %

Product	N total	N-NO <sub>3</sub>	N-NH <sub>4</sub>	N-NH <sub>2</sub>	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	MgO	SO <sub>3</sub>	Fe (EDTA)	Mn (EDTA)	B	Zn (EDTA)	Cu (EDTA)	Mo
AM 20.20.20	20.0	5.6	4.0	10.4	20.0	20.0	-	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 13.40.13	13.0	3.7	9.3	-	40.0	13.0	-	3.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 15.5.30+2	15.0	8.4	3.6	3.0	5.0	30.0	2.0	11.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 17.6.18	17.0	5.0	12.0	-	6.0	18.0	-	29.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 19.6.6	19.0	1.7	17.3	-	6.0	6.0	-	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 15.11.15	15.0	2.5	12.5	-	11.0	15.0	-	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 10.18.32	10.0	6.5	3.5	-	18.0	32.0	-	8.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 3.37.37	3.0	3.0	-	-	37.0	37.0	-	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 20.5.20	20.0	5.5	7.0	7.5	5.0	20.0	-	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 20.5.10+2	20.0	7.5	12.5	-	5.0	10.0	2.0	-	0.12	0.08	0.04	0.05	0.03	0.01
AM 3.11.38+4	3.0	3.0	-	-	11.0	38.0	4.0	27.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 18.18.18+3	18.0	5.1	3.5	9.4	18.0	18.0	3.0	6.0	0.12	0.08	0.04	0.05	0.03	0.01
AM 9.0.46	9.0	9.0	-	-	-	46.0	-	10.0	0.12	0.08	0.04	0.05	0.03	0.01



## Physical characteristics:

Product	Appearance	Color	pH (1% aqueous solution)	Solubility (g/100 ml) 20°C	Conductivity 1‰(mS/cm) 18°C
AM 20.20.20	Microcrystals	White	5.1	55	0.914
AM 13.40.13			4.7	42	1.053
AM 15.5.30+2			5.6	35	1.063
AM 17.6.18			5.2	45	0.230
AM 19.6.6			5.1	58	1.836
AM 15.11.15			4.0	42	1.638
AM10.18.32			4.0	15	1.275
AM 3.37.37			4.0	25	0.916
AM 20.5.20			4.9	40	1.243
AM 20.5.10+2			4.0	10	1.667
AM 3.11.38+4			3.4	10	1.200
AM 18.18.18+3			4.3	25	0.744
AM 9.0.46	3.5	20	1.387		

## Fertigation (application in drip irrigation systems)

0.5 - 2 g / l of ready-mixed solutions.

## Fertigation (application in drip irrigation systems)

5-15 kg / ha per day. In the event that fertigation is not performed on a daily basis, the dose increases in proportion to the number of missed days.

## Foliar Application

Nutrient complexes **AgroMaster (NPK + Mg + micro)** are distinguished by a high degree of chemical purity and solubility. In field crop cultivation they are applied to all agricultural crops during critical periods of growth and development, to correct mineral nutrition and to achieve a certain directed effect (increase in yield and quality indicators). Apply together with pesticides, without requiring additional costs. When applied with herbicides, they reduce their stress on crop plants without affecting the effectiveness of weed control. Increase the assimilation of NPK plants from soil and fertilizers. Different types of **AgroMaster** can influence the content of proteins, sugars and fats in plants. The optimal dosage is 2 - 3 kg / ha, with a ready-mixed solution consumption from 100 to 250 l / ha.

25L

25 kg bags



Attention! Before preparing the working solution, carefully read the physical and chemical characteristics.



## Simple mineral fertilizers

(Salts of high purity and complete solubility, for hydroponics and drip irrigation)

Calcium nitrate (Calcium saltpetre tetrahydrate, crystalline)

(N-12%, CaO – 24%) -  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ , pH 5-7.

Monopotassium phosphate – (52%  $\text{P}_2\text{O}_5$  and 34 %  $\text{K}_2\text{O}$ )

$\text{KH}_2\text{PO}_4$ , pH 4.4 – 4.6.

Potassium sulphate – (50%  $\text{K}_2\text{O}$  and 18% S)

$\text{K}_2\text{SO}_4$ .

Potassium nitrate– (N-13%,  $\text{K}_2\text{O}$  – 46%)

$\text{KNO}_3$ .

Magnesium nitrate (MgO – 16% and N –11%)

$\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ , pH 4.0 min.

Magnesium sulfate – (MgO – 16% and S – 13%)

$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ .

25L

25 kg bags

### Risk of clogging of the drip system depending on water quality

	Low risk	Moderate risk	High risk
pH	<7	7-8	>8
Dissolved salts (mg / l)	<500	500-2000	>2000
Manganese (mg / l)	<0.1	0.1-1.5	>1.5
Iron (mg / l)	<0.2	0.2-1.5	>1.5
Hydrogen sulphide (mg / l)	<0.2	0.2-2	>2

## Unit conversion table

(Coefficients of conversion of oxides (salts) into elements of the active substance and back)

$\text{NO}_3 \times 0.226 = \text{N}$   
 $\text{NH}_3 \times 0.822 = \text{N}$   
 $\text{NH}_4 \times 0.776 = \text{N}$

$\text{N} \times 4.427 = \text{NO}_3$   
 $\text{N} \times 1.216 = \text{NH}_3$   
 $\text{N} \times 1.288 = \text{NH}_4$

$\text{P}_2\text{O}_5 \times 0.436 = \text{P}$   
 $\text{PO}_4 \times 0.026 = \text{P} \text{ K}$

$\text{P} \times 2.291 = \text{P}_2\text{O}_5$   
 $\text{P} \times 3.066 = \text{PO}_4$

$\text{K}_2\text{O} \times 0.830 = \text{K}$   
 $\text{KCl} \times 0.525 = \text{K}$   
 $\text{K}_2\text{SO}_4 \times 0.449 = \text{K}$   
 $\text{K}_2\text{CO}_3 \times 0.566 = \text{K}$

$\text{K} \times 1.205 = \text{K}_2\text{O}$   
 $\text{K} \times 1.907 = \text{KCl}$   
 $\text{K} \times 2.228 = \text{K}_2\text{SO}_4$   
 $\text{K} \times 1.767 = \text{K}_2\text{CO}_3$

$\text{CaO} \times 0.715 = \text{Ca}$   
 $\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \times 0.233 = \text{Ca}$   
 $\text{CaCO}_3 \times 0.400 = \text{Ca}$   
 $\text{MgO} \times 0.603 = \text{Mg}$

$\text{Ca} \times 1.399 = \text{CaO}$   
 $\text{Ca} \times 4.296 = \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$   
 $\text{Ca} \times 2.497 = \text{CaCO}_3$   
 $\text{Mg} \times 1.658 = \text{MgO}$

$\text{Na}_2\text{O} \times 0.742 = \text{Na}$   
 $\text{Fe}_2\text{O}_3 \times 0.699 = \text{Fe}$   
 $\text{FeO} \times 0.777 = \text{Fe}$   
 $\text{Al}_2\text{O}_3 \times 0.529 = \text{Al}$   
 $\text{SiO}_2 \times 0.468 = \text{Si}$   
 $\text{NaCl} \times 0.607 = \text{Cl}$   
 $\text{KCl} \times 0.476 = \text{Cl}$   
 $\text{SO}_3 \times 0.401 = \text{S}$   
 $\text{SO}_4 \times 0.33 = \text{S}$   
 $\text{K}_2\text{SO}_4 \times 0.184 = \text{S}$

$\text{Na} \times 1.348 = \text{Na}_2\text{O}$   
 $\text{Fe} \times 1.430 = \text{Fe}_2\text{O}_3$   
 $\text{Fe} \times 1.286 = \text{FeO}$   
 $\text{Al} \times 1.889 = \text{Al}_2\text{O}_3$   
 $\text{Si} \times 2.139 = \text{SiO}_2$   
 $\text{Cl} \times 1.648 = \text{NaCl}$   
 $\text{Cl} \times 2.102 = \text{KCl}$   
 $\text{S} \times 2.497 = \text{SO}_3$   
 $\text{S} \times 3.0 = \text{SO}_4$   
 $\text{S} \times 5.435 = \text{K}_2\text{SO}_4$

$\text{MnO} \times 0.775 = \text{Mn}$   
 $\text{MnO}_4 \times 0.364 = \text{Mn}$   
 $\text{CuO} \times 0.799 = \text{Cu}$   
 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \times 0.254 = \text{Cu}$   
 $\text{B}_2\text{O}_3 \times 0.311 = \text{B}$   
 $\text{H}_3\text{BO}_3 \times 0.121 = \text{B}$   
 $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} \times 0.197 = \text{B}$   
 $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O} \times 0.227 = \text{Zn}$   
 $(\text{NH}_4)_2\text{MoO}_4 \times 0.489 = \text{Mo}$   
 $\text{CoSO}_4 \cdot 7\text{H}_2\text{O} = \text{Co}$

$\text{Mn} \times 1.291 = \text{MnO}$   
 $\text{Mn} \times 2.748 = \text{MnO}_4$   
 $\text{Cu} \times 1.291 = \text{CuO}$   
 $\text{Cu} \times 3.929 = \text{CuSO}_4 \cdot 5\text{H}_2\text{O}$   
 $\text{B} \times 3.212 = \text{B}_2\text{O}_3$   
 $\text{B} \times 8.237 = \text{H}_3\text{BO}_3$   
 $\text{B} \times 5.070 = \text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$   
 $\text{Zn} \times 4.399 = \text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$   
 $\text{Mo} \times 2.043 = (\text{NH}_4)_2\text{MoO}_4$   
 $\text{Co} \times 4.772 = \text{CoSO}_4 \cdot 7\text{H}_2\text{O}$







# Optimum

## Indicator and acidity regulator (pH), dispersion and sticking agent (PAV)

As many pesticides are sensitive to alkaline hydrolysis (dissolve in alkaline conditions) and hardness salts, the usage of hard and alkaline water (pH>7) significantly affects the productivity or even precludes the possibility of pesticidal conditioning. Such conditioning as well as micro-element foliar application requires appropriate pH-value of water – pH 5,5-6,5. For instance, all glyphosates are extremely sensitive to hardness salts and alkaline pH water.

### Physical characteristics:

Appearance	Liquid 
Color	 Red
Density (g/cm <sup>3</sup> )	1.17
pH (1% water p-p)	2.16
Conductivity 1‰ (mS/cm) 18°C	0.8
Crystallization point	- 5°C

### Composition, %




Nitrogen (N) total:	w/w 3,0%
- including amide	w/w 3,0%
Phosphorus (P <sub>2</sub> O <sub>5</sub> )	w/w 17,0%





Acidic aspect of aqua is determined after the Optimum addition by comparison of the aqua color with the scale on the tag.


Use medical injection syringe (5-10 ml volume) filled with 3-4 ml of Optimum. Add Optimum to 10 ml of water used to prepare the spray material and plant conditioning. The water is supposed to become slightly yellow. Use the color scale on the tag in order to determine the pH level. Using the titration method add Optimum (0,5-1,0 ml) for the pH level to achieve appropriate optimum value (pH 5,5-6,5). The subsequent product consumption recalculation per hectare consumption rate of spray material (or per 1000 l of water). In average 80-100 ml of Optimum per 100 l of water is required for aqua acidification. In case the conditioning is performed with water-soluble complexes NPK-micro (Agromaster, Plantafid) which also affect water acidification, the average consumption is equal to 50 ml of Optimum per 100 l of water, where for the purposes of determining the requisite amount Optimum, Agromaster or Plantafid is added in water (as per the aqua strengths) before Optimum addition.

Calculation sample: the planed spray material consumption is equal to 200 L/ha + 2 kg/ha of AgroMaster. One should dissolve 100 g of AgroMaster, then, at first, 3 ml of Optimum +1 +1 ml to the optimal substance (5 ml of Optimum in total). Correspondingly, one hectare consumption rate of water (200 l) requires 100 ml of Optimum.

-  Physiologically appropriate consumption of Optimum for all crops – 50-180 ml/hL.
-  Stabilization of multicomponent mixture and decrease of it's isotropic condition require 20-30 ml/100 l of water.
-  In order to wash the insects waste from fruits, fold and plaster mold the usage of 100-180 ml/hL is required (use the significant amount of water).

The abovementioned consumption rates are based on the large-scale experiments.

-  1 liter bottle, box with 20 bottles of 1 liter
-  5 liter canister, box with 4 cans of 5 liters

 Attention! The change in consumption rates depends on the initial amount of hardness salts and pH range.  
\* 1 hL – hectolitre i.e. 100 liters



# Why Pesticides Don't Work?

Many farms in various agricultural regions of Russia often face the same problem – branded pesticides acquired from reliable counterparts don't perform at an adequate level. So what is the reason? In most cases the problem is water, as many pesticides are sensitive to alkaline hydrolysis. Simply said, pesticides dissolve if pH level of water exceeds 7.

## The influence of quality characteristics of water on pesticides and the effectiveness of chemical treatment

The appropriate water quality stands for the important aspect during the process of interfusion and preparation of pesticides spray materials. The water is supposed to be pure and have physical and chemical characteristics optimal for treatment. Inferior quality water may decrease the productivity of pesticides/ agricultural chemicals treatment and negatively affect the spray equipment. Unsatisfying results of pesticides treatment and foliar application may be directly caused by the relevant quality of water.

## The influence of water quality

Water quality depends on its source: stank, river, well or aquifer. The quality also depends on the climatic conditions of performing treatment: rain, draught, high temperature. There are several criterions that affect the chemical substance of water.

## Dirt

Dirty water contains small pieces of silt and clay. These soil elements are capable of absorbing and connecting active ingredients of chemical substances, decreasing the performance thereof. This statement specifically applies to glyphosate, paraquate and diquat. Dirt may obstruct atomizers, lines and filters, as well as decrease the productivity and endurance of spray. For comparison, the water is considered dirty if the coin is hard to be seen on the bottom of the normal container (10-12 l).

## Water hardness

Water is considered to be hard if it contains high level of salt and magnesium. The soap is hard to dissolve in such water. Hard water may cause certain chemical elements to flocculate (i.e. phosphorus). Sensitive chemical elements, as a rule, contain special additives, designed to solve this issue. It is well known, that such herbicides like glyphosate, 2,4-D amine salt and MCPA-amin, clopyralid and Diflufenican are affected by the influence of hard water ( $> 400 \text{ ppm CaCO}_3 \approx > 0,6 \text{ mS/cm}$ ). Hard water may also affect the balance of surface-active substance system and, consequently, such qualities as: madefaction, emulsionizing and dispersion. Extremely hard water may decrease the performance of substances, used for the dirty water purification.

## pH level of water

pH indicator in most natural types of water ranges between 6.5 and 8.0. In high alkaline water (pH>8) many chemical elements undergo the process of alkaline hydrolysis. Such process initiates the dissolution of active ingredients, which negatively affect pesticides effectiveness. This is one of the reasons not to leave spray mixture even for the night. The alkaline environment influences Glyphosate and Lontrel the most. High alkaline environment may also affect the stability and physical properties of certain chemical formulizations.

## Dissolved salts

The general amount of mineral salts, dissolved in water, is commonly measured by means of electrical conductivity of water. Electrical conductivity of water in wells and stanks mostly depends on salt level of surrounding rocky soil. In drought the salt level of water increases. Extremely salt water may cause difficulties with dissolution of crystal agricultural chemicals, as well as equipment obstruction. Such water is more resistant to pH level changes.



## Organic substance

Water contains a lot of organic substances, such as plant matters, weeds and elementary organisms, which obstruct atomizers, lines and filters. Weeds may also react to certain chemical substances, decreasing their productivity.

## Temperature

Extremely hot or cold water may negatively influence the dissolution process and activity of certain chemical substances.

## Water quality increase

Water consistent of large level of calcium and magnesium salts (hard water) may cause difficulties with interfusing, as the stability of suspensions and emulsions decrease. Glyphosate activity decreases at a high level of calcium and magnesium salts, as well as under the influence of sodium hydrogencarbonate. Such consequences can be handled by substances which contain acid and additive agents. In case of alkaline water, it is advised to start perfusion immediately after interfusion. Alternately, in order to decrease pH level and hardness salts, agricultural chemical Optimum can be added.

Same chemical substances manufactured by different commercial companies may differently react to pH, depending on the consistency of additives in formulations. If bad quality water is used, it is advised to perform perfusion immediately after interfusion.



## Sensitivity of herbicides to water characteristics

(Source of information: John Moore. Agriculture)

The table below demonstrates the **influence of water quality on commonly used herbicides**. Despite the relevant stability of herbicides in certain liquid conditions, the manufacturers of chemical substances advise using high quality water in order to secure pesticides performance.

Herbicide	Water quality				
	Polluted	Salty	Hard	Alkoline (> pH 8)	Acid (< pH 5)
2,4-D or MCPA amin	y	y	X	HP	-
2,4-D or MCPA compound ether	y	Test	Test	y	y
Metsulfuron 600WG	y	y	y	HP	X
Dicamba amine	y	y	HP	HP	-
Diuron	y	Test	y	y	-
Diuron + 2,4-D amin	y	Test	X	HP	-
Diuron + MCPA amin	y	Test	X	HP	-
Fusilade®	y	y	y	HP	X
Chlorsulfuron/ Chlorsulfuron 750WG	y	y	y	HP	X
Glyphosate	X	y	X	X	y
Logran® Mandate 750 / Nugran®	y	y	y	HP	X
Lontrel®	y	y	X	X	-
Simazine	y	X	y	HP	-
Sprayseed®/ Paraquate / Diquat	X	y	y	HP	y
Trifluralin	y	y	y	y	y

**Note:** Y = Stable; X = High sensitivity i.e. requires preliminary water preparation (purification, acidification etc.); HP = Medium sensitivity i.e. preliminary water preparation (purification, acidification etc.) or, without relevant alternative, the prompt usage is advised; Test = mix herbicide with water in order to determine any instability; - = no data.

### Water suitability for spraying can be determined by the following procedure:

- Prepare 500 ml of properly dissolved substance for spraying in glass container in accordance with manufacturer recommendations;
- Mix thoroughly;
- Let the substance settle during 30 minutes.  
If after 30 minutes the spots of creamy remainder or layers formation can be noticed that means the water is not suitable for chemical treatment. If there are unsuitability suspicions, the sample of such water shall be sent for the chemical evaluation of salt and hardness level.



AgroMaster Company is proud to introduce a brand new product – Optimum, which simultaneously solves three important issues. Optimum is an indicator, acidity regulator (pH) for the spray material, as well as a disperser and a sticking agent. Generally, Optimum appears to be fertilizer material acidating characteristics, which consists of special additives. Spray material acidity, which changes color after addition of Optimum, can be easily determined and adjusted to optimal level by means of simple comparison between the color of substance and the pH color scale on the bottle tag. In order to determine water pH level it is only required to add 20-40 ml of Optimum per 100 l of water used to prepare spray material. For the purposes of softening and optimizing water the average amount of 50-100 ml of Optimum per 100 l of water is used.

Many pesticides are sensitive to alkaline hydrolysis (dissolve in alkaline conditions) and hardness salts, while Optimum extends the stability of such substances up to several days. The majority of organophosphates, carbamates and some pyrethroids, as well as fungicides are sensitive to alkaline hydrolysis. At pH level 4-7, half-life period of certain organophosphates is between ½ and 1 day. At pH level 7.5 or higher half-life period at normal working temperature may decrease to 20 minutes. Certain herbicides may also depend on pH level. Low pH level stimulates the activity of some herbicide ingredients, increasing their performance. What is more, today many agriculturists combine protective substance treatment of plants with foliar application. Optimal pH level of spray material, that provides for the maximum effectiveness of foliar application and fixation of mineral nutrition, fluctuates between 5,5 to 6,5.

### Significantly sensitive active components of pesticides

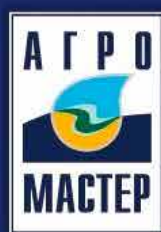
Insecticides		Fungicides		Phytohormones
Azinphos metile	Metil paration	Thyophanate metil	Tiram	Gibberellic acid
Bacillus	Myclobutanil	Mancozeb	Captan	
Permetrina	Imidacloprid	Ciprodinil	Dinocap	
	Acrimetrina	Fludioxonil	Benomyl-Bacillus	

**Optimum** buffers spray material, improves the homogeneity and stability of multicomponent mixtures. **Optimum** accumulates sticking agent qualities, decreases the surface strain of liquid, increases cuticular transmittance, enhancing the penetration of active elements of fertilizer materials and pesticides into organic tissues, promoting the effectiveness of chemical treatment.

*Principal / Chief officer, M Agr Khoroshkin A.B.*







## Effective plant nutrition

