Sato Hum

Clever by Nature

PRODUCT CATALOG

2022-2023

JSC Organic farming Bel, operating under the brand name **SatoHum®**, is engaged in the study of sapropel and its derivatives - humic and fulvic acids.

We develop and produce soil improvers for creating, restoring and improving soils; solid and liquid biostimulants for growth; macro and micronutrition for plants; special functional formulations for complex tasks and feed additives for agricultural animals and poultry.

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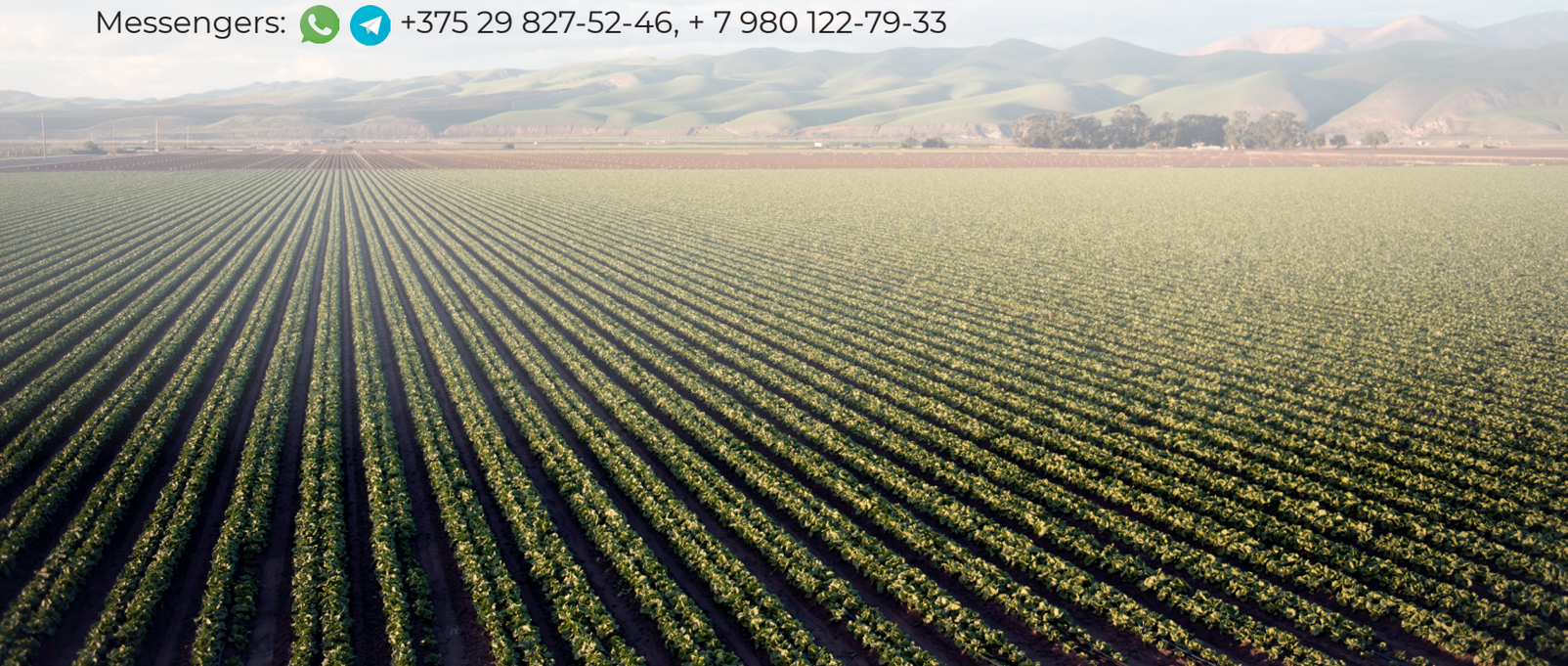

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About company

JSC Organic Farming Bel, operating under the **SatoHum®** trademark, is a Belarusian company engaged in the research, development and production of its own organo mineral and organic fertilizers, biostimulants and top dressings based on sapropel and **humic and fulvic acids** obtained from peat-sapropel mixtures.

Sapropel and peat are the main sources of humic and fulvic acids, which have proven to be effective accumulators of fertility.

We have developed four lines of profile products for crop production: **Soil improvers SatoSoil®**, **Biostimulants SatoGrow®**, **Macro and micro nutrition SatoHum®** and **Special compounds SatoHum®** and **Sato®**, as well as feeding supplements for husbandry **SatoHum® Bio**.

Soil improvers SatoSoil®

Sapropel is low-lying lake and swamp silt formed in fresh water bodies. It's extremely rich in organic matter of animal and vegetable origin. From year to year, low-lying layers are replenished with new ones, that is, unlike coal or oil, sapropels and peat are renewable fossils. JSC Organic farming Bel conducts competent and rational elaboration of sapropel deposits and lowland peat, observing the principle of sustainable management, works with the precious raw materials of our land as carefully and waste-free as possible.

For the production of **soil improvers**, which are also commonly called soil conditioners, we use a peat-sapropel mixture from lowland peat and properly sapropel. Sapropel has an exceptional ability to **neutralize** natural **acidity** or acidity acquired due to the irrational use of mineral fertilizers, while lowland peat **corrects soil friability** and **serves as a buffer for microelements**.

Without any additives and special treatment, the peat-sapropel mixture obtained from pure raw materials is a highly effective organic fertilizer in itself. Sapropel **soil improvers SatoSoil® are able to reduce the content of nitrates in humus, improve the mechanical structure of soils**, moisture retention and gradual absorption of water and trace elements, as well as **prevent the entry of radionuclides into plants**, and **activate soil biological processes.**

Our advantage lies in the use of high-tech production methods, which guarantees a **consistently reproducible functional composition of our soil improvers** and the optimal content of humic and fulvic acids in combination with the necessary low molecular weight amino acid complexes (lysine, leucine, proline, arginine, cysteine, etc.), macro and microelements and bioactive compounds.

Why do our SatoHum® liquid solutions activate solid soil improvers?

Liquid products SatoHum® activate **solid soil improvers SatoSoil®**. Below in the table of applications, the application rates are given separately, if watering is performed with water with SatoHum® liquid compositions dissolved in it.

SatoSoil® soil improvers have a relatively low absolute humidity, 18-25%, similar to the average absolute humidity of agricultural lands, therefore, after application and mixing with the arable horizon (top layer of soil) or with mulch with zero tillage, **abundant watering is required** - for uniform moisture absorption and the first interaction with the recipient soil (receiving land).

The start of the chemical reaction of the soil improver with the soil **depends on a number of factors:** the temperature of the soil and the soil improver itself, the degree of decomposition of the humus of the topsoil of the recipient soil, the bioactivity of the soil microbiota, the presence of active pathogens and mobile toxins in it, etc.

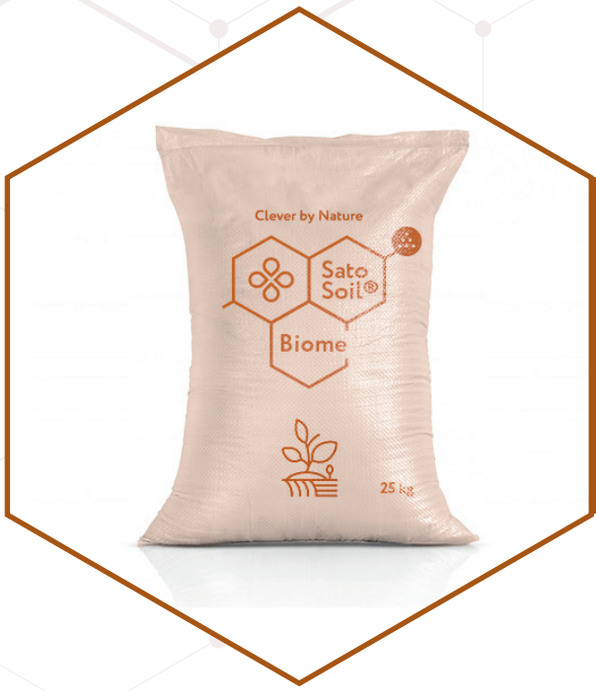
Our technologists recommend the **activation** of the soil improver with **SatoHum® liquid formulations,** because there is a **stable formation of «key-lock» reactions** with amino acids of SatoHum® liquid solutions and chains of humic and fulvic acids of soil improvers **SatoSoil®**, which triggers the work of granulates and full interactive splicing and interaction with the recipient earth.

Application rates of soil improvers SatoSoil® together with the basic liquid composition SatoHum® K

Product Name	Application rate of soil improver SatoSoil®	Application rate of SatoHum® solution into irrigation water	Method of application
SatoSoil® Biome + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering. With zero soil treatment (No-Till system), application on top of the soils together with mulch, without mixing and abundant watering
SatoSoil® pHoenix + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering
SatoSoil® pHoenix Petroil + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 15-20 cm and abundant watering

SatoSoil® Biome

Broad spectrum soil improver



SatoSoil®Biome is a broad spectrum soil improver made from environmentally friendly high-decomposition lowland peat and organic sapropel.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥80,0	Total potassium (K), g/kg	≥3,5
Humic complex, g/kg	≥220,0	Calcium CaO, g/kg	≥2,5
Mass fraction of humic acids, g/kg	≥30	Magnesium MgO, g/kg	≥0,4
Mass fraction of fulvic acids, g/kg	≥180,0	Iron (Fe), g/kg	≥5,0
Total nitrogen (N), g/kg	≥3,3	Sulfur (S), g/kg	≥1,0
Total phosphorus (P), g/kg	≥1,8	pH	5,1 - 5,8

DESCRIPTION

The product contains nitrogen-fixing compounds, which simplifies the absorption of organic macro and microelements, vitamins, amino acids and neutralizing bacteriophages. **It prevents the penetration of salts, heavy metals and radionuclides to the root system of plants.**

Indicated for use on **desert and degraded lands and for maintaining old arable soils.** The soil improver proved to be excellent with zero tillage (No-Till): in this case, **SatoSoil® Biome** is applied without plowing the upper soil layer. Joint application with the liquid formulation **SatoHum® K** is recommended for the sterling activation of the humic complex.

Benefits:

- **increases the level of humus in the soil;**
- ncreases soil moisture retention and doses gradual water absorption;
- **contributes to the temperature self-regulation of the soil cover** with a large difference in daily temperatures;
- activates soil beneficial microorganisms and eliminates painful microflora (fungal mycelium, pathogenic bacteria);
- **reduces the mobility of nitrogen fertilizers and converts phosphorus into a more mobile form,** easily absorbed by plants;
- in a short time restores the fertile soil layer;
- zero toxic waste.

SatoSoil® Biome application rates

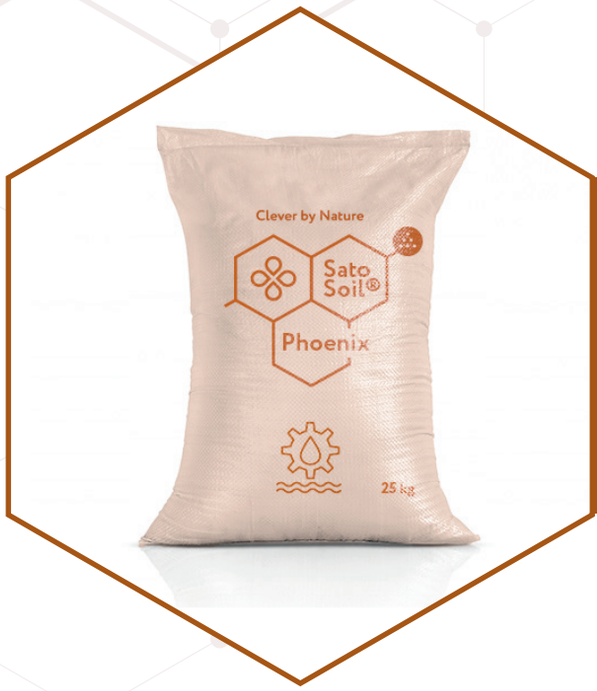
Product Name	Application rate of soil improver	Method of application
SatoSoil® Biome	5 – 20 t/ha (0,5 - 2 kg/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering. With zero soil treatment (No-Till system), application on top of the soils together with mulch, without mixing and abundant watering

SatoHum® K application together with the basic liquid solution

Product Name	Application rate of soil improver SatoSoil®	Application rate of SatoHum® solution into irrigation water	Method of application
SatoSoil® Biome + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering. With zero soil treatment (No-Till system), application on top of the soils together with mulch, without mixing and abundant watering

SatoSoil® pHoenix

Restoration of fertility of saline and acidic soils.



SatoSoil®pHoenix is a formulation designed to revive saline soils, fallow and old arable lands.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥75,0	Total potassium (K), g/kg	≥1,0
Humic complex, g/kg	≥225,0	Calcium CaO, g/kg	≥2,5
Mass fraction of humic acids, g/kg	≥25,0	Boron (B), g/kg	≥0,5
Mass fraction of fulvic acids, g/kg	≥200,0	Iron (Fe), g/kg	≥7,5
Total nitrogen (N), g/kg	≥4,0	Sulfur (S), g/kg	≥1,0
Total phosphorus (P), g/kg	≥10,0	pH	3,4 – 3,9

DESCRIPTION

In intensive farming, there is a gradual accumulation of nitrites, chlorides, carbonates, sulfates in the upper layers of the soil as a result of excessive mineralization. **Excessive salt content in the soil disables huge arable areas**, since at medium and high atmospheric temperatures the topsoil overheats, which provokes constant capillary evaporation of moisture from groundwater, **and mineral fertilizers are no longer absorbed by plants and settle in the soil, salting it even more.**

SatoSoil® pHoenix soil improver consists of ecological sapropel and lowland peat with non-toxic phosphogypsum. Phosphogypsum is an excellent adsorbent, has a high water-absorbing capacity and eliminates soda, and the absorbed sodium is replaced by calcium, forming neutral salts - sodium sulfates. In its turn, humic substances form

stable water-insoluble compounds with metal ions contained in the soil and molecules of inorganic compounds that pollute the environment and in ion exchange absorb excess sodium, calcium and magnesium present in saline soils. Thus, the **soil improver SatoSoil® pHoenix restores the neutral pH of the soil,** removes excess nitrates and ammonium salts.

SatoSoil® pHoenix is suitable for the **restoration of professional lawns, on construction sites and in industrial areas** where revegetation activities are required after construction and industrial work. It's possible to develop a more specific compound with reagents for binding to insoluble complexes of pollutants.

BENEFITS:

- **is a sorbent buffer that absorbs excess salts;**
- prevents the penetration of salts, heavy metals and radionuclides to the root system of plants;
- **improves soil friability,** activates metabolic processes, increases healthy microflora;
- retains moisture and strengthens plant defenses.

SatoSoil® pHoenix application rates

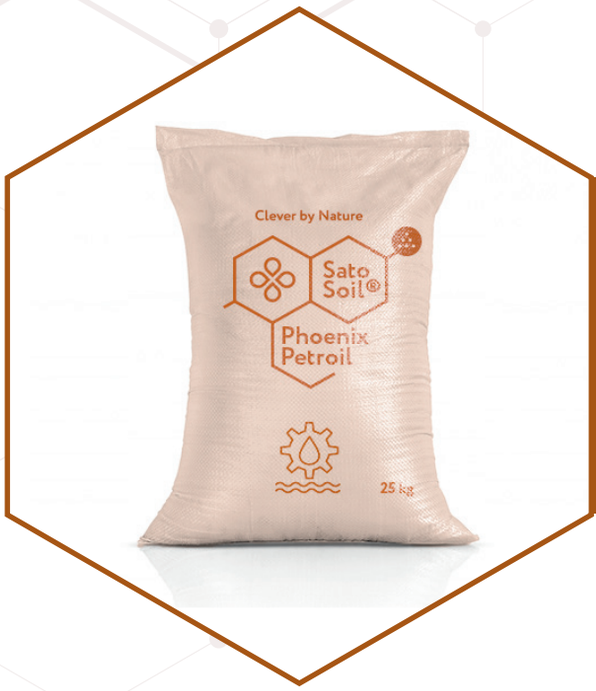
Product Name	Application rate of soil improver	Method of application
SatoSoil® pHoenix	5 – 20 t/ha (0,5 - 2 kg/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering

Application together with the basic liquid solution SatoHum® K

Product Name	Application rate of soil improver SatoSoil®	Application rate of SatoHum® solution into irrigation water	Method of application
SatoSoil® pHoenix + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering

SatoSoil® pHoenix Petroil

Soil restoration after oil spills



SatoSoil® pHoenix Petroil is specially designed for **healing soils after spills of fuels and lubricants.**

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥75,0	Calcium CaO, g/kg	≥2,5
Humic complex, g/kg	≥225,0	Magnesium MgO, g/kg	≥0,1
Mass fraction of humic acids, g/kg	≥25,0	Boron (B), g/kg	≥5,0
Mass fraction of fulvic acids, g/kg	≥200,0	Iron (Fe), g/kg	≥7,5
Total nitrogen (N), g/kg	≥3,5	Sulfur (S), mg/kg	≥1,0
Total phosphorus (P), g/kg	≥3,0	pH	3,4 – 3,9
Total potassium (K), g/kg	≥1,0		

DESCRIPTION

This preparation uses not only the ability of the peat-sapropel mixture to improve soil structure, but also to neutralize the negative impact of external pollutants. **The formulation is specially indicated to revive lands after an oil spill** or other man-made incidents, for terracing and leveling the slopes of ore dumps and quarry sides, in areas of mine failures and subsidence of the soil.

The use of **SatoSoil® pHoenix Petroil** in the **restoration of land near sludge storages and environmentally hazardous waste dumps** from both industrial and household activities **shows a decrease in soil salinity**, significant purification from heavy metal compounds and radionuclides, **better germination and plant growth.**

BENEFITS:

- forms insoluble complexes with salts and heavy metals, **degrades chemical toxic compounds** to low-toxic complexed groups;
- stimulates the formation of its own microorganisms;
- improves soil aeration;
- prevents evaporation of moisture and effectively redistributes it;
- **contributes to the siltation of sagging areas and the growth of its own soil.**

SatoSoil® pHoenix Petroil application rates

Product Name	Application rate of soil improver	Method of application
SatoSoil® pHoenix Petroil	5 – 20 t/ha (0,5 - 2 kg/1 m²)	Incorporation to a depth of 15-20 cm and abundant watering

Application together with basic liquid solution SatoHum® K

Product Name	Application rate of soil improver SatoSoil®	Application rate of SatoHum® solution into irrigation water	Method of application
SatoSoil® pHoenix Petroil + SatoHum® K	5 – 20 t/ha (0,5 - 2 kg/1 m²)	6 l/ha (0,6 ml/1 m²)	Incorporation to a depth of 12-16 cm and abundant watering

Organo-mineral Biostimulants SatoGrow®

Biostimulants, as their name suggests, stimulate plant growth and increase yields. The world continues to develop a bunch of bio-stimulating compounds that have a beneficial effect on the growth and development of plants at certain stages of the growing cycle.

Among the recognized **natural stimulants** are **humic and fulvic acids**, which are formed naturally as a result of the decomposition of plants, animals and microorganisms, as well as a result of the metabolic activity of soil microorganisms, which use these compounds as substrates.

There are two types in **SatoGrow®** product line: **SatoGrow®K** and **SatoGrow® NPK granulates** and **liquid organo-mineral formulations SatoGrow® N** and **SatoGrow® NPK.**

The huge advantage of **granulates SatoGrow® Granules** is the high-tech activation of the peat-sapropel mixture. The own content of organic nitrogen, phosphorus and potassium (N, P, K) in the natural mixture is low, therefore we study the fractional composition of each batch and **supplement the set of structural fragments and humic substances, linking them with functional mineral components** that contribute to the penetration of stimulating nutrients into plant cells. Our organo-mineral biostimulants are a mature alternative to classic mineral fertilizers, recommended for industrial and intensive arable farming that follows the new «green» trends and seeks to reduce the consumption of chemical fertilizers.

Liquid organo-mineral formulations SatoGrow® N and **SatoGrow® NPK** are designed for **intensive and extensive crop production** for all types of watering, both root and non-root. When processing on the leaf, the best results are observed, intensive growth of vegetation organs is stimulated, and there is an increased weight gain, ripeness of grain, pods and fruits.

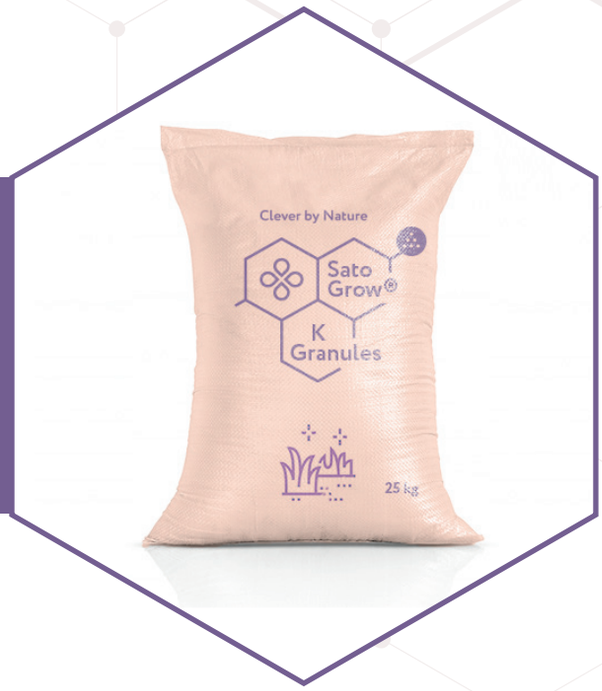
Humic acids are surfactants, that is, they reduce the surface tension of aqueous solutions, affecting the water-repellent and water-retaining sections of membranes, and raising their throughput.

By acting on the plant's cellular metabolism, SatoGrow® delivers all the essential nutrients through the upward or descending current of the plant – xylem and phloem, **increasing germination, reducing the lodging of seedlings,** giving **optimal yields** with rational fertilization and **extending the crops shelf life**.

SatoGrow® K Granules

Granulate with high potassium content

SatoGrow® K Granules is an **organo-mineral granulate based on a peat-sapropel mixture with high potassium content.** Potassium is especially demanded by plants in the growth phase in those organs and tissues where intensive processes of metabolism and cell division take place.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥78,5	Total phosphorus (P), g/kg	≥1
Humic complex, g/kg	≥400,0	Total potassium (K), g/kg	≥250
Mass fraction of humic acids, g/kg	≥100,0	Iron (Fe), g/kg	≥3,5
Mass fraction of fulvic acids, g/kg	≥300,0	pH	4,1 – 5,6
Total nitrogen (N), g/kg	≥7,5		

DESCRIPTION

Potassium is extremely mobile and goes from old tissues to young ones and into the proper fruit of the plant. This means that potassium does not remain in the soil, but is carried into the final product - grain, corn, legumes, root crops, vegetables, fruits or berries. **SatoGrow® K Granules** **provides a gradual, steady release of potassium.**

Along with its own qualities of potassium, **SatoGrow® K Granules** has inherited the moisture-regulating ability of sapropel and the healing properties of humic and fulvic acids. In intensive farming, **SatoGrow® K Granulesis** valued for **increasing plant stress resistance** to sudden changes in temperature, hail, heavy rains and wind, as well as for improving the presentation and caliber of grains and fruits.

BENEFITS:

- **promotes fruitful hydro regulation** of soils and plants;
- prevents wind and water erosion;
- stimulates natural biocenosis;
- **relieves potassium starvation and chlorosis;**
- strengthens seedlings, improves germination, flowering and fruiting.

APPLICATION:

Granulate SatoGrow® K Granules is used for root feeding, and **it's recommended to additionally activate** it with a liquid organo-mineral biostimulant with nitrogen **SatoGrow® N**, basic liquid solution with potassium **SatoHum® K** or with formulation with amino acids **SatoHum® Complex**, which, by analogy with the activation of soil improvers, provide a start to the interaction of soils and the root system of plants with granulate.

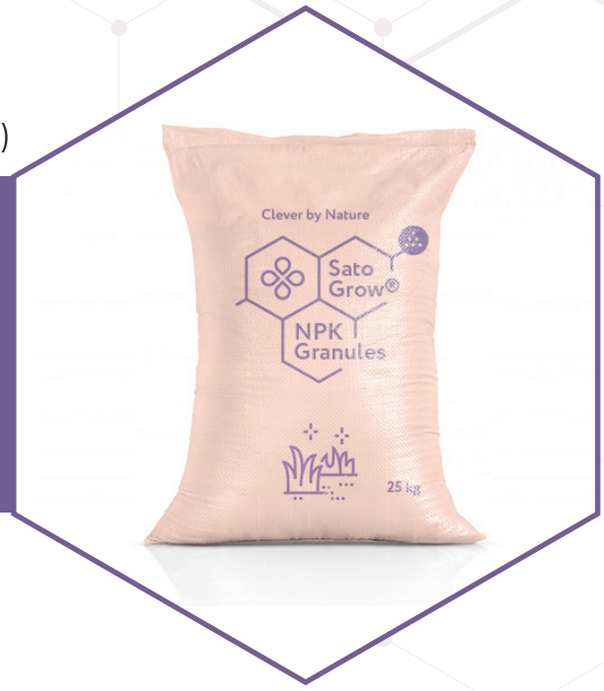
RECOMMENDATIONS FOR USE:

Potato	10 g/m²	100 kg/ha
Tomato	10 g/m²	100 kg/ha
Cucumber, zucchini, squash	5-8 g/m²	50-80 kg/ha
Cabbage, carrot, beet, berries	30 g/m²	300 kg/ha
Apple, fruit trees	100g near-trunk application for 1 tree	

SatoGrow® NPK Granules

Granulate with a complex of mineral substances (nitrogen-phosphorus-potassium)

SatoGrow® NPK Granules is an organo-mineral fertilizer based on a peat-sapropel mixture with an NPK complex (10-10-10).



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥77,5	Total phosphorus (P), g/kg	≥100
Humic complex, g/kg	≥500,0	Total potassium (K), g/kg	≥100
Mass fraction of humic acids, g/kg	≥100,0	Sulfur (S), g/kg	≥50,0
Mass fraction of fulvic acids, g/kg	≥400,0	Iron (Fe), g/kg	≥30,0
Total nitrogen (N), g/kg	≥100	pH	3,4 – 3,9

DESCRIPTION

The optimal ratio of mineral and organic substances **stimulates the harmonious development of plants**, the most effective absorption of nitrogen, phosphorus and potassium, gains the resistance of plants to adverse environmental conditions - sudden temperature changes, drought, lack of oxygen in the soil and **cuts down the cost of mineral fertilizers per unit crop.**

SatoGrow® NPK Granules **should be applied in pre-sowing campaign, during sowing and flowering** of both arable land, fruit and berry plantations, orchards and vineyards, as well as hay and pasture lands.

The compound is specially designed for **large plantations and intensive gardening** in order to lessen the total content of mineral fertilizers in soils and their most rational use. It does not cause soil salinization, has a prolonged action and a higher return compared to mineral fertilizers. Humic and fulvic acids contained in the granulate decrease the need for mineral fertilizers even on large-scale crops.

BENEFITS:

- prevents water erosion;
- **increases stress resistance of plants;**
- promotes early cell differentiation and enhances the growth of plant organs and tissues;
- **improves fruiting, caliber and elasticity of grain, fruits and berries.**

APPLICATION:

Granulate SatoGrow® NPK Granules is used for root feeding, and it's recommended to additionally activate it with a liquid organo-mineral biostimulant with basic liquid solution with potassium **SatoHum® K** or with formulation with amino acids **SatoHum® Complex**, which, by analogy with the activation of soil improvers, provide a start to the interaction of soils and the root system of plants with granulate.

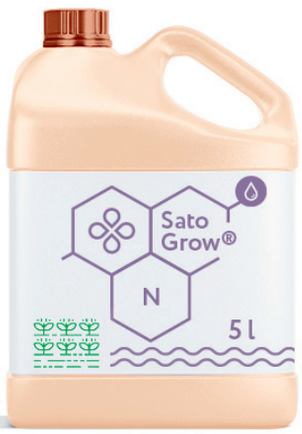
RECOMMENDATIONS FOR USE:

Potato	Pre-sowing incorporation Bud development After flowering	40-50 g/m² (400-500 kg/ha) 50-60 g/m² (500-600 kg/ha) 40-50 g/m² (400-500 kg/ha)
Beet, carrot	Pre-sowing incorporation Top dressing	60-70 g/m² (600-700 kg/ha) 20-25 g/m² (200-250 kg/ha)
Cabbage	Pre-sowing incorporation Row application Top dressing	60-100 g/m² (600-1000 kg/ha) 10 g/hole 20 g/m² (200 kg/ha)
Tomato, pepper, eggplant	Pre-sowing or row incorporation Top dressing	15 g/hole 25 g/m² (250 kg/ha)
Garlic, onion	Pre-sowing incorporation Top dressing	40-60 g/m² (400-600 kg/ha) 20 g/m² (200 kg/ha)
Strawberry, fragaria	Pre-sowing incorporation Top dressing	25 g/m² 30-50 g/m²
Berry bushes	Planting seedlings Top dressing	50 g/bush 40-60 g/bush
Fruit trees	Planting saplings Top dressing during growth Top dressing at full fruiting	85-120 g/tree 50-70 g/tree 40-60 g/tree
Professional lawn	Pre-sowing incorporation Top dressing	20 g/m² (200 kg/ha) 12 g/m² (120 kg/ha)
Grape	Top dressing	25 g/bush
Leaf crops	Row application	15 g/m² (150 kg/ha)

SatoGrow® N

Liquid solution with a high content of nitrogen

SatoGrow® N is an organo-mineral solution of humic and fulvic acids with nitrogen.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥35,0	Total nitrogen (N), g/l	≥100,0
Mass fraction of organic matter nat. humidity, %	≥20,0	Total phosphorus (P), g/l	≥10,0
Mass fraction of mechanical impurities, %	≤2,0	Total potassium (K), g/l	≥10,0
Mass fraction of humic acids, g/l	≥10	pH	4,9
Mass fraction of fulvic acids, g/l	≥250,0	Density, kg/m³	1200-1300

DESCRIPTION

Initially, this composition was developed to activate the granulate **SatoGrow® K Granules** to supplement the action of mineral potassium with a liquid solution with nitrogen. **SatoGrow® N** is indicated **for any farms and crops that allow the use of** mineral and **organo-mineral fertilizers.**

The formulation is characterized by a **high concentration of fulvic acids in the humic complex**, which triggers and stimulates the course of biological processes at all stages of vegetation, starting with the germination of seeds and buds and ending with the ovary formation and the filling of grain and fruits.

Nitrogen is particularly in demand in legumes and cereals, but it's generally known that nitrogen is also one of the most rapidly leached substances that is too mobile in the soil

and plant organs. **In combination with humic acids, nitrogen-fixing complexes are formed**, that is, humic acids delay the volatilization and removal of nitrogen, releasing it gradually both into the root rhizosphere (when irrigation of soils) and into the growth points of the plant (with foliar irrigation).

BENEFITS:

- **gradual intake of nitrogen in the vital organs of plants;**
- elimination of the risk of nitrate burns of the roots;
- during soil irrigation, the formation of key-lock reactions with **SatoSoil®** **soil improvers** or **SatoGrow®** **organo-mineral granulates** and recipient earth;
- fulvic acids enhance transport function and deliver nitrogen and other nutrients to plant cells.

APPLICATION:

SatoGrow® N is applied to any type of irrigation: **from stationary irrigation systems** (channels, trays, pipelines), irrigation hinged, ground or manual systems (furrows, watering machines, backpack spraying) to **sprinkling and drip irrigation of crops, saturation of mineral wool plug in hydroponics** and mixing with mother and working solutions in greenhouses.

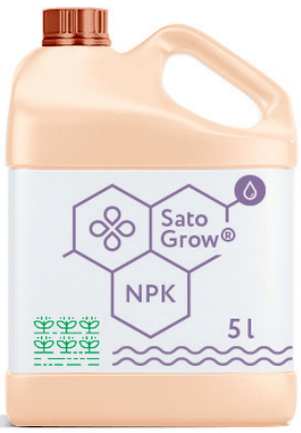
Allows mixing with any organic fertilizers.

Product Name	All types of watering	Calculation of perennial fruits	Method of application
SatoGrow® N	2 l/ha (0,2 ml/1 m²)	20 ml/10 l of water	Watering or mixing with other organic fertilizers

SatoGrow® NPK

Liquid solution with NPK for intensive arable farming

SatoGrow® NPK is an organo-mineral solution of humic and fulvic acids with the mineral complex nitrogen-phosphorus-potassium.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥35,0	Total nitrogen (N), g/l	≥85,0
Mass fraction of organic matter nat. humidity, %	≥20,0	Total phosphorus (P), g/l	≥100,0
Mass fraction of mechanical impurities, %	≤2,0	Total potassium (K), g/l	≥100,0
Mass fraction of humic acids, g/l	≥10	pH	4,9
Mass fraction of fulvic acids, g/l	≥250,0	Density, kg/m³	1200-1300

DESCRIPTION

SatoGrow® NPK is a liquid solution of humic and fulvic acids with NPK complex that increases nitrogen, phosphorus and carbohydrate metabolism in plants. Thanks to the increased content of fulvic (low molecular weight) acids, the **cellular nutrition of plants is stimulated.**

Humic acids fix nitrogen and potassium in exchange form, weakening their mobility and preventing their removal and leaching, and phosphorus is transferred to an easily digestible form by plants, which **ensures the assimilation of the main macronutrients by 92-96%** and **allows to cut down the application rates of fertilizers by 30-40%**, which significantly decreases the cost of harvest.

The composition is indicated for all types of irrigation in **intensive and extensive farms**

can be used in combination with organic fertilizers. SatoGrow® NPK **effectively solves the problem of nitrogen, phosphorus and potassium starvation**, contributes to the full and uniform development of vegetative and generative organs of plants.

BENEFITS:

- **systematically feeds crops with the main macronutrients;**
- retains nitrogen, phosphorus and potassium from immediate removal with precipitation;
- improves nutrition both in ascending current (with root feeding) and downward current (with non-root dressing);
- **boosts the effect of any organic fertilizers.**

APPLICATION

SatoGrow® NPK is applied to any type of irrigation: **from stationary irrigation systems** (channels, trays, pipelines), irrigation hinged, ground or manual systems (furrows, watering machines, backpack spraying) to **sprinkling and drip irrigation of crops, saturation of mineral wool plug in hydroponics and mixing with mother and working solutions in greenhouses.**

Allows mixing with any organic fertilizers.

Product Name	All types of watering	Calculation of perennial fruits	Method of application
SatoGrow® NPK	2 l/ha (0,2 ml/1 m²)	20 ml/10 l of water	Watering or mixing with other organic fertilizers

Macro and micro nutrition (liquid top dressing) SatoHum®

The advantage of our **SatoHum®** line of liquid formulations is that **we study the fractional composition of the extracted peat-sapropel mixture** and bring the optimal complex of humic and fulvic acids into the finished product, and supplement it, depending on the task, with essential amino acids, phytohormones, meso and microelements.

High-molecular complexes of humic substances bind ecotoxins and do not allow **harmful substances** into the root system of plants, and **low-molecular complexes contribute to the absorption of missing nutrients by cell membranes.** We combine the functional acid groups of the peat-sapropel mixture with micro and macro elements to correct vitamin deficiencies or to stimulate the growth of certain organs and parts of a particular crop.

Our **SatoHum®** solutions have a precise effect: they **heal the root system**, improve the assimilation of moisture and nutrients, **and affect the development of the fruit and weight gain**, correct excess salts in soils or lack of certain elements.

Why do our SatoHum® liquid solutions activate solid soil improvers and organo-mineral granulates?

Liquis products **SatoHum®** activate solid soil improvers **SatoSoil®** and organo-mineral granulates **SatoGrow®**.

Solid SatoSoil® soil improvers and solid organo-mineral biostimulants SatoGrow® have a relatively low absolute humidity, 18-25%, similar to the average absolute humidity of agricultural lands, therefore, after application and mixing with the arable horizon (top layer of soil) or with mulch when zero tillage, **abundant watering is required** - for uniform moisture absorption and the first interaction with the recipient soil (receiving land).

The start of the chemical reaction of solid products with the soil **depends on a number of factors:** the temperature of the soil and the granulates themselves, the degree of decomposition of the humus of the topsoil of the recipient soil, the bioactivity of the soil microbiota, the presence of active pathogens and mobile toxins in it, etc.

Our technologists recommend the **activation** of **SatoSoil®** soil improvers and **SatoGrow®** granulates with **SatoHum®** **liquid formulations**, because there is a **stable formation of «key-lock» reactions** with amino acids of **SatoHum®** liquid solutions and chains of humic and fulvic acids of **SatoSoil®** soil improvers and **SatoGrow®** organo-mineral granulates, which triggers the work of granulates and full interactive splicing and interaction with the recipient earth.

SatoHum® K

Basic liquid solution of humic and fulvic acids with potassium

SatoHum® K is a liquid composition of organic origin with micronutrients. The formulation is characterized by high content of acidic functional groups of peat and sapropel, which activates exchange cationic reactions, improves the **carbon-nitrogen ratio (C:N), corrects the electrical conductivity of soils** and levels the soil balance. It is the combination of hydroxy aromatic compounds of peat, primarily phenols, and polyunsaturated aliphatic acids of sapropel that gives a highly effective result of the formulation.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥9	Total nitrogen (N), g/l	≥1,5
Mass fraction of organic matter nat. humidity, %	≥7,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of mechanical impurities, %	≤3,5	Total potassium (K), g/l	≥10,0
Mass fraction of humic acids, g/l	≥35,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥41,0	Density, kg/m³	1020-1070

DESCRIPTION

Potassium is one of the most important **macronutrients** for plant nutrition and growth, so it's difficult to overestimate its role during the growing season. Potassium is especially **needed for young plants for germination and gaining vegetative mass** (cereals, beets, potatoes, sunflower, all annual plants) and **new shoots of perennial plants** (fruit, herbaceous, ornamental, root crops, etc.).

Correction of the growing cycle of plants based on yield maps in precision agriculture has shown excellent results when using SatoHum® K, both with automatic or manual sprinkler irrigation, as well as with drip irrigation and spray irrigation.

BENEFITS:

- provides effective correction of potassium deficiency in plants;
- easily absorbed and assimilated by plants;
- **reduces the content of pesticides;**
- increases plant's own defenses;
- zero toxic waste;
- prevents soil salinization;
- **increases the crop shelf life.**

RECOMMENDATIONS FOR FOLIAR APPLICATION:

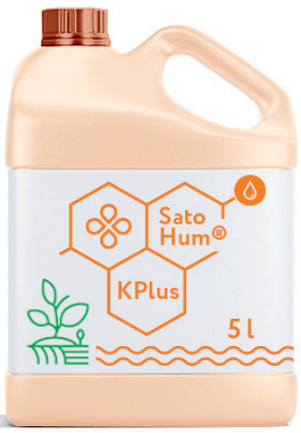
Potato	1: Treatment of tubers before sowing 2: 5-7 leaves 3: Bud development	30 ml/10 l of water 3,2 l/ha 3,6 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,4 l/ha 3,4 l/ha 3,4 l/ha
Carrot	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	2,8 l/ha 2,8 l/ha 2,8 l/ha
Cabbage	1: 12 days after planting seedlings 2: Beginning of cabbage growth 3: Cabbage mass growth	3,4 l/ha 3,7 l/ha 3,7 l/ha
Cucumber	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Mass flowering 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 2,4 l/ha 2,4 l/ha
Tomato	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Flowering 2nd brush 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha
Pepper	1: Green biomass growth 2: Mass flowering 3: Mass fruiting	2,4 l/ha 3,6 l/ha 3,6 l/ha
Eggplant	0: Soaking seeds for seedlings (15 hours) 1: 2-4 leaves 2: Bud development 3: Beginning of flowering	10 ml/10 l water 2,4 l/ha 3,2 l/ha 3,0 l/ha
Zucchini, squash	0: Soaking seeds for seedlings (18 hours) 1: 3-4 true leaves 2: Bud development 3: Flowering	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha

Garlic, onion	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-12 days after the first treatment 3: 10-12 days after the second treatment	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,4 l/ha
Radish	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-15 days after the first treatment 3: 10-15 days after the second treatment	10 ml/10 l water 2,8 l/ha 2,8 l/ha 2,8 l/ha
Watermelon	0: Soaking seeds for seedlings (18 hours) 1: Whip formation 2: 10-15 days after the first treatment	10 ml/10 l water 1,0 l/ha 1,0 l/ha
Grape	0: Soaking of saplings roots (24 hours) 1: First buds 2: Cracking flower buds 3: Ovary of berries	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha
Pome and stone fruits	0: Soaking of saplings roots (24 hours) 1: 5-7 days after flowering 2: Falling of petals 3: Green ovary 4: Intensive fruit growth	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha 0,3 l/ha
Winter and spring wheat, barley and oat	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: Tillering and stem extension 3: Milky ripeness	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Millet, sorghum	0: Seed treatment in a tank mix with a disinfectant 1: Tillering 2: Tassel formation	0,8 l/t 2 l/ha 3 l/ha
Corn grain and silage	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Tassel formation/flowering 3: 10-15 days after the second treatment	0,8 l/t 2 l/ha 2-3 l/ha 3 l/ha
Buckwheat	0: Seed treatment in a tank mix with a disinfectant 1: Branching, first buds 2: 10-15 days after the first treatment	0,8 l/t 2 l/ha 3 l/ha
Pea	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Bud development 3: Flowering	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Sunflower	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: 3-4 pairs of true leaves 3: 10-15 days after the second treatment	1 l/t 2 l/ha 3 l/ha 3 l/ha

SatoHum® K Plus

Liquid composition with high potassium

SatoHum® K Plus – top dressing contains potassium hydroxide, as well as a complex of micronutrients.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥9	Total nitrogen (N), g/l	≥20,0
Mass fraction of organic matter nat. humidity, %	≥7,0	Total phosphorus (P), g/l	≥15,0
Mass fraction of mechanical impurities, %	≤3,5	Total potassium (K), g/l	≥55
Mass fraction of humic acids, g/l	≥20,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥60,0	Density, kg/m³	1020-1070

DESCRIPTION

All micronutrients are required by plants in very small quantities. The lack of these substances affects the growth, fruiting, caliber of fruits and their shelf life, and the **excess can be toxic both for plants and for humans and animals.**

Together with Republican unitary enterprise “Institute for Vegetable Growing” of the Republic of Belarus, studies and tests were carried out on various fruit and vegetable crops and considerable experience has been accumulated to **solve the deficiency of certain trace elements.** SatoHum® K Plus formulation is indicated in fruit and crop production, especially **in the flowering stage for pollen production and in the fruit ripening stage.**

The elevated content of potassium in this composition is **specially indicated** for crops such as **buckwheat, potato, sunflower, beet, rhubarb, artichoke, onion, perennial fra-**

grant plants. At the germination stage, potassium is in demand in the root system, and then it migrates along the lifeblood to new shoots and leaves, so potassium dressing by irrigation or sprinkling quickly corrects underdeveloped buds or inflorescences, pumps up fruit ripening.

BENEFITS:

- **pinpointed top dressing of root and non-root systems to correct vitamin deficiencies;**
- zero toxic waste;
- increases nitrogen fixation in plants;
- **enhances color and improves fruit caliber;**
- prevents leaf chlorosis and promotes the respiratory function and photosynthesis of plants.

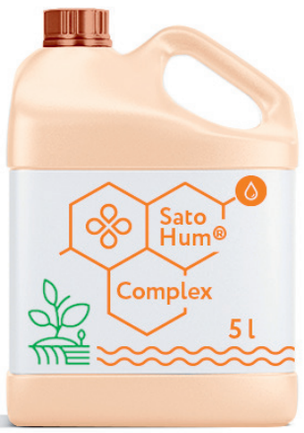
RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	1: 5-7 leaves 2: Bud development	3,2 l/ha 3,6 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,5 l/ha 3,4 l/ha 3,4 l/ha
Sunflower	1: First seedlings 2: 3-4 pairs of true leaves 3: 10-15 days after the second treatment	2,2 l/ha 3,2 l/ha 3,2 l/ha
Buckwheat	1: Branching, first buds 2: 10-15 days after the first treatment	2,2 l/ha 3,2 l/ha
Winter and spring wheat, barley and oat	1: First seedlings 2: Tillering and stem extension 3: Milky ripeness	2,1 l/ha 3,2 l/ha 3,2 l/ha
Garlic, onion	1: 2-3 leaves 2: 10-12 days after the first treatment 3: 10-12 days after the second treatment	2,5 l/ha 3,5 l/ha 3,5 l/ha
Sweet pea	1: 10-14 days after re-potting 2: 8-10 days after the first treatment 3: Normalization of growth, if necessary	1,5 ml/10m^2 1,8 ml/10m^2 2,5 ml/10m^2
Artichoke	1: Vegetative mass growth 2: Before flowering	3,2 ml/10m^2 3,2 ml/10m^2
Rhubarb	1: First seedlings 2: After the first harvest 3: Green ovary	1,8 ml/10m^2 2,4 ml/10m^2 2,4 ml/10m^2

SatoHum® Complex

Liquid composition with amino acids

SatoHum® Complex is a liquid top dressing for systemic care of crops and plantations, **recommended for application in critical phenological phases**, which vary both from the geographical zone of plants cultivation, and from seasonal exogenous and endogenous factors.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥6	Total nitrogen (N), g/l	≥25,0
Mass fraction of organic matter nat. humidity, %	≥4,5	Total phosphorus (P), g/l	≥17,0
Mass fraction of mechanical impurities, %	≤1,0	Total potassium (K), g/l	≥25,0
Mass fraction of humic acids, g/l	≥20,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥60,0	Density, kg/m³	1020-1070
Free amino acids, g/l	≥28,0		

DESCRIPTION

Due to the peculiarities of the structure of natural seasons at different latitudes and the specifics of traditional farming, the main phenodates have a fairly large spread. **Common in all phenological data of any crops** are such criteria as: **average daily temperature amplitudes**, radiation balance and spectral composition of light, evaporation and water absorption, possible **negative atmospheric phenomena, main phases of development, growth and fruiting.**

Each industrial crop has its own fertilizer application **calendar** according to the standard phenophases. **SatoHum® Complex** is called to eliminate seasonal disturbances in growth

dynamics, smooth out low yield indicators, and even out the overall crop map. **The composition is in demand by specialists of precise farming** using a geoanalytical assessment system. **SatoHum® Complex** lets to fine-tune and **bring boundary stages to a standard level**, meliorate soil factors, and minimize losses from atmospheric phenomena.

BENEFITS:

- **prevents lodging of seedlings** in case of unfavorable seasonal phenomena;
- restores and strengthens the plant defenses against external factors;
- promotes moisture retention of the root and foliar systems;
- **levels to reference plants those with insufficient solar exposure and growing on slopes;**
- helps to evenly start budding and flowering.

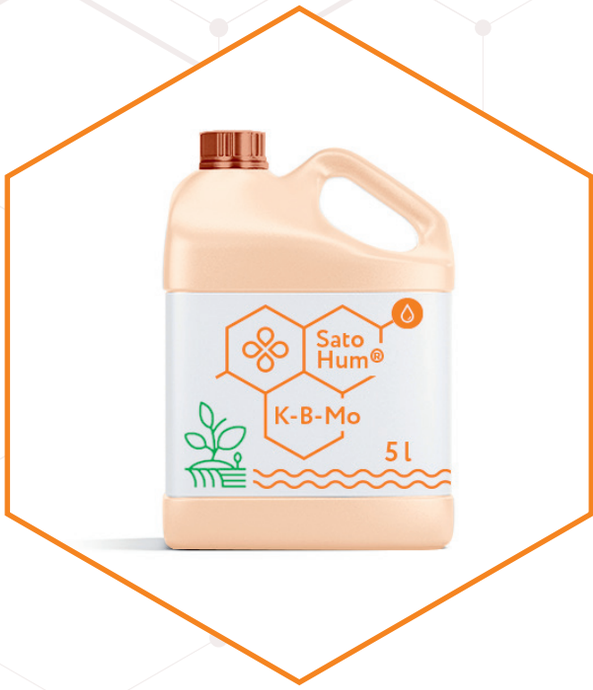
RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	1: Treatment of tubers before sowing 2: 5-7 leaves 3: Bud development	30 ml/10 l of water 3,2 l/ha 3,6 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,4 l/ha 3,4 l/ha 3,4 l/ha
Carrot	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	2,8 l/ha 2,8 l/ha 2,8 l/ha
Cabbage	1: 12 days after planting seedlings 2: Beginning of cabbage growth 3: Cabbage mass growth	3,4 l/ha 3,7 l/ha 3,7 l/ha
Cucumber	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Mass flowering 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 2,4 l/ha 2,4 l/ha
Tomato	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Flowering 2nd brush 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha
Pepper	1: Green biomass growth 2: Mass flowering 3: Mass fruiting	2,4 l/ha 3,6 l/ha 3,6 l/ha
Eggplant	0: Soaking seeds for seedlings (15 hours) 1: 2-4 leaves 2: Bud development 3: Beginning of flowering	10 ml/10 l water 2,4 l/ha 3,2 l/ha 3,0 l/ha

Zucchini, squash	0: Soaking seeds for seedlings (18 hours) 1: 3-4 true leaves 2: Bud development 3: Flowering	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha
Garlic, onion	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-12 days after the first treatment 3: 10-12 days after the second treatment	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,4 l/ha
Radish	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-15 days after the first treatment 3: 10-15 days after the second treatment	10 ml/10 l water 2,8 l/ha 2,8 l/ha 2,8 l/ha
Watermelon	0: Soaking seeds for seedlings (18 hours) 1: Whip formation 2: 10-15 days after the first treatment	10 ml/10 l water 1,0 l/ha 1,0 l/ha
Grape	0: Soaking of saplings roots (24 hours) 1: First buds 2: Cracking flower buds 3: Ovary of berries	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha
Pome and stone fruits	0: Soaking of saplings roots (24 hours) 1: 5-7 days after flowering 2: Falling of petals 3: Green ovary 4: Intensive fruit growth	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha 0,3 l/ha
Winter and spring wheat, barley and oat	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: Tillering and stem extension 3: Milky ripeness	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Millet, sorghum	0: Seed treatment in a tank mix with a disinfectant 1: Tillering 2: Tassel formation	0,8 l/t 2 l/ha 3 l/ha
Corn grain and silage	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Tassel formation/flowering 3: 10-15 days after the second treatment	0,8 l/t 2 l/ha 2-3 l/ha 3 l/ha
Buckwheat	0: Seed treatment in a tank mix with a disinfectant 1: Branching, first buds 2: 10-15 days after the first treatment	0,8 l/t 2 l/ha 3 l/ha
Pea	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Bud development 3: Flowering	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Sunflower	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: 3-4 pairs of true leaves 3: 10-15 days after the second treatment	1 l/t 2 l/ha 3 l/ha 3 l/ha

SatoHum® K-B-Mo

Liquid composition with boron and molybdenum



SatoHum® K-B-Mo contains potassium, boron and molybdenum, effectively and quickly replenishes the lack of these nutrients.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of organic matter nat. humidity, %	≥10,0	Total potassium (K), g/l	≥6,5
Mass fraction of mechanical impurities, %	≤2,0	Boron (B), g/l	≥50,0
Mass fraction of humic acids, g/l	≥20,0	Molybdenum (Mo), mg/l	≥1,7
Mass fraction of fulvic acids, g/l	≥220,0	pH	7,0 – 8,6
Total nitrogen (N), g/l	≥1,5	Density, kg/m³	1020-1070

DESCRIPTION

Boron is involved in the formation of cell structure and extends the intensity of photosynthesis, betters protein and carbohydrate metabolism, promotes cell division, guarantees the delivery of sugars and ensures plant respiration. Thanks to the combination with an **organic solution of humic substances** from peat and sapropel, **effective assimilation of microelements** occurs in the critical phases of plant growth: **in embryonic stage and at the beginning of fruiting.**

SatoHum® K-B-Mo formulation is indicated for **foliar application and drip applications in soils.** Potassium enhances ripening, helps weight gain and ensures the **fruit uniformity.** Molybdenum promotes biological nitrogen fixation and more active synthesis of peat and sapropel's own amino acids.

BENEFITS:

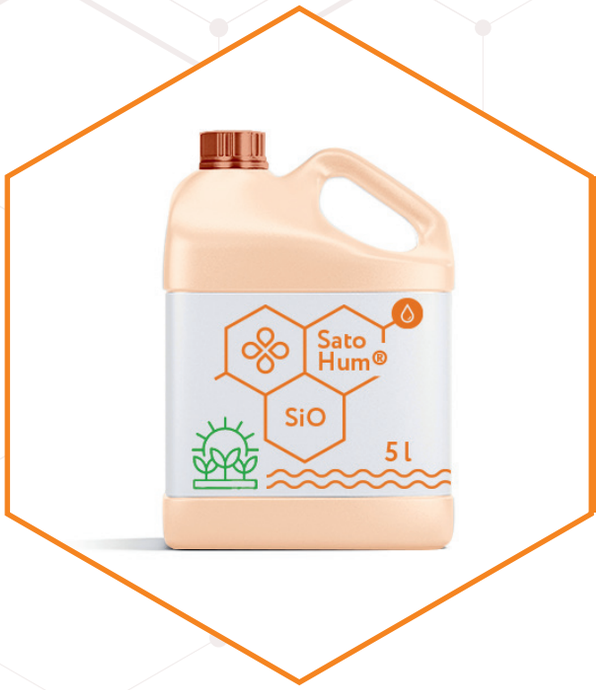
- effectively corrects the lack of boron;
- **increases stress resistance of plants;**
- improves ripening and fruiting;
- stimulates the physiological processes of plants;
- **increases the crop shelf life.**

RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	1: 5-7 leaves 2: Bud development	3,2 l/ha 3,2 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,0 l/ha 3,1 l/ha 2,8 l/ha
Cucumber, tomato	1: 5-6 days after planting seedlings 2: Mass flowering 3: After the 4th harvest	2,4 l/ha 3,0 l/ha 3,0 l/ha
Legumes	1: 3-5 leaves 2: Bud development 3: Flowering	2,0 l/ha 3,0 l/ha 3,0 l/ha
Pome and stone fruits	1: 5-7 days after flowering 2: Falling of petals 3: Green ovary	0,3 l/ha 0,3 l/ha 0,3 l/ha
Sunflower	1: First seedlings 2: 3-4 pairs of true leaves 3: 10-15 days after the second treatment	2,2 l/ha 3,2 l/ha 3,0 l/ha

SatoHum® SiO

Silicon-containing liquid composition



SatoHum® Sio is specially **designed for cereals and fodder crops** at risk of lodging, for fruit bushes and trees under unfavourable weather conditions and when attacked by pests.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of organic matter nat. humidity, %	≥10,0	Total potassium (K), g/l	≥2,5
Mass fraction of mechanical impurities, %	≤2,0	Silicon oxide SiO, g/l	≥50,0
Mass fraction of humic acids, g/l	≥35,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥41,0	Density, kg/m³	1020-1070
Total nitrogen (N), g/l	≥1,5		

DESCRIPTION

Silicon is known for its ability to **pump up cell wall strength**, making plants more hardy and resilient. Mono and polysilicic acids perform the function of launching the **immune mechanism**, that is, they permit the synthesis of stress enzymes on the cell surface without energy costs, **even before the presence of stress as such**. This mechanism for the production of stress enzymes affects not only the stress resistance of plants, especially **drought resistance and high temperatures**, but also ensures the **biochemical mobility of the main macronutrients** - nitrogen, phosphorus and potassium.

The product is specially designed for root and foliar treatment of cereals and fodder crops at **risk of lodging**, but is also suitable for **fruit bushes and trees** under unfavourable weather conditions and **when attacked by pests**.

It should be remembered that an excess of minerals in the soil diminishes the overall fertile layer. **SatoHum® SiO**, thanks to its high content of humic and fulvic acids, in combina-

tion with silicon, contributes to maintaining fertility, improving granulosity and microbiological composition of the soil.

BENEFITS:

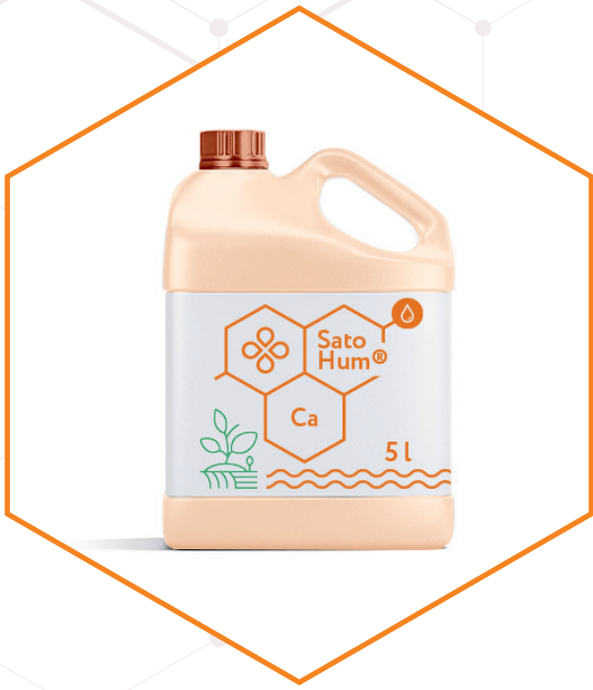
- **pumps up drought resistance of plants;**
- strengthens the root system;
- activates the migration ability of the main macronutrients - nitrogen, phosphorus and potassium;
- **reduces the disease of plants and attacks of insect pests;**
- prevents the ingress of radionuclides and heavy metals into the roots of plants and their migration to vital organs - lifeblood, shoots, leaves and fruits.

RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	Bud development	2,8 l/ha
Table and sugar beet	2-3 true leaves	2,8 l/ha
Carrot	2-4 leaves 8-10 leaves	1,6 l/ha 2,8 l/ha
Cabbage	First seedlings Beginning of cabbage growth	1,0 l/ha 3,6 l/ha
Cucumber	Mass flowering	2,8 l/ha
Tomato	2 shoot growth	3,6 l/ha
Lawn	Vegetation resumption 20-30 days after the first application 20-30 days after the second application	2,8 l/ha 2,8 l/ha 2,8 l/ha
Garden flowers	Vegetation resumption Bud development	08-10 ml/10 l water 10 ml/10 l water
Grape	Bud development Active berry growth	3,6 l/ha 4,2 l/ha
Pome and stone fruits	Ovary formation	4,2 l/ha
Winter and spring wheat, barley and oat	Tillering and stem extension	3,2-3,8 l/ha
Soya	First seedlings	3,2 l/ha
Colza	Bud development and beginning of flowering	3,3 l/ha
Linseed	“Small fir” phase	2,6 l/ha
Sunflower	3-5 true leaves Bud development and beginning of flowering	3,6 l/ha 3,6 l/ha

SatoHum® Ca

Liquid composition with calcium



SatoHum® Ca is a liquid formulation for all types of root and foliar irrigation.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of organic matter nat. humidity, %	≥10,0	Total potassium (K), g/l	≥2,5
Mass fraction of mechanical impurities, %	≤2,0	Calcium oxide, g/l	≥50,0
Mass fraction of humic acids, g/l	≥35,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥41,0	Density, kg/m³	1020-1070
Total nitrogen (N), g/l	≥1,5		

DESCRIPTION

Calcium is considered one of the most important secondary elements. After macronutrients – nitrogen, phosphorus and potassium – the greatest need for plants is in calcium. It is **calcium that is responsible for the preservation of cell membranes and for the production of functional phytohormones.** Lack of calcium leads to cell deformation, death of roots and new shoots. **SatoHum® Ca** is a liquid formulation for all types of irrigation, especially recommended for foliar irrigation.

Calcium is poorly mobile, so calcium deficiency is immediately noticeable on young leaves, which become visibly smaller, irregular in shape, with twisted edges and

yellowness around the perimeter. **Prolonged calcium starvation provokes under-ripening of the fruit.** **SatoHum® Ca** is based on a peat-sapropel mixture with a high content of humic and fulvic acids, which equalizes soil pH, betters moisture retention, effective absorption of macro and micronutrients, extends plant immunity to pathogens and external factors (strong wind, rain, drastic changes in temperature etc.).

BENEFITS:

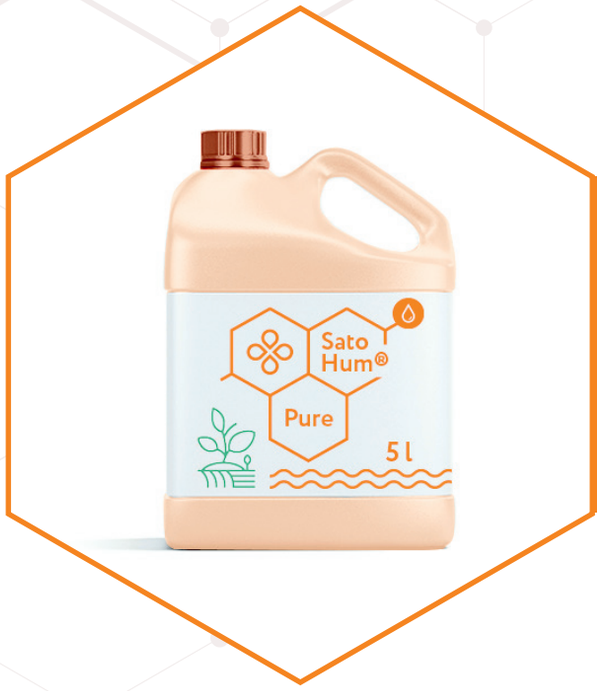
- has a thermoregulatory effect;
- effectively corrects calcium starvation;
- prevents excessive accumulation of potassium and nitrates;
- **increases the elasticity of the skin of fruits and prolongs their shelf life;**
- has zero toxic waste.

RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	1: Bud development 2: Tuber formation phase	3,2 l/ha 3,2 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,2 l/ha 3,2 l/ha 3,2 l/ha
Carrot	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	2,8 l/ha 2,8 l/ha 2,8 l/ha
Cabbage	1: 12 days after planting seedlings 2: Beginning of cabbage growth 3: Cabbage mass growth	3,2 l/ha 3,5 l/ha 3,5 l/ha
Cucumber	1: 5-6 days after planting seedlings 2: Mass flowering 3: After the 4th harvest	2,4 l/ha 2,4 l/ha 2,4 l/ha
Tomato	1: Flowering 2nd brush 2: The appearance of fruits on lateral sprouts 3: After the 4th harvest	2,2 l/ha 3,4 l/ha 3,4 l/ha
Pepper	1: Green biomass growth 2: Mass flowering 3: Mass fruiting	2,4 l/ha 3,6 l/ha 3,6 l/ha
Watermelon	1: Whip formation 2: 10-15 days after the first treatment	1,0 l/ha 1,0 l/ha
Grape	1: First buds 2: Cracking flower buds 3: Ovary of berries	0,3 l/ha 0,3 l/ha 0,3 l/ha
Pome and stone fruits	1: 5-7 days after flowering 2: Green ovary 3: Intensive fruit growth	0,3 l/ha 0,3 l/ha 0,3 l/ha

SatoHum® Pure

Non-alkaline organic basic composition



SatoHum® Pure is a liquid **alkaline-free formulation** suitable for organic farming.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total nitrogen (N), g/l	≥2,0
Mass fraction of organic matter nat. humidity, %	≥10,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of mechanical impurities, %	≤2,0	Total potassium (K), g/l	≥0,2
Mass fraction of humic acids, g/l	≥10,0	pH	3,6 – 3,9
Mass fraction of fulvic acids, g/l	≥100,0	Density, kg/m^3	≥1040

DESCRIPTION

For the production of **SatoHum® Pure** we use **alkaline-free hydrolysis of humic and fulvic acids** from the peat-sapropel mixture. Such hydrolysis results in a slightly acidic pH of the product, which allows to slightly acidify plants growing on alkaline soils.

This product **is suitable for organic farming**, because doesn't contain mineral additives. The humic complex is represented by a **high content of fulvic acids**, which have a molecular weight several times lower than the mass of humic acids, which ensures their unhindered penetration into plant cells.

SatoHum® Pure shows **optimal results in foliar irrigation**. This means that any non-root watering responds immediately by an **improvement in cellular metabolism**, since the treated area is significantly larger than in root irrigation. Through the leaf stomata, the composition enters the **descending current of plants** - phloem - and nourishes the

plants, delivering, together with fulvic acids, elementary macro and micronutrients necessary for the complete growth and development of vegetative and generative organs.

BENEFITS:

- has **antibacterial and fungicidal action;**
- provides transport of easily digestible elements to all organs of the plant;
- performs a moisture-retaining function;
- **suitable for any leaf and berry crops** where it is impossible to use mineral nor organo-mineral fertilizers;
- has zero toxic waste.

APPLICATION:

SatoHum® Pure is suitable for all types of watering, both root and foliar. Below are recommendations for non-root processing of the main crops.

RECOMMENDATIONS FOR FOLIAR APPLICATION:

Potato	1: Treatment of tubers before sowing 2: 5-7 leaves 3: Bud development	30 ml/10 l of water 3,2 l/ha 3,6 l/ha
Table and sugar beet	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	3,4 l/ha 3,4 l/ha 3,4 l/ha
Carrot	1: Green biomass growth 2: Beginning of root vegetable formation 3: 3 weeks before harvest	2,8 l/ha 2,8 l/ha 2,8 l/ha
Cabbage	1: 12 days after planting seedlings 2: Beginning of cabbage growth 3: Cabbage mass growth	3,4 l/ha 3,7 l/ha 3,7 l/ha
Cucumber	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Mass flowering 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 2,4 l/ha 2,4 l/ha
Tomato	0: Soaking seeds for seedlings (15 hours) 1: 5-6 days after planting seedlings 2: Flowering 2nd brush 3: After the 4th harvest	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha
Pepper	1: Green biomass growth 2: Mass flowering 3: Mass fruiting	2,4 l/ha 3,6 l/ha 3,6 l/ha

Eggplant	0: Soaking seeds for seedlings (15 hours) 1: 2-4 leaves 2: Bud development 3: Beginning of flowering	10 ml/10 l water 2,4 l/ha 3,2 l/ha 3,0 l/ha
Zucchini, squash	0: Soaking seeds for seedlings (18 hours) 1: 3-4 true leaves 2: Bud development 3: Flowering	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,6 l/ha
Garlic, onion	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-12 days after the first treatment 3: 10-12 days after the second treatment	10 ml/10 l water 2,4 l/ha 3,6 l/ha 3,4 l/ha
Radish	0: Soaking seeds for seedlings (15 hours) 1: 2-3 leaves 2: 10-15 days after the first treatment 3: 10-15 days after the second treatment	10 ml/10 l water 2,8 l/ha 2,8 l/ha 2,8 l/ha
Watermelon	0: Soaking seeds for seedlings (18 hours) 1: Whip formation 2: 10-15 days after the first treatment	10 ml/10 l water 1,0 l/ha 1,0 l/ha
Grape	0: Soaking of saplings roots (24 hours) 1: First buds 2: Cracking flower buds 3: Ovary of berries	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha
Pome and stone fruits	0: Soaking of saplings roots (24 hours) 1: 5-7 days after flowering 2: Falling of petals 3: Green ovary 4: Intensive fruit growth	100 ml/100 l water 0,3 l/ha 0,3 l/ha 0,3 l/ha 0,3 l/ha
Winter and spring wheat, barley and oat	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: Tillering and stem extension 3: Milky ripeness	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Millet, sorghum	0: Seed treatment in a tank mix with a disinfectant 1: Tillering 2: Tassel formation	0,8 l/t 2 l/ha 3 l/ha
Corn grain and silage	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Tassel formation/flowering 3: 10-15 days after the second treatment	0,8 l/t 2 l/ha 2-3 l/ha 3 l/ha
Buckwheat	0: Seed treatment in a tank mix with a disinfectant 1: Branching, first buds 2: 10-15 days after the first treatment	0,8 l/t 2 l/ha 3 l/ha
Pea	0: Seed treatment in a tank mix with a disinfectant 1: 3-5 leaves 2: Bud development 3: Flowering	0,8 l/t 2 l/ha 3 l/ha 3 l/ha
Sunflower	0: Seed treatment in a tank mix with a disinfectant 1: First seedlings 2: 3-4 pairs of true leaves 3: 10-15 days after the second treatment	1 l/t 2 l/ha 3 l/ha 3 l/ha

Special compounds Sato®

Sato® special formulations were born as **solutions to the specific needs of our customers,** not always in the field of agriculture, but always concerned about the state of the environment.

This is how our permeable reaction barrier **Sato® Barrier** was born, which we developed for the **cleaning of polluted water bodies** and the perimeter treatment of coastal zones.

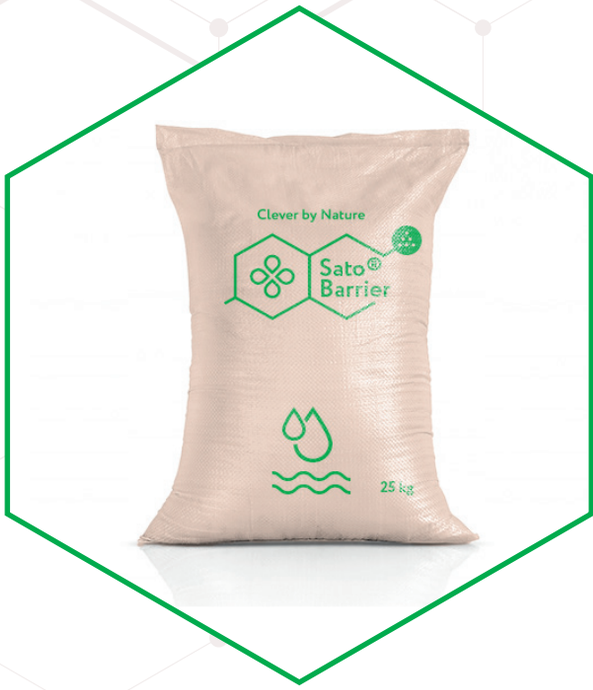
Sato® Hydro appeared as a profile fertilizer for **industrial greenhouse and hydroponic farming. Sato® Seeds** has been included in Special compounds line as a **seed and seedling treatment product.**

We could not ignore such a common plant protection agent as potassium soap, suitable for professional and private gardening and horticulture – **SatoHum® Potassium soap**.

Each of these formulations is prepared ad hoc, that is, on site, but has common components, namely: our most valuable asset - **ecological sapropel and lowland peat**, our **technology** for the analysis and **fractional processing of raw materials** to get optimal high-molecular and low-molecular complexes with a high content of **humic and fulvic acids**, as well as the experience of our technologists and agronomists, cooperating side by side with agricultural producers, laboratories and specialized research institutes to obtain the best yields with the least harm to land and the environment.

Sato® Barrier

Permeable reaction barrier



Sato® Barrier is a peat-sapropel mixture **for disinfection and cleaning of surface and underground water bodies and coastal zones.**

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥80,0	Total potassium (K), g/kg	≥3,5
Humic complex, g/kg	≥220,0	Calcium CaO, g/kg	≥2,5
Mass fraction of humic acids, g/kg	≥30	Magnesium MgO, g/kg	≥0,4
Mass fraction of fulvic acids, g/kg	≥180,0	Iron (Fe), g/kg	≥5,0
Total nitrogen (N), g/kg	≥3,3	Sulfur (S), g/kg	≥1,0
Total phosphorus (P), g/kg	≥1,8	pH	5,1 – 5,8

DESCRIPTION

Following new trends in the field of groundwater treatment and rehabilitation of lands and water bodies as a result of accumulated damage, we developed our own **permeable reaction barrier** (PRB) that acts inside polluted water bodies and as a substrate on the banks adjacent to water reservoirs.

The task of such a reactive barrier is to **retain pollutants** through absorption and form **insoluble complexes with heavy metals, nitrates, radionuclides**, by this means preventing them from entering the soil and groundwater. **Sato® Barrier** uses a stable organic mass of lowland peat and sapropel with high porosity and neutralizing effect. After application of the formulation, the migration of pollutants in water and soil is significantly

(from 70 to 100%) decreased due to the removal of nitrate ions and the effective absorption of radionuclides and salts of heavy metals.

Sato® Barrier has **low desorption**, i.e. it does not return absorbed harmful substances back into the water stream or into the soil. The product format is a soil mixture, which is used either along the contour of the main pollution, or fills the gate system (funnels) as the main reactive sorbent on the path of groundwater. Our specialists will help you define the **reaction treatment zone** based on water and soil studies for the presence of microorganisms and pollutants. If necessary, in order to increase the sorption capacity, it is possible to add other natural sorbents - **zeolite or shungite**.

Sato® Barrier doesn't cut down its permeability, but **its reactivity decreases over time**. Close to industrial facilities and when rehabilitating lands, it's important to **systematically monitor soils and groundwater** to maintain optimal results.

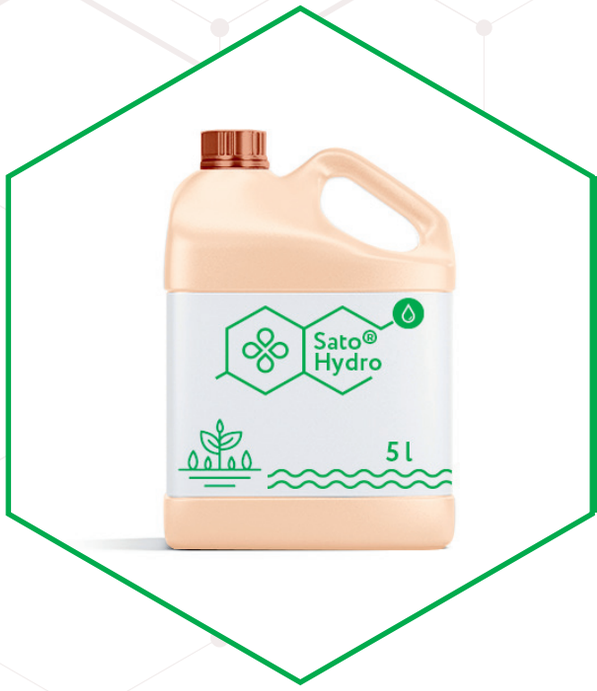
BENEFITS:

- has high sorption capacity;
- **the compound is chemically and radiation resistant;**
- does not have secondary waste;
- **effectively restores coastal zones and reservoirs in places of accumulated damage** (sludge storage facilities, quarries, waste incineration plants, pulp and paper, processing, chemical plants, etc.);
- in comparison with other technological cleaning methods (sparging and blowing, curing and thermoelectric treatment) has a **low cost;**
- allows **combination with other cleaning methods** - especially with rhizofiltration and phytostimulation.

APPLICATION:

Perimeter treatment or feeding of the coastline: mixing with disturbed or contaminated soils at the rate of 4 kg/m^2 to a depth of 16-20 cm.

Funnel and sluice system: contour placement of the reaction barrier, with or without the addition of local soils.



Sato® Hydro

Basic solution for industrial hydroponics and greenhouses

Sato® Hydro is a liquid organo-mineral feeding for industrial hydroponics and greenhouses.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of organic matter nat. humidity, %	≥10,0	Total potassium (K), g/l	≥6,5
Mass fraction of mechanical impurities, %	≤2,0	Boron (B), g/l	≥50,0
Mass fraction of humic acids, g/l	≥20,0	Molybdenum (Mo), mg/l	≥1,7
Mass fraction of fulvic acids, g/l	≥220,0	pH	7,0 – 8,6
Total nitrogen (N), g/l	≥1,5	Density, kg/m³	1020-1070

DESCRIPTION

It's developed on request of a particular crop, microclimate (temperature, lighting, humidity, oxygen-carbon dioxide ratio, etc.), for the irrigation distribution system or the solution unit of the customer's complex. **JSC Organic farming Bel has a successful experience in complex projects with digital control devices** for maintaining optimal stock solution in industrial hydroponics and smart greenhouses controllers.

The basis of **Sato® Hydro** top dressing is a liquid nutrient solution of humic and fulvic acids, in combination with mineral macro and microelements, which are added accord-

ing to the results of the analysis of the root system of plants in hydroponics and according to the results of the analysis of the ground mat in greenhouse farming.

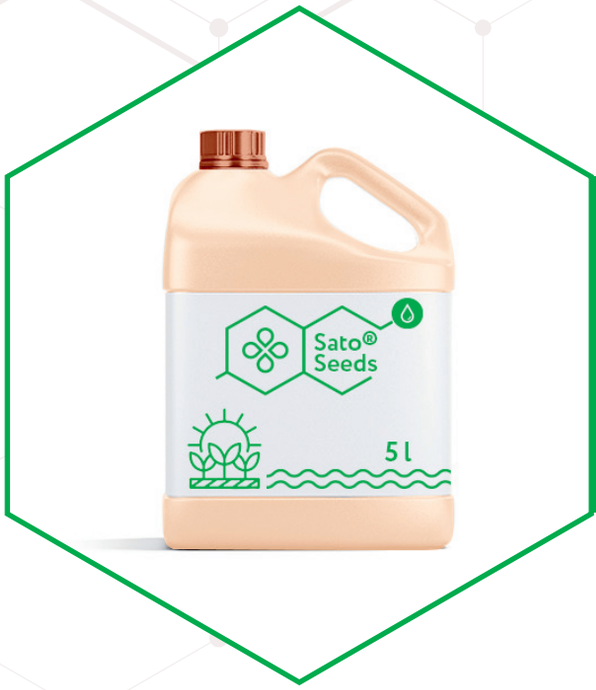
To reduce the cost of logistics and storage, JSC Organic farming Bel has its own developments and accumulated experience in various crops and technologies for applying solution/irrigation.

BENEFITS:

- brings the seed out of dormancy;
- **corrects acidity deficiencies,** lack of specific macro and micronutrients;
- neutralizes harmful microorganisms;
- **requires less consumption of minerals;**
- has a prolonged effect.

Sato® Seeds

Liquid preparation for seed dressing



Sato® Seeds is a liquid preparation with highly soluble potassium humate and oxyhumates for pre-sowing seed treatment and **stimulation of natural germination**.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥9	Total nitrogen (N), g/l	≥1,5
Mass fraction of organic matter nat. humidity, %	≥7,0	Total phosphorus (P), g/l	≥0,1
Mass fraction of mechanical impurities, %	≤3,5	Total potassium (K), g/l	≥10
Mass fraction of humic acids, g/l	≥35,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥41,0	Density, kg/m³	1020-1070

DESCRIPTION

Increases seed germination and **seed immunity to the effects of chemicals.** Treatment method: seed soaking or drip irrigation and seedlings sprinkling. **Application at the tillering/heading stage in organic farming for phytosanitary purposes is allowed.** In intensive farming, it's used in conjunction with phytosanitary preparations or heat treatment of seeds.

The best properties of sapropel and lowland peat are present in **Sato® Seeds: bactericidal and fungicidal action**, neutralization of an excessively active biological environment, general sanative effect. **Sato® Seeds inhibits the spread of root rot and fungal pathogens**, improves the resistance of sprouts to stress.

The humates contained in the composition **contribute to the natural synthesis of proteins, cell division and the production of phytohormones**, that is, they directly affect the growth of primary roots and the stage of formation of seedlings. In combination with mineral fertilizers and plant protection products, the composition **avoids an overdose of minerals** and activates the vital processes of cellular metabolism.

BENEFITS:

- increases the immunity of seeds and seedlings;
- **enhances photosynthesis and rooting process;**
- protects against harmful microorganisms and pathogens;
- **non-toxic to humans, animals and insects entomophages** (bees, ladybugs, lacewings that eat parasites);
- fixes nitrates in immobile complexes, relieving plants from an excess of mineral fertilizers;
- has a healing effect and **brings the seed fund to the standard.**

RECOMMENDATIONS FOR SEEDS AND SEEDLINGS TREATMENT:

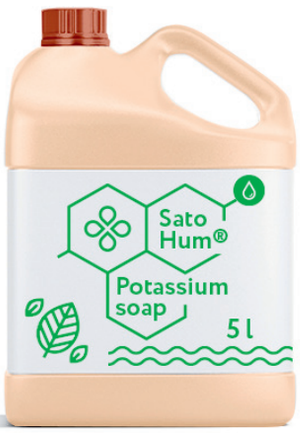
Potato	Treatment of tubers before sowing	30 ml/10 l of water
Table and sugar beet	Disinfection of seed material (15-18 hours) Adding to the dragee mass	20-30 ml/10 l of water 30 ml/1 kg
Carrot	Seed dressing (15-18 hours) Seedling treatment	30 ml/10 l of water 25-30 ml/10 l of water
Cabbage	Seed soaking (24 hours) Seedling treatment	20 ml/10 l of water 20 ml/10 l of water
Cucumber	Soaking seeds for seedlings (15-24 hours) Seedling treatment	10 ml/10 l water 10 ml/10 l water
Tomato	Disinfection of seed material (15-18 hours) Seedling treatment after re-potting	10 ml/10 l water 10 ml/10 l water
Pepper	Seed dressing (15-18 hours) Seedling treatment	10-15 ml/10 l of water 10-15 ml/10 l of water
Eggplant	Soaking seeds for seedlings (15 - 18 hours)	10 ml/10 l water
Zucchini, squash	Soaking seeds for seedlings (18 hours)	10 ml/10 l water
Garlic, onion	Soaking chive for seedlings (24 hours)	10 ml/10 l water
Radish	Замачивание семян для рассады (15 ч)	10 ml/10 l water

Watermelon	Soaking seeds for seedlings (18 hours)	10 ml/10 l water
Grape	Soaking of saplings roots (24 hours) Graft (scion) treatment	100 ml/100 l water 15 ml/bush
Pome and stone fruits	Soaking of saplings roots (24 hours) Graft (scion) treatment	100 ml/100 l water 10-20 ml/tree
Winter and spring wheat, barley and oat	Seed treatment in a tank mix Harvest treatment	0,8 l/t 0,8 l/t
Millet, sorghum	Seed treatment in a tank mix Harvest treatment	0,8 l/t 0,8 l/t
Corn grain and silage	Seed treatment in a tank mix Harvest treatment	0,8 l/t 0,8 l/t
Buckwheat	Seed treatment in a tank mix Harvest treatment	0,8 l/t 0,8 l/t
Pea	Seed treatment in a tank mix Harvest treatment	0,8 l/t 0,8 l/t
Sunflower	Seed treatment in a tank mix Harvest treatment	1 l/t 1 l/ha
Organic farming	Seed treatment Foliar treatment for phytosanitary purposes	10-20 ml/10 l of water 0,8-1,5 l/ha

SatoHum® Potassium soap

Concentrated potassium soap

SatoHum® Potassium soap is a concentrated gel preparation. The soap is diluted in water and used to spray the leaves to control pests.



GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥20,0	Total phosphorus (P), g/kg	≥3,0
Humic complex, g/kg	≥120,0	Total potassium (K), g/kg	≥35,0
Mass fraction of humic acids, g/kg	≥100,0	Calcium CaO, g/kg	≥2,5
Mass fraction of fulvic acids, g/kg	≥20,0	Magnesium MgO, g/kg	≥0,3
Total nitrogen (N), g/kg	≥3,5	pH	3,9 – 8,0

DESCRIPTION

SatoHum® Potassium soap has all the properties of a classic concentrated potassium soap, in which humic and fulvic acids are present, which enhances the cleansing, bactericidal and fungicidal effect of the composition.

SatoHum® Potassium soap is **non-toxic to humans, animals, birds, to the main insect entomophages and to bees**. The main difference of **SatoHum® Potassium soap** is that it contains humic and fulvic acids obtained by alkaline extraction from peat-sapropel mixture. These acids have an excellent bactericidal effect, are considered natural detoxicants, and are used to combat a wide range of pathogens and pests.

Traditionally, potassium soap is used more for fruit garden crops. Possible combined use with PPP (pesticides and herbicides). At the same time, the rate of application of PPP is NOT reduced.

BENEFITS:

- fulvic acids penetrate cell membranes and **promote optimal absorption of nutrients;**
- soap solution fixes a protective film with **antiseptic and fungicidal action** on the treated leaves, stems and shoots;
- zero toxic waste, **suitable for organic farming**;
- effectively fights aphids, fungi, while not being toxic to bees and most natural predators of insect pests.

APPLICATION

Purpose of treatment	Type of treatment	Application rate
Early spring prevention of fruit trees	Treatment of trees and bushes before budding	20 ml/10 l of water
Scab, powdery mildew, phytophthora, rust, leaf spot	Treatment in the evening or in cloudy day, stirring with hot water until a homogeneous mixture	20 – 30 ml/10 l of water
Aphids, thrips, spider mites, scale insects, true bugs (heterotera)	Treatment in the evening or in cloudy day, stirring with hot water until a homogeneous mixture	30 – 50 ml/10 l of water
Combined treatment with pesticides	Mixing with working solution, application up to 5 days before harvest	20 ml/10 l of water
Treatment for the winter from wintering pests	Healing pruning of fruit trees and bushes, application on branches and trunks	20-40 ml/10 l of water

Feed additives SatoHum® Bio

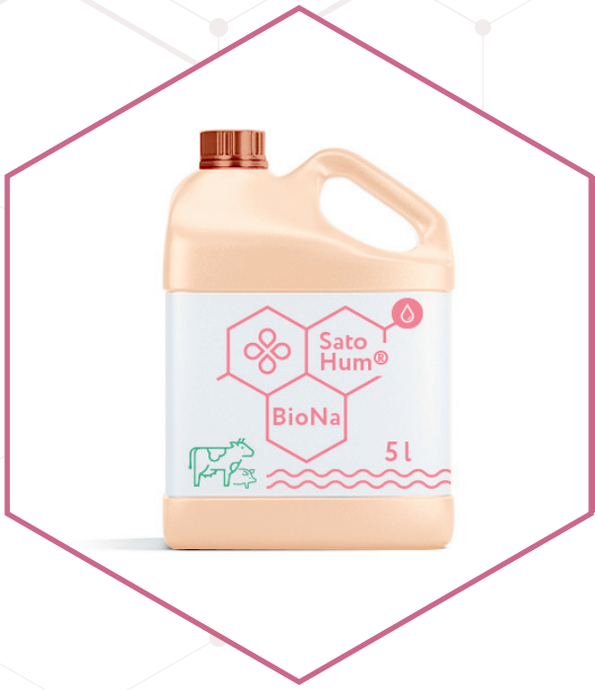
Since olden times inhabitants of lakeside settlements have used silt as feed for livestock and poultry. Sapropel dressings have been tested for ages. Young animals of livestock enterprises, fur farms and poultry houses, receiving sapropel top dressing, show **high resistance to diseases**. Mineral and biologically active substances, including essential amino acids, activate physiological processes in animals and help the complete assimilation of the main diet fodder.

Our profile product **SatoHum® BioNa** is designed to feed poultry, cattle, pigs, horses, medium and small livestock, rabbits, and also for fur animals in fur farms. The dosage depends on the weight of the bird or animal. **The liquid formula of the product can be added both to drinking water and solid feed**, the composition is completely harmless to animals and humans, doesn't cause rejection or allergies.

The preparation is based on deep bottom sediments - sapropel and lowland peat, which have **bactericidal and antifungal effect**. **SatoHum® Bio** feedings improve the immunity of young animals, cuts down mortality, better the absorption of the main feed.

SatoHum® BioNa

Liquid feed additive for animals



SatoHum® BioNa is a **universal liquid supplement** suitable for all farm animals and poultry, including pets.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total nitrogen (N), g/l	≥1,5
Mass fraction of organic matter nat. humidity, %	≥6,5	Total phosphorus (P), g/l	≥0,2
Mass fraction of mechanical impurities, %	≤2,0	Total potassium (K), g/l	≥0,2
Mass fraction of humic acids, g/l	≥35,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥30,0	Density, kg/m³	1020-1070

DESCRIPTION

SatoHum® BioNa is a «classic» sodium humate. It's indicated **for industrial animal husbandry** (cattle, horses, pigs, goats, sheep, rabbits), **poultry farming and fur farms.** Since non-free grazing animals and birds are constantly in confined spaces and in continuous contact with other animals, more attention to their welfare is needed to lower loss of livestock without overusing antibiotics and drugs. Feeding based on peat-sapropel mixture is much more effective than feeding from chalk, bone meal and shells.

Sapropel supplements **elevate the vital activity of organs and systems** of animals and birds; have a beneficial effect on their general health, **including their reproductive system**. Systematic feeding of animals with SatoHum® BioNa is an excellent preventive remedy, **increases the daily weight gain of young animals** and decreases the cost of veterinary measures.

BENEFITS:

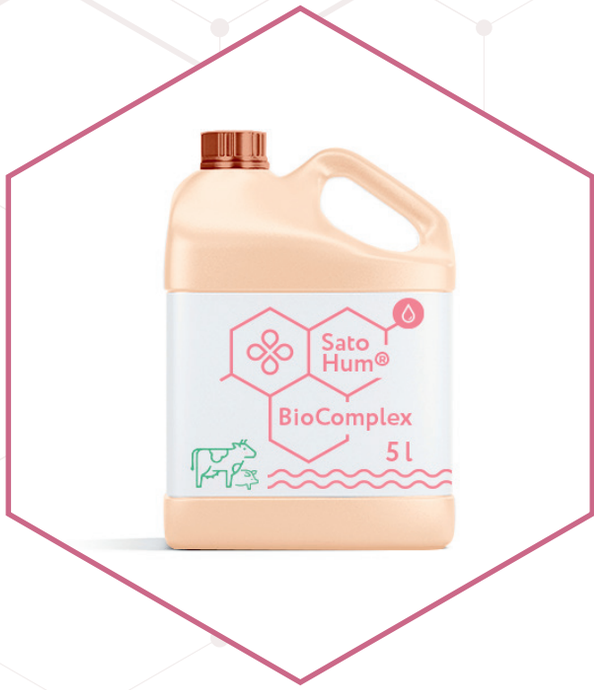
- has a bactericidal effect and **neutralizes pathogens and harmful organisms;**
- a complex of useful micronutrients **increases the survival rate of embryos and newborns;**
- strengthens the immune and endocrine systems of animals and poultry;
- doesn't cause allergies or rejection, **suitable for all types of animals;**
- increases the absorption of complex feed;
- **reduces the cost of veterinary measures.**

DOSAGE:

Cattle	Calves 20-75 days Calves 76-114 days Young 115-400 days Calf cows Dairy cows	0,4 – 0,5 ml/kg live weight 0,5 – 0,6 ml/kg live weight 0,6 ml/kg live weight 0,4 ml/kg live weight 0,6 ml/kg live weight
Pigs	Weaned piglets Piglets on rearing Young fattening pigs Boars, sows	0,2 – 0,3 ml/kg live weight 0,3 – 0,4 ml/kg live weight 0,4 – 0,5 ml/kg live weight 0,4 – 0,5 ml/kg live weight
Poultry	Chickens Laying hens	0,2 ml/kg live weight 0,2 ml/kg live weight

SatoHum® BioComplex

Liquid feed additive with amino acids for animals



SatoHum® BioComplex is a **liquid feed additive with amino acids**, suitable for all agricultural animals and poultry, as well as for pets.

GUARANTEED COMPOSITION:

Mass fraction of dry matter, %	≥10,0	Total nitrogen (N), g/l	≥1,5
Mass fraction of organic matter nat. humidity, %	≥6,5	Total phosphorus (P), g/l	≥0,2
Mass fraction of mechanical impurities, %	≤2,0	Total potassium (K), g/l	≥0,2
Mass fraction of humic acids, g/l	≥30,0	pH	7,0 – 8,6
Mass fraction of fulvic acids, g/l	≥45,0	Density, kg/m³	1020-1070
Free amino acids, g/l	≥28,0		

DESCRIPTION

SatoHum® BioComplex is supplemented with a **complex of essential amino acids** (lysine, valine, isoleucine and leucine, threonine, tryptophan, etc.), which are not independently synthesized in the body, so they must come from food and drink. Essential amino acids themselves are a source of energy and are required for the formation of new tissues, stimulate the growth and development of cells, reduce the sensitivity of the skin, prevent and stop diseases and activate regenerating functions of the body.

L-forms of amino acids, that is, left-oriented amino acids, **delay the aging process**, preventing a gradual mutation into right-sided, that is, D-forms. The supplement promotes

intracellular metabolism, improves physiological processes both in the embryonic stage and in adults, **prolongs the reproductive ability of animals and poultry.**

SatoHum® BioComplex is added to drinking water, dissolves 100% in water and doesn't clog the nozzles and filters of drinkers. If necessary, **our technological department** is ready to develop a **composition on demand** to solve specific problems: **restoring the reproductive ability of animals, normalizing the digestive tract, correcting the nutritional qualities of the main diet,** etc.

BENEFITS:

- essential amino acids in the composition of the supplement **regulate metabolic processes inside the cells** of animals and poultry;
- increases the viability of young animals and resistance to diseases even with a high-density population;
- **improves the economic value of animals,** prolongs the reproductive age, productivity and breeding qualities of animals and poultry;
- prevents the death of livestock and poultry;
- has zero toxic waste.

DOSAGE:

Cattle	Calves 20-75 days Calves 76-114 days Young 115-400 days Calf cows Dairy cows	0,4 – 0,5 ml/kg live weight 0,5 – 0,6 ml/kg live weight 0,6 ml/kg live weight 0,4 ml/kg live weight 0,6 ml/kg live weight
Pigs	Weaned piglets Piglets on rearing Young fattening pigs Boars, sows	0,2 – 0,3 ml/kg live weight 0,3 – 0,4 ml/kg live weight 0,4 – 0,5 ml/kg live weight 0,4 – 0,5 ml/kg live weight
Poultry	Chickens Laying hens	0,2 ml/kg live weight 0,2 ml/kg live weight

SatoHum® — compositions with a high content of humic substances, discovered more than 200 years ago, which are involved in maintaining life on our planet

www.satohum.com