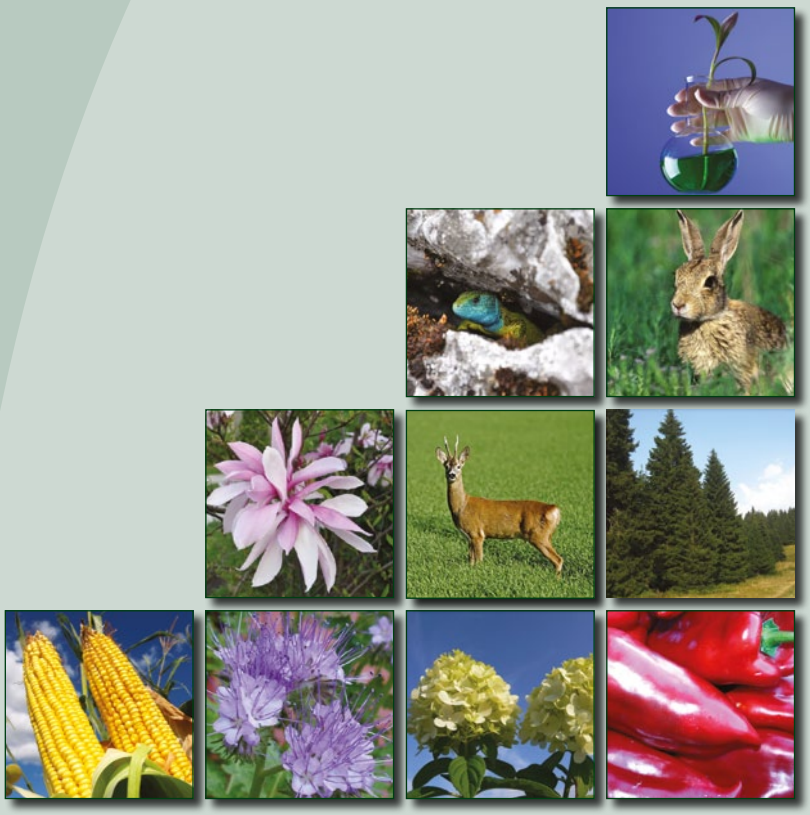
corax - bioner
biotechnology

ENVIRONMENT-FRIENDLY PLANT NUTRITION

EC FERTILISERS



corax - bioner
biotechnology

CORAX-BIONER CO.
1119 Budapest, Etele út 57.
Tel: (+36 1) 209 0853
www.corax-bioner.hu

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 = ISO 14001
OHSAS 18001

Product description

VOLIGOP®

Boron

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Boron (B , ethanolamine-borate)	2.5	3.0	30
Nitrogen (N), from which	15.0	18.3	183
urea (N)	13.0	15.9	159
ammonium (N)	2.0	2.4	24
Zinc (Zn, sulphate)	0.03	0.037	0.37
Sulphur-trioxide (SO_3)	5.0	6.1	61
Elemental sulfur (S, sulphate)	2.0	2.4	24
Manganese (Mn, sulphate)	0.15	0.184	1.84
Molybdenum (Mo, molybdate)	0.04	0.049	0.49
Copper (Cu, sulphate)	0.03	0.037	0.37
Iron (Fe, sulphate)	0.05	0.061	0.61
pH (original solution)	7.4 - 7.6		
Density (g/cm^3)	1.220 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: green odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Role of constituting nutrients in plant life

Boron is an essential micronutrient, playing a fundamental role in nutrient uptake of plants, transport and accumulation of carbohydrates and other assimilates formation of root and transport tissues, sprouting and production of flowers and fruits. In fruits, it has a determining role in the formation of generative organs

(formation of flowers and pollen) and growth, in grapevine in pollen germination and good fertilization. Typical symptoms of boron deficiency are dwarfed stem elongation, inhibition of flower formation and flower falling. The boron deficiency appears early rather as malformed, brownish spots on trees, which expand later to fruit flies as well. Malformations can be observed on fruits, most typical being the spotty browning of the fruit flesh, as a storage disease. Boron and calcium have an important role in the formation of cell walls, growth of plant tissues and regulation of plant hormones.

The boron content of the soil that can be assimilated decreases with the bonding and increase of pH value. Bonding due to strong liming and leakage occurring in soils with reduced colloid content can lead to boron deficiency. Translocation of boron in plants is restricted; its deficiency appears in young plant parts.

The boron needed by dicotyledonous plants is double or triple compared to monocotyledonous plants. Plants sensitive to boron deficiency are rape (prolonged flowering), sunflower (poor bonding), sugar beet (heart rotten), grapevine (loose, defective grape bunch), apple, potato. Do not omit the boron treatment of rape, performed during the autumn and springtime, green bud stage, since it has an important role in flower formation, fertilization, and it increases the extractable oil percentage. For spring regeneration rape demands, nutrients that can be taken up easily, abundant nutrient with suitable composition. Boron deficiency leads to decreased fertility and bud lost.

The product contains not only a single nutrient, but, in order to provide plants with an equilibrated nutrient supply, it contains other micronutrients as well.

Molybdenum is essential for plants, being an electron-transfer agent and activator of many enzymes. The sulphate ions inhibit, in contrary the phosphate ions presents in soil promote his uptake. It is not translated in plants, its uptake is inhibited in acid soils (<5.5 pH), therefore application of molybdenum-containing foliage fertilizers is indispensable.

Molybdenum helps nitrogen uptake of plants from the soil and its utilization in plants (in case of both sunflower and corn). Molybdenum deficiency results in yellowing of young leaves, shedding of older leaves. Availability of molybdenum is of utmost importance in avoiding the so-called whiptail syndrome (the leaf itself does not grow, it is only the stem that grows, fruit development is also stunted). Symptoms of molybdenum deficiency are similar to those of nitrogen deficiency, but in this case ,,leaf blight" ("leaf-singeing") is a result of accumulated nitrogen, unutilized by plants. In case of vegetables higher nitrogen fertilization demands more molybdenum supply. We strongly recommend the use of molybdenum-

containing boron foliage fertilizers for sunflower, sugar beet, rape, cabbage, onion and legume crops.

The importance of the product

The Voligop® Boron is a liquid EC fertilizer enriched with those micronutrients that are the most important for plants. Recommended for nutrient supply of many cultivated plants, simultaneously with fungicide or other plant protecting treatments.

The recommended dose for field and horticultural crops, fruit trees is 1-5 l/ha, according to the particular needs of the plants and their phonological phase for foliage feeding of sugar beet, sunflower, rape and mustard, used simultaneously with herbicide treatments. We recommend for foliar feeding concentrations of 0.5-1.5%, for fertigation concentrations of 0.1-0.5%.

Field of application

- **Pome trees:** at the red bud stage, then treatment repeated from petal falling until the period of fruit growth, then post-harvest, but before shedding of leaves. We recommended for enhancing flowering, fertilization, pollen fertilization and fruit bonding, development of shoot pucks, decreasing flower necrosis, improving compositional indicators, decreasing frost damage.
- **Berries and Strawberry:** treatments at white bud stage, repeated after 10-14 days; the after harvesting.
- **Peas, beans, carrot and turnip:** treatments before flowering for facilitating bonding, fertilization, moderating flower and pod loss (for prevention of molybdenum deficiency symptom).
- **Potato:** after plants have come up entirely (to prevent boron deficiency), repeated immediately before flowering (to enhance pollen tube formation, better bonding).
- **Sugar beet, beet, and Mangel-Wurzel:** treatments from the stage of 8-10 leaves, repeated at row closure, repeated after 10-14 days in case of deficiency symptoms. Boron deficiency results in classical "heart rate" symptom.
- **Stone fruits - cherry, sour cherry, and plum:** at the beginning of flowering to help fruit bud differentiation; then on the July-August turn-of-month, before ripening, to increase fruit size and sugar content, to help uniform ripening and to enhance winter hardiness.
- **Stone fruits - peach and apricot:** at the beginning of flowering to facilitate bonding and fertilization; then for boron fill-up in the autumn for improvement of fruit bonding in next season.

- **Onions:** treatments at formation of proper leaf surface, repeated after 10-14 days to improve the storage quality and to promote calcium uptake.
- **Nuts (walnut, hazelnut, almond, and chestnut):** at the beginning of flowering, mandatory for early varieties before pollen release (until the 1st of May the latest) for facilitating fertilization of female flowers.
- **Cucurbits:** before flowering before main flowering for all of bearing varieties.
- **Cereals:** in the autumn, from a height of 8-10 cm, combined with Voligop Copper Ore Voligop Potassium foliar fertilizers. During autumn and/or spring, simultaneously with other plant-protecting works.
- **Brassicas:** at the very beginning of head formation; for cauliflower before flowering, for initiation of flowering, repeated after 10-14 days until lemon-sized flowers.
- **Corn:** treatment at 3-5 leaf stage, repeated if needed at 7-9 leaves stage, upon tasselling, simultaneously with other plant-protecting treatments.
- **Outdoor ornamental plants, ornamental trees and bushes:** during vegetation period for full growth and proper shape, for formation of a compact branch system.
- **Sunflower:** at 4-8 leaf stage and then at star-buds stage, simultaneously with other plant-protecting treatments.
- **Green/red pepper, paprika and tomato:** before flowering; in case of ever bearing varieties prior to main flowering. Boron deficiency also results in improper calcium transport in plants, which can perturb formation of cell walls.
- **Rape:** treatments in the autumn (for enhancement of root formation) at 4-6 leaf stage and in the spring, before stalk development, and/or before flowering, especially in the condition of low humidity.
- **Soybean:** before flowering, combined with Voligop Sulphur Extra, simultaneously with herbicide treatment (quizalofop) against monocotyledonous plants. The acidity of soil inhibit the uptake of Molybdenum; its addition is necessary for intensifying the activity of nitrogen-bonding bacteria.
- **Grapevine:** treatments at the formation of the raceme and appearance of flower sprouts; then post-harvest. During flowering, the boron need of grapevine is multiple, even ten times higher than its iron needle.
- **Vegetables** (outdoor): treatment at 2-3 weeks after planting, or at 10-14 after transplanting. Vegetables with an increased sensitivity to boron deficiency: cabbage, kohlrabi, cauliflower, Savoy cabbage, celery, beetroot, while carrots and tomato show medium sensitivity.

In order to avoid boron intoxication of plants, should adjust the boron content of irrigation water taking into account the plant sensitivity.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Boron Extra

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Boron (B, ethanolamine-borate)	4.0	4.9	49
Nitrogen (N), from which	15.0	18.4	184
urea (N)	15.0	18.4	184
Molybdenum (Mo, molybdate)	0.04	0.05	0.5
pH (original solution)	8.4 - 8.7		
Density (g/cm^3)	1.230 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: colorless and odorless solution – ***sodium and chlorine free*** – premium fertilizer.

The importance of main micronutrient

Boron is an essential micronutrient playing a fundamental role in nutrient uptake of plants, transport and accumulation of carbohydrates and other assimilates formation of root and transport tissues, production of flowers and fruits.
Sandy, strongly leached soils without colloids, rich in salt and having high pH suffer from boron deficiency, their boron supply falling often under the minimum limit. Plants cannot take up boron from alkaline soils, this being present in form of insoluble compounds, it should make up only by foliar feeding. The dryness imped the flowing motion of boron and molybdenum; their deficiency appears mainly in younger parts of the plants.
During plant growing, micronutrient supply has an essential role. Some field crops (rape, sugar beet, sunflower), some vegetables (cabbage, kohlrabi, cauliflower) and

some fruits (apple, pear, peach, plum, and raspberry) have an increased need of boron already in earlier phenological stage.
Draws attention that in many cases, plants nutrient demanding and the boron overdose is at the same time the most sensitive as well (e.g. apple, peach, and strawberry).
Plants can store some micronutrients; their needs can be satisfied during growing season by proper supply. However, boron is not storable by plants, while boron needs are continuous, so, it has to continuously supply for boron-demanding plants.
It is worthy to note the role of boron in winter hardiness of rape. Boron plays an important role in the initial growing stage of autumn rape, increasing its resistance to stress.
Having regard to boron sensitivity of some plants, boron content should take into account when calculating safe application of irrigation water. For an amount of 50 mm irrigation water during one growing period, recommended boron amounts are 4 mg/l for boron-sensitive and 8 mg/l for boron-resistant plants; for a double amount of irrigation water the half of these boron doses are recommended (100 mm//2 reps. 4 mg/l; 200 mm//1 reps. 2 mg/l).
The molybdenum micronutrient ingredient of the product supplement the usually extremely low molybdenum content of the soils. Molybdenum is present in soil in lower amounts than other micronutrients (<1-10 mg/kg), especially in acid soils. Adsorption bound of molybdenum increases with an increasing acidity of the soil. It plays an important role in growth, development, cellular functioning and nitrogen uptake and utilization in plants. Molybdenum needing is very different for different plants, some are especially sensitive: sunflower, corn, tomato, lettuce, spinach, cabbages, alfalfa, clovers). In case of insufficient Mo supply, chlorophyll content of the plant decreases. It causes symptoms similar to nitrogen deficiency. Older leaves become chlorotic and then roll up.
Growing and flower production slows down; deficiency results in nitrate accumulation, "pseudo-nitrogen deficiency". Crucifers are especially sensitive to molybdenum deficiency, thus resulting in so-called whiptail.

The importance of the product

The Voligop® Boron Extra is a liquid EC foliar fertilizer enriched in micronutrients, which are most important for plants. Recommended for nutrient supply of many cultivated plants, simultaneously with application of herbicides or other plant-protecting treatments, by performing a previous mixing test.
For field and horticultural crops, fruit trees, doses of 1-3 l/ha is recommended for particularly boron-demanding plants, according to the specific need and the physiological phase of the plants, for foliar feeding of sugar beet, sunflower, rape, mustard its application together with other plant-protecting treatments is aloud.

General recommendation: for foliar fertilizations in concentrations of 0.5-1.5%, for fertigation concentrations of 0.1-0.5%.

Field of application

- **Peas, beans:** at a height of 10-15 cm, before flowering.
- **Potato:** at the beginning of flowering, during tuber formation, repeated 2-3 times.
- **Sugar beet, beetroot, and Mangel-Wurzel:** from the stage of 4-6 leaves to row closure, repeated after row closure simultaneously with the actual plant protection treatment.
- **Ornamental plants:** before flowering to stimulate flowering and improve flowering quality.
- **Root vegetables:** 1-2 times during intensive root for prevention of heart root, root sponginess, stalk and leaf blight of celery; for strong collars.
- **Orchards:** at red and white bud stage, at the beginning of flowering, before main flowering, at petal falling, and at the beginning of fruit growth as a combining partner in half dose (differentiation of fruit-buds, increase of fruit set, fruit size and sugar content). After harvesting, but before shedding of the leaves, onto the green, active foliage for filling up with boron (and potassium) prior to the winter season. Post-harvest of pome trees, for filling up of the trees' reserves.
- **Nuts** (walnut, hazelnut, almond, and chestnut): on the July-August turn-of-month for facilitation of fruit-bud differentiation (as a combining partner).
- **Cucurbits:** In case of continuously producing plants it should be applied before the main flowering (in case of others: before flowering) at concentrations 0.5-1% to facilitate the pollen tube formation, to improve bonding; and to reduce crop losses in case of root degradation occurring in cold weather conditions, hail.
- **Brassicas:** at the stage of 4-6 leaves and then at the beginning of head formation.
- **Corn** upon tasselling, simultaneously with the first insecticide treatments, for improvement of seed formation and grain filling.
- **Poppy plant:** during intensive leaf formation, at the beginning of flowering and during the formation of capsules.
- **Sunflower:** at the rosette for initialization, then in star-buds stage simultaneously with the first fungicide treatment.
- **Oil flax, oilseed radish, mustard:** before flowering, simultaneously with the first fungicide treatment.
- **Rape:** in the autumn, before frosts, at 4-6 leaf stage and 5-8 cm height, simultaneously with the growth regulation; in springtime from formation of shots to flowering.
- **Strawberry:** in white bud stage and at the very beginning of flowering.

- **Soybean:** from 4-6 leaf stage, before flowering, at the beginning of bean formation simultaneously with other plant protecting treatments. (Combination with imazamox is not aloud).
- **Grapevine:** immediately before flowering, to enhance bonding, then one time to help shoot ripening; in case of blue grapes at the beginning of ripening to enhance coloration and increase the sugar content.
- **Vegetables:** immediately before flowering to enhance bonding in the usual foliar treatments.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Calcium

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Calcium (Ca, nitrate)	10	13.9	139
Calcium oxide (CaO)	14	19.4	194
Nitrogen (N), of which	8.0	11.1	111
nitrate (N)	8.0	11.1	111
pH (original solution)	6.3 - 6.7		
Density (g/cm^3)	1.420 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: colorless and odorless solution – ***sodium and chlorine free –*** premium fertilizer.

Role of components in the life of the plants
Calcium has an essential role in the strengthening of the cell wall, the cytoplasm, the regulation of the cell membrane permeability and root growth.
Calcium deficiency (dicotyledonous plants are usually more sensitive) causes the roots to stop growing; calcium excess can lead to manganese, potassium, boron, zinc, magnesium and iron deficiency. There is no close relationship between calcium intake and the calcium content of the soil. As with boron, zinc, manganese and iron, calcium translocation may be difficult in the plant. Old leaves accumulate and bind calcium, and thus young, rapidly growing parts can't get enough calcium. Deficiency symptoms always occur on the growing parts depending on the plant. Calcium chloride can cause scorching symptoms. This chlorine-free Voligop Calcium contains calcium nitrate which is fully soluble in water.

Calcium plays a crucial role in protecting against bitter pit in winter apples and peaches, brown staining of pears, cracking of cherries and softening of fruits in general.

For pome fruits, calcium supplementation is recommended for increasing pulp strength to improve shelf-life and fruit growth. The incorporation of calcium into the fruits is the most intense during the 6th week after fertilization, that is, during the cell division phase of fruit growth. Early bitter pit commonly occurs on bigger apples because fruits do not naturally get enough calcium. Calcium deficiency causes the roots to stop growing, their tips get slimy and brown, and then they die; young leaves may become distorted, and then bitter pit can appear on the fruits. For pome fruits, as the quantity of fruits increases, the concentration of magnesium and potassium in the fruits decreases, while that of calcium remains relatively constant. As a result, peel browning will occur when large quantities of smaller fruits grow because the K + Mg/Ca ratio in the fruits is more favorable.

Calcium plays an important role for rape, as well. Calcium ensures stem strength which is extremely important for tall plants. Plants sensitive to calcium deficiency also include: carnation, pepper, tomato, eggplant (drying of the fruit tips on the side of the flower), cucumber (deterioration of flavor), melon (browning of the skin and fruit flesh, shrinking of young top leaves, deterioration of their tips), lettuce (browning of the leaf edges) and carrot (slimy roots).

The advantageous skin structure of the grape berries has a positive effect on plant protection. Good calcium supply plays a big part in helping the berries better resist to smaller shocks due to the thickness of the skin during some machine works, such as using the shoot binder or during mechanized harvesting.

Calcium is indispensable for the regular growth of cell walls and roots. The advantages of using Voligop Calcium in vegetables are as follows:

- improves shelf-life and the quality of vegetables stored, reduces storage loss by improving cell wall strength,
- improves transportability and reduces losses from crash or deterioration during transport,
- facilitates the growth of the roots, the differentiation of the root apex, and thus increases the intake of other nutrients even in low-quality soils,
- improves stem strength which is of relevance during mechanized harvesting,
- improves the resistance of vegetables to diseases due to the harder cell walls,
- stimulate callus formation (healing of the wound) after removing tendrils, cutting, pinning and inoculating.

The intake of calcium nitrate through the leaves is very good, and therefore, it can be efficiently used in all Ca-consuming plants (fruits, vegetables, flowers and grapes). Calcium supplementation should be started during intensive foliage growth by foliar fertilization in order to prevent calcium binding in the leaves; this treatment should be repeated several times.

The importance of the product

Voligop® Calcium is a liquid EC foliar fertilizer solution enriched in a form and proportion that is ideal for plants. It can be used as nutrient supply in a number of crops, alone or in combination with other plant protection treatments, after conducting a preliminary mixing test. Calcium-containing products usually cannot be mixed, or can be mixed with other products (in particular, products with low pH value) only with difficulty. It should not be mixed with products containing phosphates or sulfates. The miscibility of liquid agents can be checked if we dissolve 1-2 drops of each in a little water. It is not allowed to mix agents if solid particles form in the liquid. It is recommended to apply the mixture from the tank as soon as possible. It is not advisable to mix more than three agents.

The solubility (the ratio of dissolved matter to the water in the saturated solution) of specific nutrient(s) should be taken into account when dissolving solid foliar fertilizers or mixing ready-to-use foliar fertilizers. Solubility is usually determined for water at 20°C; above this value, solubility increases, while below this value it decreases, and thus the insoluble "excess" will precipitate. When several products or active substances are mixed, one of these can influence or reduce the solubility of the other. In many cases, mixing in a tank is not recommended because insoluble salts may form.

It is recommended to use this product with calcium nitrate in a concentration of 0.5-2% and 0.1-0.5% when used as foliar fertilization and nutrient solution, respectively, based on expert advice, depending on the needs and phonological stage of the plants:

- **Pome fruits:** 4 to 8 times (pear: 2 to 4 times) in a concentration of 0.3-0.6% (the lower value is for species less vulnerable to bitter pit). The first treatment should be applied when the apples are the size of a green nut, and then it must be repeated during intensive tendril and fruit growth, until the week before the expected date of harvest. Much of the calcium gets directly into the tissues under the skin through the surface of the fruits.

- **Berries:** 3-4 times between intensive cell elongation and growing to reduce berry cracking.
- **Potato:** 2-3 times every 10-14 days from tuber formation (after blooming) to ameliorate diseases during storage.
- **Stone fruits (cherries):** from the beginning of coloration to the 2nd week before harvesting to reduce loss during harvesting (fruit cracking).
- **Stone fruits (such as plum, peach and apricot):** every 7-14 days in a dose of 5-6 l/ha (0.5-0.6%) from petal fall until the week before the expected date of harvest to prevent skin cracking and to increase seed coat strength, and thus to reduce the secondary formation of gray rot. The product significantly reduces browning of the peel and pulp.
- **Melon:** every 14 days in a dose of 3-5 l/ha (0.3-0.5-1%) during fruit formation to improve the firmness of the fruit pulp.
- **Ornamental plants:** from vegetative growth to blooming to improve stem strength and flower quality.
- **Root vegetables:** 1-2 times during root growth to attain appropriate root strength.
- **Onion:** to sustain the density and quality of the bulb and to provide nutrients for the bulb, and thus, to reduce storage problems.
- **Nuts (walnuts, hazelnuts, almonds, chestnuts):** every 10-14 days from intensive cell elongation to growth to facilitate shell formation and to avoid the formation of uneven, thin, splintered or hollow shells.
- **Brassicas (cabbages):** 1-2 times after head formation starts to prevent leaves from shriveling, to improve shelf-life, to reduce damages caused by black vein rot and to prevent browning, softening and shriveling of lettuce leaf edges.
- **Sunflower: i**n a dose of 1-3 l/ha until 4-6 leaf pairs are formed to improve root formation and stem strength.
- **Pepper (bell pepper and chili pepper), tomatoes, eggplants:** every 7-14 days from blooming (maximum intake is during blooming) to the second or third fruit set, and then repeated to prevent drying of the fruit tips. Calcium deficiency is often associated with magnesium deficiency.
- **Rape:** as required, at 4-6 leaves stage, during fall or early spring.
- **Strawberry:** for species that do not constantly ripen: 3 times every 7-10 days from blooming; for species that constantly ripen: 5-6 times every 10-14 days to reduce gray rot formation.
- **Grapevine:** maximum 4 times every 7-14 days in a dose of 3-5 l/ha after fruit set, until growth, to prevent berry cracking. A direct cause of peduncle necrosis is relative calcium and magnesium deficiency.

- **Cucumber:** from planting, concomitantly with plant protection works, even during harvesting to prevent shoot tip necrosis, curled shoot tips and leaf roll.
- **Green peas:** to be treated before blooming because it requires lime and nitrogen.
- **Vegetables (especially in intensive production):** 2-5 times as required in vegetation.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Copper

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Copper (Cu, sulphate)	4.0	5.0	50
Nitrogen (N), of which	15.0	18.7	187
urea (N)	14.2	17.7	177
ammonium (N)	0.8	1.0	10
Boron (B, borate)	0.03	0.037	0.37
Zinc (Zn, sulphate)	0.03	0.037	0.37
Elemental Sulfur (S, sulphate)	3.0	3.7	37
Sulfur trioxide (SO_3)	7.5	9.3	93
Manganese (Mn, sulphate)	0.15	0.187	1.87
Molybdenum (Mo, molybdate)	0.04	0.050	0.50
Iron (Fe, sulphate)	0.05	0.062	0.62
pH (original solution)	4.0 - 4.3		
Density (g/cm^3)	1.250 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: greenish blue odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Role of components in the life of the plants
Cooper cooperates as an enzyme generating and enzyme activating catalyst. It has a role in respiration, photosynthesis, protein creation, water balance, growth, assimilation, lignin formation and cell wall strengthening, as well as in resistance against diseases and drought resistance.

Its absence can disturb the evolution of the plant, due to metabolic disturbances. Copper deficiency is characterized by steady withering, the destruction of young sprouts, chlorosis and in a later stage, necrosis on the edges of the leaves. The growth of the leaves stops the edges of the leaves curl up, are twisted, leaves fall and shoots bare up. In its absence blooming and fruit formation fail to come about. The drying of shoot apices occurs and "witch's broom" disease develops. Most affected by copper deficiency can be the cereals and fruit trees. The most sensitive species are apples, pears, peaches and apricots, plums and cherries. Arable species that are sensitive to the absence of copper: cereals, corn, sunflower, sugar beet. Copper deficiency can occur on sandy, alkaline, cold, dry or too humid soils.

Its mobility within plants is low; the copper quantity supplied by foliar fertilization is well used.
Lack of copper reduces the production of pollen and fructification. This deficiency always appears at first on very young and very active plant organs, leaves become green touched with grey or whitened. Loose, wilted leaves, twisting up, or white stained in the case of cereals, abnormal ramifications in the case of woody plants are all symptoms of copper deficiency. By using Voligop® Copper the nitrogen intake and use of the plant also improves.

The importance of the product
Voligop® Copper is a genuine solution EC foliar fertilizer, enriched with the most important micronutrients, in the adequate concentration for the plants. Usable for the nutrient supply of a great number of cultivated plants, together with weed control or other plant protection treatments.
In arable land (e.g. cereals) and gardening cultures, and in fruit and viticulture the application of 1-3 l/ha is recommended, in accordance with the necessities and phenological stage of the given plant; in a concentration of 0.5-2% in case of leaf fertilization, and 0.1-0.5% in case of fertigation.

Field of application:

- **Peas and beans:** before and after inflorescence at any time, in a concentration of 0.5-1% in order to prevent bacterial and fungal diseases, and to temper their effects.
- **In potato** during intensive leaf formation (with the exception of inflorescence) in a concentration of 1% in order to prevent bacterial and fungal diseases, and to temper their effects.
- **In sugar beet** at 6-10 leaves stage.

- **In stone fruits** in the autumn after the harvest 2-3-5 l/ha, as an autumn copper closure treatment.
- **In tree nursery cultures** in the period of intensive growth on 1-2 occasions.
- **In root vegetables** in the period of intensive growth on 1-2 occasions.
- **In orchards** in the period of intensive growth on 1-2 occasions.
- **In onion** following germination, as a preventive treatment on a weekly basis, respectively at any time during the period of vegetation to achieve adequate skin, in a concentration of 0.5-1%.
- **In Cereals** until the time of spearing, concomitantly with weed control or other plant protection tasks, in the autumn or in the spring for plant conditioning, to enhance the efficiency of fungicides, to prevent copper deficiency. We recommend using it in combination with Voligop Boron or Voligop Potassium in order to improve drought resistance, to preserve root mass and root surface. From the time of the appearance of the flag leaf until the beginning of flowering, together with fungicide to improve protein and gluten content, and to prevent white spike disease. The foliar fertilization is the most effective way to make up micronutrients!
- Tending **garden lawn** any time during the period of vegetation, using a concentration of 0.5%, in order to reduce the development of certain diseases. At least 24-48 hours after recent lawn mowing.
- **In corn** at 6-12 leaves stage, concomitantly with weed control, respectively during vegetation, at the time of tasselling, concomitantly with the first insecticide treatment, in order to promote stronger female flowers, grain formation, and setting.
- **Bell peppers, paprika, tomato, eggplant:** any time during the vegetation period (excluding flowering) in a concentration of 0.5-1%, in order to prevent copper deficiency, respectively bacterial and fungal diseases.
- **Grape:** During flowering its adequate copper supply must be twice, but even ten times as much as its iron need.
- **Soybean:** from the beginning of pod formation until the beginning of seed development.

Precautions and Liability

Should not mix Voligop Copper with any strong alkaline products!

We strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products. It is not recommended to be used together with stem strengthens. Voligop Copper **should be mix with** foliar fertilizers Voligop Potassium or Voligop Boron, but **cannot be mix with** foliar fertilizer Voligop Phosphorous.

The use of triple or more tank mixtures should be avoid!

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.
The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.
We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.
Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.
Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Iron

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Iron (Fe, sulphate)	3.0	3.7	37
pH (original solution)	4.0 - 4.3		
Density (g/cm^3)	1.240 ± 0.005		

Voligop® Iron fulfils the requirements of Council Regulation 834/2007/EC and Commission Regulation 889/2008/EC. Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: brown solution with pungent odor – ***sodium and chlorine free*** – premium fertilizer.

Role of components in the life of the plants

For plants iron is an electron transporting agent, which plays an important role as the catalyst of chlorophyll synthesis. It is indispensable in breathing and protein synthesis processes. Magnesium is a structural element of chlorophyll, with a defining role in the photosynthesis of plants.
Iron is an indispensable micro-nutrient in plant breathing, metabolism, photosynthesis, as well as in protein generating processes. Most of it is located in the leaves of plants, in the vicinity of leucites. Its role in iron containing enzymes is based on the oxidation – reduction ability of iron.
It is generally present in the soil, but in a form that is difficult to absorb. Its deficiency often appears due to the difficulty of intake. It is a micro-nutrient that weakly translocate within the plant, therefore only the young parts show its absence. In case of severe deficiency the whole of the plant can turn yellow. The yellowing of the leaves always begins at the sprout tips, in the case of the youngest leaves. The symptom called lime induced chlorosis is well known in plants, when due to the higher pH value resulting from the larger quantity of calcium carbonate in the soil, the absorption of

iron is impeded, respectively the iron within the plant cannot partake in the biosynthesis of chlorophyll. The space between the veins of fresh leaves become lighter, yellower in color, whereas the veins themselves remain green. In the case of monocotyledonous plants a characteristic longitudinal streakiness appears on the leaves. In case of severe deficiency leaves turn almost completely white and the color of their nervure does not differ significantly from the other areas of the leaf-blade. As a result of iron deficiency, grapes can experience reduced sprout growth, leaf and sprout decay, berry shedding, leading to significant produce loss. As a result of iron deficiency fruit trees can stop growing, and their fruit will be small, hard, and dry-fleshed, and in the case of peaches the winter resistance of the fruit deteriorates.
Symptoms of iron deficiency can also occur due to large quantity of phosphorus fertilization, a phenomenon that can be even aggravated on calcareous and highly argillaceous soils. Zinc, calcium, and nitrogen overdosing also impede the absorption of iron from the soil.

The importance of the product
Voligop® Iron is a liquid EC foliar fertilizer, enriched with magnesium, important for the plants. It can be used to supplement the nutrients of a great number of cultivated plants, by itself or concomitantly with other plant protection treatments.
It can be used for:
Supplementing iron shortfall of plants in every culture. Plants species prone to iron deficiency: grape, fruit, soy, bell peppers, ornamental plants. Iron deficiency is characterized by the yellowing of the leaf tips, presenting the symptoms of “iron chlorosis”.

Field of application:

- **In pome fruits, and stone fruits:** before inflorescence, repeated 2-3 times, when the fruit reach the size of a nut every 14 days. In case of the species that are prone to scorching, only in doses of 1 l/ha.
- **In young plantation gardens, tree nurseries:** immediately after the appearance of deficiency synmptoms, repeated when needed.
- **Stone fruits (cherry, sour cherry, plum, peach):** first treatment when the fruits appear, repeated 2-3 times every 14 days. Not recommended for species prone to scorching.
- **Cereals:** 3-5 l/ha together with other plant protection treatments.
- **Corn:** any time during vegetation; on calciferous ground the absorption of iron is unsatisfactory.

- **Outdoor ornamental plants, ornamental trees, ornamental bushes, trees, bushes, Pinaceae:** in the period of intensive sprout growth in order to avoid iron deficiency chlorosis.
- **Evergreens:** at the time of intensive growth several treatments every 10-14 days.
- **Bell pepper, tomato, cucumber and other vegetables:** at the time of fruit formation every 14 days to avoid chlorosis and improve produce quality.
- **In grape:** The first treatment should occur at 5-6 leaves stage (predominantly in the period of sprout growth), repeated before blooming, after blooming and before bunch closure, to prevent or terminate iron deficiency, to increase yield and improve sugar content.
- **Ornamental plants with flowers:** to prevent chlorosis during vegetative growth, repeated several times.

In case of fertigation 10-30 l/ha, i.e. 1-3 ml/m² of VOLIGOP® Iron fertilizer should be dispensed, in a maximum concentration of 10%!

In plantations (grape, orcahrs etc.), where only a few trees, or vine-stocks show the symptoms of iron chlorosis, these can be treated by fertigation "individually". Lack of iron can cause so-called iron chlorosis, the typical yellowing of the tip of plants! In the absence of iron the formation of green plastids and chlorophyll slacken! Leaves turn yellow with the exception of veins (which remain green). In more severe cases the leaves can turn completely white, with brown, irregular necrotic spots on the edges. Leaves presenting the symptoms of iron deficiency usually do not fall during the breeding season. When the symptoms of iron deficiency appear, the changes are still reversible, can be healed, but white leaves with necrotic portions are already the sign of irreversible changes.

In case of severe iron deficiency the growth of the fruit tree fall behind, fruit remain small in size and excessive in color. Iron is the micro-nutrient needed by fruit producing plants in the largest quantity. Fruit trees take up iron in the form of Fe^{2+} and Fe^{3+} ions and in complex organic compounds. The fruit species most prone to iron deficiency are: apple, pear, quince, cherry, peach, plum, strawberry, raspberry and grape.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Magnesium

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Magnesium (Mg, nitrate)	6.0	8.1	81
Magnesium oxide (MgO)	10	13.6	136
Nitrogen (N), of which	7.0	9.5	95
nitrate (N)	7.0	9.5	95
pH (original solution)	5.0 - 5.3		
Density (g/cm^3)	1.360 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: colorless and odorless solution – ***sodium and chlorine free –*** premium fertilizer.

Role of components in the life of the plants

Magnesium is a structural component of the chlorophyll molecule and plays a determining role in plant photosynthesis. In living organisms, energy-dependent processes would not be possible without magnesium. Magnesium is one of the factors responsible for water balance in plants. It is also an enzyme component in the phosphor and carbohydrate metabolism.
Plants usually consume a smaller amount of magnesium than the antagonist K and Ca. It is carried to the top of the plant, so that magnesium deficiency first causes symptoms on ageing leaves and deteriorated leaves fall if they are exposed to stronger sunlight. Signs of magnesium deficiency first appear on older leaves and the areas between veins become yellow and then reddish-brown. The veins and leaf edges remain green.

In monocots plants, magnesium deficiency causes the leaves to become yellow along the main vein, in two strips, and then die and fall off.
As regards grapevines, relative magnesium (and calcium) deficiency causes the flowers to fall off, as well as peduncle necrosis and severe yield loss. The sensitivity of different species varies significantly. Grapevines with long thin peduncle, grafted grapevines and exuberantly growing grapevines are more sensitive. Fertilization with high magnesium content foliar fertilizer after blooming plays an essential role in the prevention of this deficiency.
Magnesium also plays a critical role in the fruit development (for example apple). As a result of severe magnesium deficiency only the leaves at the top of the tree remain there because the other leaves fall off. The fruits will be sour and cannot be stored. Intensive liming may potentially lead to magnesium (and potassium) deficiency. Magnesium is easily carried toward the younger parts of the plants. Magnesium deficiency may also be caused by the large amounts of competitive potassium and ammonium ions in the soil. The most sensitive fruits: berries, apple, pear, peach, raspberry, sour cherry and red currant.
As regards grapevines, magnesium deficiency plays a significant role in the occurrence of peduncle necrosis.
Magnesium deficiency is expected for almost all vegetables in case of intensive cultivation, on sandy soils in case of frequent irrigation and in the cultivation of plants that need magnesium (rape, sunflower, tobacco, tomato, pepper, cucumber, melon, potato and leguminous plants).
In sunflowers, magnesium increases photosynthesis and the resulting sucrose is transformed into oil in the achene fruits. This oil stored in the achene fruits plays an important role during seed production and ensures the initial development of the plant by changing back to sucrose during germination.
Magnesium (the only mineral in the chlorophyll molecule) deficiency slows down the assimilation and synthesis processes of the plants, impedes metabolic processes and leads to an accumulation of sugars and starch in the leaves. Different qualitative changes should be expected in different plant groups. Magnesium deficiency:

- inhibits the nitrate reductase, and thus it increases the nitrate content in the crop,
- slows down carotene formation which is a precursor of vitamin A, and thus it decreases the nutritional value of carrots, pumpkins, leaf vegetables and fruits,
- decreases sugar levels in sugar beets and sweet corn,

- as a result of a metabolic problem, it slows down protein formation, causes cell walls to weaken, and thus leads to a deterioration in the shelf-life and transportability (for example, potato), and an increase in the sensitivity to fungal and bacterial diseases in some species (for example, potato, apple, carrot, beet and parsley).

When fertilizing with high doses of ammonium and potassium, as a result of the antagonism of the nutrient, magnesium level should be increased because Mg will be at a relative minimum level due to high NPK levels.
Magnesium deficiency leads not only to a decrease in yield, but also to an increase in the vulnerability to pathogens. Magnesium, phosphor and nitrogene have synergic effects.
Vegetables with high potassium demand usually need more magnesium, as well. Magnesium is an antidote of peduncle necrosis.
Magnesium nitrate is a well soluble form that can be absorbed through the foliage. Foliar fertilization should be started before the occurrence of the symptoms, especially on loose soils with low magnesium content.
This product facilitates nutrient intake in case of low soil temperature, high groundwater, insufficient air in the soil, over irrigation or root deterioration.

The importance of the product
Voligop® Magnesium is a liquid EC foliar fertilizer solution enriched with nitrogen. It can be used as nutrient supply in a number of crops, alone or in combination with other plant protection treatments, after conducting preliminary mixing test.
In arable land and gardening cultures, the application of 1-4 l/ha is recommended in a solution with a concentration of 1-2%, depending on the needs and phonological stage of the specific plant; in a concentration of 0.5-2% and 0.1-0.5% when used as foliar fertilization and nutrient solution, respectively.
Recommended use based on expert advice.

- **Peas and bean:** when the plants are 10-15 cm tall, in case of deficiency repeated every 10-14 days.
- **Potato:** in a concentration of 0.5% – at the beginning of blooming (when flower buds occur), and then after blooming 1-2 times from tuber set to improve the quantity and quality of the yield and to increase starch content.
- **Sugar beet and fodder beet:** at 5-6 leaves stage and 8-12 leaves stage.

- **In fruit orchards:** treatments during bud burst, before blooming and after petal fall, 2-3 times every 10-14 days when the fruits are the size of a hazelnut, in a concentration of 0.3 – 0.5%. Not recommended from August.
- **Cucurbits (melon and cucumber):** in a concentration of 0.5% during fruit set; thereafter 1-2 times every 10-14 days.
- **Cereals:** in a concentration of 0.3% when the plants shoot up, and then repeated at the beginning of spike shading.
- **Brassicas (cabbages):** 1-2 times after head formation in a concentration of 1% to prevent discoloration.
- **Maize:** in a concentration of 0.3% at the beginning of blooming (upon tasseling), and then repeated after 10-14 days.
- **Outdoor ornamental plants, trees, bushes, conifers, tree nurseries (leafy and evergreen):** after blooming, during vegetative growth, in a concentration of 0.4-0.5%. It is especially recommended for soils with insufficient air and in case of over fertilization with N-K.
- **Sunflower:** at 4-8 leaves stage, as needed in star stage, together with other plant protection works.
- **Styrian pumpkin:** during ripening, in a concentration of 0.5-1%, to improve quality and to increase growth.
- **Rape:** from spring to bud stage. Magnesium facilitates the incorporation of potassium.
- **Strawberry:** at the beginning of vegetation and just before blooming, in a concentration of 0.3-0.5%.
- **Soy bean:** when the plants are 10-15 cm tall.
- **Grapevine:** from fruit set (small berry stage) – growing (ripening), in a concentration of 0.5-1.05%, 2-4 times every 10-14 days to prevent peduncle necrosis and to facilitate fruit set and fertilization. It is evenly absorbed from bud burst, during the growing period, and for this reason, a balanced supply should be ensured during the entire growing period. Good magnesium supply has a beneficial effect on bunch yield and sugar production, that is, on wine quality.
- **Vegetables:** 2-3 times during intensive growth in a concentration of 0.3-0.5%.

Irrigation with nutrient solution: magnesium demand in the shoots is above average, and therefore magnesium should be supplemented using a nutrient solution in a concentration of 0.5-1.5% for plants.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Manganese

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Manganese (Mn, sulphate)	4.0	5.0	50
Nitrogen (N), of which	15.0	18.7	187
urea (N)	14.2	17.7	177
ammonium (N)	0.8	1.0	10
Boron (B, borate)	0.03	0.037	0.37
Zinc (Zn, sulphate)	0.03	0.037	0.37
Sulfur trioxide (SO_3)	8.2	10.2	102
Elemental Sulfur (S, sulphate)	3.3	4.1	41
Molybdenum (Mo, molybdate)	0.04	0.050	0.50
Copper (Cu, sulphate)	0.03	0.037	0.37
Iron (Fe, sulphate)	0.05	0.062	0.62
pH (original solution)	4.0 - 4.3		
Density (g/cm^3)	1.250 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: greenish yellow odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Role of components in the life of the plants

Manganese – like iron and magnesium – is an enzyme activator during plant metabolic processes. It is primarily important in protein synthesis, in photosynthesis and citric acid cycle. Its translocation is weak within the plant. The manganese uptake of plants through the soil

is rather uncertain, due to the bonding processes going on in the soil; it is expressly impeded by high pH values. Manganese deficiency can occur on sandy, alkaline, cold, droughty or too humid soils.

Its deficiency appears first on young leaves, in the form of unevenly yellow, drooping leaves. Plants that necessitate much Manganese are sugar beet, cucumber, peas, oat, sorghum, spinach, sunflower, rapeseed, tomato, soy, wheat, apples. Stone fruits (peaches, plums, cherries, sour cherries) need it even more than other types of fruit. On the barks of young trees, damp and later decaying spots appear. In the case of corn, manganese deficiency can result in the significant drop of yield. Deficiency symptoms mostly occur on sandy soils.

Manganese deficiency can be well distinguished from zinc and iron deficiency because in this case, the leaves are smaller and the longitudinal growth and the thickening of the sprouts are stronger. In the case of manganese deficiency, the first symptom is the marbled yellowing of the older leaves along main and side veins, which is followed, as the yellowing of the leaves gets stronger, by reticular interveinal chlorosis with "green veins and green plant". Later on, yellowish white spots are also symptomatic. Fine, interveinal chlorosis greatly resembles with the symptom of beginning iron deficiency, however manganese deficiency does not begin on apical leaves.

Oat reacts spectacularly on manganese deficiency by dry spots and the cracking of spring leaves. Other manganese demanding plants are the sugar beet, pea, spinach, wheat, barley.

Excessive manganese levels can become toxic. Sensitivity towards too much manganese is varying, not only depending on plant species but also within species and is linked to the age of the plant, too. One of the reasons of its occurrence in the case of calcareous plants is the soil with a low pH value and slack water. Barley is especially sensitive of manganese excess, but many other plants can show signs of manganese toxicity in case of over dosage: corn, sunflower, potato, tomato, bean, cabbage, cucumber, lettuce, pear, apple, peach and lemon. By foliar fertilization the possible manganese over dosage through the soil, manganese poisoning and the resulting product lag can be avoided.

The importance of the product

Voligop® Manganese is an EC foliar fertilizer enriched with the most important micronutrients, in the adequate concentration for the plants. It can be used for the nutrient supply of a great number of cultivated plants, together with weed control or other plant protection treatments, with a preliminary mixing test.

In arable land and gardening cultures, and in viticulture the application of 1-5 l/ha is recommended, in accordance with the necessities and phenological stage of the given plant; in a concentration of 0.5-2% in case of leaf fertilization, and 0.1-0.5% in case of fertigation.

Field of application:

- **Pome fruits (and Citrus):** 2-4 times every 10-14 days after petal fall until harvesting. It should be applied before blossoming exclusively in cases of severe deficiency.
- **Potato:** after full germination; to treat the roots before plantation, in order to increase their resistance against pathogens. The resistance of plants against bacterial contaminations can be increased by doses of manganese; e.g., the pathogen causing the incrustation of potato roots can be driven back by adequate manganese administration; against cucumber curving when the first symptoms appear and repeated whenever necessary.
- **Sugar beet:** From the stage with 6-10 leaves until row closure on 1-2 occasions, the presence of manganese is essential for the increase of the vitality of the sugar beet plant, and to improve yield.
- **Stone fruits:** 2-3 times every 10-14 days from fruit setting until the hardening of the stone; repeated after harvesting but before repose.
- **Leguminous plants (beans, peas):** to increase yield and quality in the period of intensive growth and before blooming.
- **Cereals:** In order to increase the strength of the stem. In the autumn from the stage of 3 leaves, in order to increase frost hardiness and stool; in the spring until the appearance of flag leaf in order to stimulate stool and yield.
- **Corn:** At 4-8 leaves stage. Sweet corn is manganese, zinc and molybdenum demanding.
- **Sunflower (oil plants):** At 4-8 leaves stage, or at the star bud stage as the circumstances may require, concomitantly with other plant protection works.
- **Tomato:** In order to increase inflorescence and fruit yield concomitantly with plant protection, on 2-4 occasions.
- **Rapeseed (Brassicaceae):** in the autumn, at 4-6 leaves stage in order to increase frost hardiness, and winter resistance, and later in the stem elongation stage. Must not be used in the stage of inflorescence.
- **Strawberries, berries (currant, raspberry):** from the beginning of inflorescence repeated 1-2 times.
- **Soy (leguminous):** at development stage of 10-15 cm.
- **Grape:** when floral buds appear and later at fruit set. The need of manganese of the grape during its stage of blooming is ten times greater than its need of iron.
- **Flowery ornamental plants and deciduous trees:** once, when fresh leaves appear.
- **Vegetables (leafy and root), Brassicaceae, bulb crops, tomato:** once the foliage needed for intake has formed 1-2 times in order to improve quality and increase hardiness. Further vegetables that are sensitive for manganese deficiency: red beet, green peas, string beans, radish, spinach, lettuce, onions and garlic, cucumbers.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Nitrogen Extra

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Nitrogen (N), of which	18	20.9	209
urea N	16	18.6	186
ammonium N	2.0	2.3	23
Elemental Sulfur (S, sulphate)	2.4	2.8	28
Sulfur trioxide (SO_3)	6.0	7.0	70
Molybdenum (Mo, molybdate)	0.15	0.17	1.7
Boron (B , borate)	0.03	0.035	0.35
pH (original solution)	4.6 - 4.9		
Density (g/cm^3)	1.180 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: colorless and odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Role of components in the life of the plants

Nitrogen plays a very important role in sprout growth, in fruit formation, in the creation of plant proteins. As a DNA and RNA component cannot be replaced with other elements. It spectacularly increases fruit mass. From the point of view of fruit quality, the forms of nitrogen administered in fertilizers are also important.

In the case of nitrogen deficiency, leaves gradually become yellow starting from below and going upwards; the plants lag behind in growth and age prematurely. The change of the colour of leaves – light green, yellowish, and reddish, brown – and their wither-

ing can be observed. Rapeseed is a specifically nitrogen demanding plant, when it lacks nitrogen, its assimilation surface becomes smaller, thus resulting in a lower thousand-seed weight and less oil to extract.

In case of nitrogen surplus vegetative organs become elongated, the frost hardiness and the capability of resistance of the plants against pathogens decrease.

The disposal of nitrogen as basic soil fertilizers is directly proportional to the quantity of spring rainfall. If there is no precipitation and the temperature is high, than as much as two thirds of the nitrogen will evaporate in the air in the form of ammonia gas, without accessibility. On the other hand, if there is much rainfall, the nitrogen dispensed as a soil fertilizer is quickly washed out of the root zone. Therefore, the utilization of foliar fertilizers is recommended.

Following the dispensation of Voligop Nitrogen Extra the absorption of nitrogen is ensured by urea. Urea ($CO(NH_2)_2$) is an amide form that can be directly absorbed through the foliage. Urea absorbed through the foliage turns into nitrate during the process of protein synthesis and thus is ensures a continuous nitrogen supply. By the application of a fertilizer with amide nitrogen content, the nitrate pollution of the environment and the plant can be reduced.

Ammonium nitrogen, (NH_4), but especially nitrate nitrogen (NO_3) are nitrogen soil fertilizers that can be absorbed through the roots.

Urea with low biuret content is recommended to be used as a sprayed foliar fertilizer (Voligop Nitrogen Extra), while granulated urea with a higher biuret content as a soil fertilizer.

Molybdenum plays an essential role in the availability of nitrogen; it is expressly important in case of sunflower, corn, Brassicaceae, tomato, root vegetables, sugar beet, or cereals. In its absence, plants are unable to use the nitrogen already cumulated in their leaves in protein synthesis. In this case the symptoms are similar to those of nitrogen deficiency, as nitrogen, is amassed in the plant without availability. The effects of molybdenum are increased by draughty weather. In case of leguminous plants, molybdenum deficiency produces symptoms that are similar to nitrogen deficiency, because root-nodule bacteria have a high demand of molybdenum.

The importance of the product

Voligop® Nitrogen Extra is a liquid EC fertilizer that contains primary/secondary nutrients enriched with molybdenum, the most important element necessary for nitrogen availability, which can be well absorbed through foliage surface. Thanks to its urea component with low biuret content, the product ensures by delayed decomposition that the plants get the necessary nitrogen. It can be used for the nutrient supply of numerous

cultivated plants, alongside with weed control or other plant protection treatments. For the general foliage fertilization, fertigation of highly nitrogen demanding plants (e.g. the foliar fertilization of Cucurbitaceous, ornamental plants with leaves, cereals from the beginning of a stool alongside with weed control, respectively until florescence alongside with foliage protection.
Its application is recommended in the case of all arable land and gardening cultures. In fruit and viticulture its use is recommended in doses of 3-15 l/ha, in accordance with the necessities and phenological stage of the given plant.

For the foliar and soil fertilization of all arable land and gardening cultures. In case of prolonged sprouting – development, in order to stimulate biochemical and energetic processes.
Field of application:

- **Potato:** It is especially important after germination, when intensive foliage and roots are developed. Excessive N supply is harmful for all the parts of the plant, especially for the quality and the keeping quality of the roots.
- **In orchards** at the time of intensive leaf formation, in order to increase fruit size, but only if necessary. For nutrient supply before autumn defoliation, respectively in order to facilitate the faster decay of the leaves. Recommended dosage: 8-10 liters/ha.
- **In Cereals** from the stage of two nodes. The latest dosing by the end of head flowering, concomitantly with fungicidal treatment. Recommended dosage: 8-15 liters/ha, in 300 liters of water, to a maximum of 20°C air temperature.
- **In corn** from 4–6 leaves stage until tasselling. Recommended dosage: 8-10 liters/ha.
- **In sunflower** from the stage with 5–6 pairs of leaves until star bud stage. Recommended dosage: 4-8 liters/ha.
- **Rapeseed** generally before the beginning of spearing until the flower buds are formed. Recommended dose: 8-10 liters/ha. The latest dosing after florescence, supplemented by 2-3 liters/ha of Voligop Zinc, concomitantly with fungicidal treatment. For fuller pods, and the best possible inner content indicators of the seeds.
- **In grape** at the time of berry growth, and bunch closure. Recommended dose: 3-6 l/ha.
- **In vegetables** during intensive leaf and/or harvest formation. Recommended dose: 8-10 liters/ha.

Precautions and Liability
The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Phosphorus

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Phosphorus (P, phosphate)	4.3	5.0	50
Phosphorus-pentoxide (P_2O_5)	9.8	11.3	113
Potassium (K, hydroxide)	7.3	8.4	84
Potassium-oxide (K_2O)	8.8	10.0	100
Molybdenum (Mo, molybdate)	0.04	0.046	0.46
pH (original solution)	6.1 - 6.3		
Density (g/cm^3)	1.160 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: colorless and odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Importance of the main macronutrient

It is a component of the materials taking part in energy transfer, an indispensable nutrient for functioning of the generative organs. Phosphate is not utilized in reduced, but in oxidized form.

The plants should take up the soluble phosphorus from soil in many forms and will translocate it fast and easily, and therefore symptoms appear on older leaves. It is strongly bond in soil, practically it does not move with water. Roots can take up phosphorus only from small distances; movement of phosphorus in soil is slower than for any other nutrient. Phosphorus applied on the soil may leak, or due to the fixation will remain unusable by the point of view of the plants. Foliar fertilization facilitates phosphorus supply.

Phosphorus uptake demand of plants is rather significant – although not in a uniform manner - in many phenological phases. It is needed at first for germination, root growth, shoot growth; then for flower formation and fruit production (e.g. the maximal phosphorus uptake in rape occurs once during flowering and once during ripening), in grapevine in the period of fruit development. For seedling production, initiation (facilitation of root formation), induction of flowering at potted flowering ornamental plants.

Phosphorus helps growth, vigorous root formation, generative development; it has a positive impact on fruit quality and protein production. It has a role in development of achene size, fullness, oil production, fertilization, dry matter accumulation. Due to its high nutrient content, Voligop Phosphorus provides the phosphorus necessary for the energy demand of autumn cabbage rape during the intensive growing and flowering period, ensuring thus the increase of crop yield through long flowering period, extended fruit bonding and increase of the number of kids.

Overdose does not produce serious symptoms in a direct manner, it does not increase salt level in soil, therefore, in justified cases is applicable even in high doses at one time. Phosphorus overdose in soil inhibits zinc uptake.

Molybdenum is necessary for the functioning of nitrogen-fixing bacteria. Its lack is associated in legumes with symptoms characteristic to nitrogen deficiency, in the background of which a significant molybdenum demand of the nodule bacteria is staying.

The importance of the product

Voligop® Phosphorus is a liquid EC fertilizer enriched with potassium and molybdenum, which are important for plants. Used as nutrient supply of several crops, applied as sole or simultaneously with other plant-protecting treatments, after a preliminary mixing test.

Harmonic plant nutrition depends on the selection of the proper fertilizer form.

Application of 2-4 l/ha is recommended for phosphorus supply, according to the particular needs of the plants and their phenological phase; for foliar feeding concentrations of 0.5-2%, for fertigation concentrations of 0.1-0.5% are recommended.

Field of application

- **Pome trees:** from full flowering until the beginning of fruit growth.
- **Potato (seed and table):** one-three times from 4-6 leaves stage to flowering, for enhancement of rooting and then helping the tubers to keep better. Phosphorus has an outstanding role in seed tuber production, it speeds up ripening and it

increases the biological value of seed tubers. It boosts the autonomous defence mechanism of the plant and its resistance towards fungal infections.

- **In stone fruits** from petal falling to harvest.
- **Sugar beet:** until 4-6 leaves stage, one time, applied as sole! For protection against draught stress, for quality improvement.
- **Turf, lawn:** in the autumn, after sprouting, before intensive growth begins, to enhance rooting.
- **Root vegetables (beet, parsley, beetroot, radish, celery):** after development of foliage, to increase root yield.
- **Onions, autumn and spring garlic:** after sprouting, before intensive growth begins. Nutrient demand of autumn garlic is the highest in May; while nutrient demand of spring garlic is the highest in June; repeated treatments every two weeks.
- **Cucurbits (watermelon, melon, spaghetti squash, marrow and oil pumpkin, cucumber, zucchini):** at least 2 times after planting the seedlings outdoor until flowering; to enhance rooting and to boost immune activity of plants, to help seed and fruit production.
- **Brassicas (cabbage, cauliflower, Chinese cabbage, broccoli):** after outdoor planting, to initiate development, to facilitate strong root formation.
- **In corn** from 3-5 leaves stage.
- **Sunflower (mustard, oil flax, and oilseed radish, poppy):** from 3-6 leaves leaf pair stage; it is indispensable in case of unfavourable weather conditions and /or genetically determined slow development.
- **Autumn-eared cereals:** in case of slow initial development in the autumn and /or early spring at the first possible intervention.
- **Paprika (green/red pepper and paprika), tomato, eggplant:** after planting seedlings outdoor for speeding up development, for protection against unfavourable effects cold, strong irradiation, draught. To prevent elongation of seedlings grown further by necessity, to facilitate rooting. Phosphorus uptake is dynamical in young plants, in the first 40-50 days. Phosphorus uptake demand increases during flowering in mass, fruit set and seed formation.
- **Rape:** in case of stunted initial development in the autumn and/or in early spring at the first possible intervention, it ensures development of viable root system.
- **Soy:** Phosphorus demand per unit of product is high, its uptake is intensive and continuous from pod set to bean filling.
- **Grapevine:** after flowering, 2-3 times until harvest.
- **Green pea:** phosphorus-demanding plant, it has to be treated during intensive growth, before flowering.

Precautions and Liability

Mix Voligop Phosphorus and Voligop Copper cannot!

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Potassium

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Potassium (K, hydroxide)	8.2	9.5	95
Potassium oxide (K_2O)	9.9	11.5	115
Phosphor (P, phosphate)	3.6	4.1	41
Phosphor pentoxide (P_2O_5)	8.2	9.5	95
Molybdenum (Mo, molybdate)	0.04	0.046	0.46
pH (original solution)	7.4 - 7.6		
Density (g/cm^3)	1.160 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: colorless and odorless solution – ***sodium and chlorine free*** – premium fertilizer.

The importance of the main primary nutrient

Potassium plays a determining role in water balance and the action of enzymes, especially in the growth period. It helps N intake, and thus protein synthesis, but it is not a building block of cells.

Good potassium supply increases the resistance of plants to drought and high turgidity facilitates plant growth. Young parts are rich in potassium, while ageing parts accumulate calcium.

Potassium, manganese and iron have a synergic effect. Potassium deficiency leads to poor blooming, decreased tissue strength and reduced resistance of the plants to frost, pathogens and pests.

Poor potassium supply impedes cell elongation, and thus the fruits will be smaller.

Voligop Potassium and Voligop Magnesium are liquid fertilizers ideal for intensive garden cultures that can be combined as required.

Sugar beets and potatoes have the highest potassium demand per hectare.
The symptoms of potassium deficiency occur first on older leaves that curl back, and necrotic whitish-brown spots appear on the edge of the leaves.
An excess of potassium leads to a decrease in Ca and Mg intake, and increase the salt concentration of the soil and metabolic disorders can occur.
Vegetables with high potassium intake usually have high magnesium demand, as well.
Molybdenum is a very valuable component of the product, the intake of which is facilitated by phosphate ions.
In case of molybdenum deficiency, young potato leaves are pale green, and then become brown and their edges curl up and shrivel. Fewer flowers will form and become brown and die. In case of cauliflowers, rose distortion can frequently occur and, if the head is formed at all, it will be loose and brown. Ageing leaves of carrots get brown and shrivel, while the plants remain small. In case of molybdenum deficiency, ageing cucumber and tomato leaves show light areas between veins, their edges curl up, and finally die. Scorching can occur at the edge of the celery leaves.

The importance of the product

Voligop® Potassium is a liquid chlorine-free EC foliar fertilizer solution enriched with phosphor and molybdenum. The composition of this product is completed by phosphor and molybdenum. It can be used as nutrient supply in a number of crops, alone or in combination with other plant protection treatments, after conducting preliminary mixing test. The product should be administered 2-4 times during vegetation, usually from the start of blooming to ripening. It is usually recommended to use this product in a concentration of 0.5 to 2-4% when used as foliar fertilizer and in a concentration of 0.1-0.5% and when used as nutrient solution, respectively, based on expert advice. In combination with Voligop Nitrogen Extra, it has usually an extraordinarily beneficial effect on plants.
Recommended use based on expert advice.

- **Pome fruits:** the product should be applied when the apples are the size of a green nut until coloration occurs to improve fruit coloration and quality. The carbon-nitrogen ratio at the end of the growing period is important in terms of resistance to frost during winter. This product contains no nitrogen, so it can be safely used from this point of view, as well.
- **Potato:** 2-3 times during tuber and potato ripening. In addition to strengthening the foliage, good potassium supply improves the quality, dry substance content and shelf-life of the product.

- **Peas:** 1-2 times before and after blooming, during pod formation.
- **Sugar beet:** 2-3 times 75-100 days after germination to facilitate sugar production before the end of the row closure.
- **Stone fruits:** after harvest, but before leaf fall, it improves fruit set next year. Potassium filling has a positive effect on the acid content and the flavors of fruits.
- **Ornamental plants:** in a concentration of 0.5% each time.
- **Onion:** at least 2-3 times beginning with head formation. The largest quantity of potassium is required during head formation to maximize yield and quality, dry substance content and sugar accumulation.
- **Nuts (walnuts, hazelnuts, almonds, chestnuts):** in July during ripening to increase the size of the shell and fruit.
- **Industrial tomato growing:** from planting, concomitantly with plant protection works; potassium intake continuously increases until the tomatoes are ripe. The administration of the product is particularly important before blooming and after fruit set and during coloration in order to attain uniform ripening and dry substance content concentration characteristic to a specific species of tomato. This product contains no nitrogen, so it can be safely used during this period; it contains easily absorbable potassium.
- **Cucurbits:** 2-3 times during the formation of cucurbits in a gradually increasing concentration from 0.5 to >>1%.
- **Cereals:** during fall, when the plants are 5-8 cm tall (with 3-4 leaves) to improve resistance to drought and frost during winter, to facilitate differentiation of bush nodes and to homogenize the crop; to preserve root mass and surface, concomitantly with other plant protection treatments during spring, especially during drought periods.
- **Brassicas (cabbages):** 1 time before and after head formation starts.
- **Garden lawn:** in case of long, dry and cold fall, when the grass is 5-10 cm tall to increase resistance to frost during winter; anytime during vegetation to increase resistance to drought. The product should be sprayed after cutting the grass, during evening hours.
- **Maize:** when the plants have 3-5 leaves to improve earliness and resistance to drought. Anytime during vegetation, in combination with any other treatment, especially during drought periods.
- **Sunflower (oil plants):** in rosette, together with insecticides, to prevent difficulties related to slow development, and concomitantly with fungicides before blooming.
- **Rape:** very important for developing good resistance to winter weather. Potassium intake constantly increases until blooming and last during the formation of the silique.

- **Strawberry:** 3-4 times during ripening, concomitantly with other plant protection treatments.
- **Soy:** before blooming, together with weed control for perennial monocotyledonous plants to increase resistance to drought. It has high potassium demand: maximum potassium intake is during vegetation, and then gradually decreases.
- **Grapevine:** 2-3 times from blooming, between fruit set and growing to improve fruit quality and sugar concentration. It has a beneficial effect on shoot ripening, flower formation and water balance of the plants.
- **Green peas:** a plant with high potassium intake, to be treated before blooming.
- **Vegetables:** in a concentration of 0.5-1% during the initial phase of growth, and maximum 4% thereafter.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Sulfur Cereals

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Elementary sulfur (S, sulfate)	5.0	6.6	66
Sulfur trioxide (SO_3)	12.5	16.5	165
Nitrogen (N), of which	15.0	19.8	198
urea (N)	15.0	19.8	198
Magnesium (Mg, sulfate)	3.7	4.9	49
Magnesium oxide (MgO)	6.1	8.0	80
pH (original solution)	4.9 - 5.2		
Density (g/cm^3)	1.330 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.
Appearance: colorless and odorless solution – ***sodium and chlorine free –*** premium fertilizer.

The importance of the main secondary nutrient and micro-nutrient
Sulfur is a building block of plant proteins; in addition to sulfur-containing amino acids, it is also a component of some vitamins, peptides, lipids and plant oils. It plays an essential role in unimpeded growth.
Sulfur demand of plants varies: in crops is one-tenth of the nitrogen demand, but oleaginous plants need a significant amount of sulfur.
Sandy soils with less than 2% organic substances have low sulfur content.
In plants sulfur is practically not translocated basipetally; young leaves show grayish-yellow symptoms and their growth slows down. In maize, chlorotic strips appear between the veins; in the case of maize and tobacco plants, the entire plant becomes yellow, and chlorotic spots appear on soy and potato leaves.

Sulfur and nitrogen have similar metabolism; high nitrogen supply leads to increased sulfur demand of the plant.

If used in the proper amount in cereals, sulfur improves baking indicators and the quality parameters of cereals, leguminous and oleaginous plants. Sulfur deficiency symptoms in cereals first occur in areas with loose soil in the form of discolored spots of irregular shape, reminding of nitrogen deficiency. Thereafter, symptoms indicative of damages caused by drought occur, and fungal infections may also occur as a result of reduced resistance. Young leaves become yellow, the number of shoots and the number of seeds per spike decreases. In cereals, sulfur may be supplemented only partially after the two-node stage.

The dough made from flour from sulfur-deficient wheat has reduced extensibility, losses its flexibility and becomes hard; in addition to a decrease in the baking indicators, sulfur-deficiency also leads to reduced bread volume.

The importance of the product

Voligop® Sulfur Cereals is a liquid EC foliar fertilizer solution enriched with nitrogen and magnesium (very important for the plants) in an efficient ratio. It can be used as nutrient supply in a number of crops, alone or in combination with other plant protection treatments. It has a beneficial effect on the resistance of the crops to drought.

In arable land and gardening cultures, the application of 3-5 l/ha is recommended depending on the needs and phonological stage of the specific plant; in a concentration of 0.5-2% and 0.1-0.5% when used as foliar fertilization and nutrient solution, respectively.

Recommended use based on expert advice.

In cereals: sulfur deficiency is a visible symptom that occurs at the end of tillering, when the stem starts to grow. It may be confounded with N-deficiency and it can get worse if N is applied; sulfur deficiency will further deteriorate as a result of atmospheric drought. Sulfur must be applied from the start of stem elongation to the formation of the first node, after the first precipitation. It can be used to improve quality during the entire lactic ripening period of the seeds, or from the start of the development of the flag leaf until the end of the entire ripening period of the seeds, together with other plant protection works, as frequently as required depending on the sulfur demand of the plants. In case the treatment is omitted, maximum yield is not possible to reach. After the two-node stage, full sulfur deficiency can be only partially mitigated.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Sulfur Extra

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Elementary sulfur (S, sulfate)	7.2	9.5	95
Sulfur trioxide (SO_3)	18.0	23.7	237
Magnesium (Mg, sulfate)	3.1	4.0	40
Magnesium oxide (MgO)	5.1	6.7	67
pH (original solution)	6.9 - 7.2		
Density (g/cm^3)	1.240 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: transparent odorless solution – ***sodium and chlorine free*** – premium fertilizer.

The importance of the main secondary nutrient and micro-nutrient

After N-P-K, sulfur is the 4th most common key component in plant tissues, a building block of proteins that is present in some essential amino acids and vitamins.

As a component of proteins, it plays a direct role in ensuring unhindered growth and is an essential nutrient.

It increases root growth and thus the resistance to frost of healthy plants. The effect of the sulfur cannot be replaced by any other nutrient.

In the right amount, it increases green mass, stimulates vegetative plant growth, facilitates chlorophyll formation and improves the digestibility and palatability. In case of sulfur deficiency, the growth of plants slows down, and they become rigid and get a chlorotic hue (yellow-green) in color. This deficiency leads to reduced yield and poor quality.

Sulfur deficiency occurs on acidic, sandy and poorly ventilated compacted soils.
The sulfur intake of sunflowers is significant and constitutes approx. 2/3 of the phosphor intake during growing period. Sulfur deficiency inhibits protein and oil synthesis. Sunflower species with high oleic acid concentration have increased sulfur demand.
Cruciferous plants have very high sulfur demand, nearly double of the sulfur intake of cereals. Sulfur deficiency leads to a reduction in the number of silique of canola and the number of seeds per silique. A typical symptom of sulfur deficiency in rape is "white flowers"; at first, young leaves remain small and lose their color; when they start to shoot up, the leaves get a marbled hue; blooming takes longer and ripening is delayed, and the number and size of siliques decreases.
Magnesium is a structural component of chlorophyll and plays a determining role in photosynthesis, and is carried to the top of the plants. Magnesium deficiency occurs first in older leaves; deteriorated leaves fall off early.

The importance of the product
Voligop® Sulfur Extra is a real liquid EC foliar fertilizer solution enriched with magnesium that is very important for the plants. It can be used as nutrient supply in a number of crops, alone or in combination with other plant protection treatments.
Recommended use based on expert advice.

- **Potato:** one week after full germination, and then during tuber formation. If deficiency symptoms occur, it should be repeated after 10-14 days.
- **Protein-containing plants (soy and peas):** before blooming to increase protein content. If deficiency symptoms occur, it should be repeated after 10-14 days.
- **Fruits:** sulfur is a component of vitamins and proteins, while magnesium is a component of chlorophyll. Recommended use: at mouse-ear stage and green bud stage, repeated as required, in combination with boron, 2-3 times every 10-14 days after petal fall, in a concentration of 0.3-0.5%. From August the use of sulfur is not recommended.
- **Onions:** when the plants are 15 cm tall. If deficiency symptoms occur, the treatment should be repeated after 10-14 days. It stimulates plant growth and should be dosed depending on the desired pungency of the onion. Sulfur intake reaches maximum levels mostly during the late stages of the growing period when the head forms. The sulfur helps the plants better use nitrogen. Sulfur-rich plants are more resistant to pathogens and pests. Furthermore, sulfur seems to be related to the strength and color of the tunic and helps to develop characteristic flavors.
- **Brassicas (cabbages):** at 4-6 leaves stage.

- **Oilplants (sunflower:** especially for HO-species – **fodder radish, oil poppy, styrian pumpkin, seed flex)** at 4-6 leaves stage, before blooming to increase oil content, and to improve photosynthesis and fatty acid synthesis. It is recommended to be used in combination with boron foliar fertilizer – Voligop Boron or Boron Extra.
- **Rape:** to improve sulfur supply of the plants and to prevent sulfur deficiency at 4-6 leaves stage, during early spring, and then before the blooming of the first levels to increase the protein content of the seeds and to improve resistance to fungal infections. During blooming, the rape should not be sprayed. The product contains no manganese, but it contains oxidized sulfur (SO_3), in a form that can be immediately absorbed and used. Oilplants cannot use nitrogen without sulfur.
- **Carrot and turnip:** when the plants are 15 cm tall. If deficiency symptoms occur, the treatment should be repeated after 10-14 days.
- **Soy bean:** from pod formation until seed formation starts.

To be used in a concentration of 0.5-2% and 0.1-0.5% usually when used as foliar fertilizer and nutrient solution, respectively.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Super

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Nitrogen (N), of which	15.0	17.3	173
urea (N)	13.0	15.0	150
ammonium (N)	2.0	2.3	23
Boron (B, borate)	0.03	0.034	0.34
Zinc (Zn, sulphate)	0.03	0.034	0.34
Sulfur trioxide (SO_3)	6.0	6.8	68
Elemental Sulfur (S, sulphate)	2.4	2.7	27
Manganese (Mn, sulphate)	0.15	0.17	1.7
Molybdenum (Mo, molybdate)	0.04	0.045	0.45
Copper (Cu, sulphate)	0.03	0.034	0.34
Iron (Fe, sulphate)	0.05	0.057	0.57
pH (original solution)	4.0 - 4.3		
Density (g/cm^3)	1.150 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: green odorless solution – ***sodium and chlorine free*** – premium fertilizer.

The importance of the main primary, secondary and micronutrients

The product is suitable to supplement the shortfall of the most important micronutrients (iron, manganese, zinc, copper, boron, molybdenum), and to reduce nitrogen, sulfur deficiency. Ensures a rapid absorption by the foliage as well as a durative effect due to its outstanding properties.

The role of essential microelements is determinant.

- **Boron:** plays a basic role in the formation of flowers and pollen, fruit, hormones, lignin, the development of the meristem, and of conducting tissues.
- **Zinc:** as an enzyme activator, it has a decisive role in plant growth, the formation of carbohydrates and chlorophyll, in protein synthesis, and carbohydrate breakdown.
- **Sulfur:** as the building element of plant protein, it boosts the growth of roots, of the plant, and by this, the frost hardiness of the healthy plant.
- **Manganese:** enzyme activator, it increases the resistance of plants against bacterial infections; e.g. the pathogen causing the incrustation of potato roots can be driven back by adequate manganese administration; against cucumber curving when the first symptoms appear and repeated whenever necessary; on stone fruits, 2-3 times until the hardening of the stone.
- **Molybdenum:** plays an extremely important role in nitrogen availability, in protein metabolism. If absent, nitrogen will accumulate without accessibility. In case of its absence, yellow, oval spots appear on the leaves of Citrus among the veins, leaves turn golden and a brown, sticky matter separates out on their reverse side. Necrosis appears in the chlorotic spots, the edge of the leaves curls up, and leaves finally fall off. Fruits become sagged in case of molybdenum deficiency. Lemon trees grafted on grapefruit are generally more sensitive. In its absence, the leaves of fruit trees are generally characterized by chlorosis in irregular spots, and necrosis on the edges and the tip of the leaves. The edge and the tip of the rose leaves have symptoms of scorch. Smaller leaves turn yellow, young shoots die. Chlorosis, withering, distortion can be observed among the veins of the poinsettia; vein patterns resembling the shape of a pine-tree shows molybdenum deficiency on young leaves.
- **Nitrogen:** protein generator; it also helps the development of generative organs, but mostly the growth of vegetative organs.
- **Copper:** it plays an outstanding role in strengthening cell walls, in lignin formation, in developing resistance against pathogens and drought. Its absence causes white and empty spikes, the generation of pollen and fertilization decreases.
- **Iron:** electron transporting agent, the catalyst of chlorophyll synthesis, an indispensable element of metabolism, photosynthesis, and breathing.

The importance of the product

It can be used in all arable land and gardening cultures in order to fulfil the necessities of primary nutrients (nitrogen, potassium) and micro-nutrients (magnesium, sulfur, iron, manganese, zinc, copper, boron, molybdenum) of plants, according to expert advice, or if that is not available, generally in a concentration of 0.5-1.3%. It can be applied as a

regular treatment for the intensive development of any culture, or when they are weakened by stress.

Field of application

All agricultural and horticultural field crops; vegetables in open fields and greenhouses; fruit crops; viticulture. Can be applied by spraying and sprinkling equipment as well as with drip irrigation and fertigation systems; particularly suited for foliar application.

- **In evergreens** (including container ones) during growth, repeating every 10-14 days in case of watering, or every 2-3 weeks in case of foliar fertilization, in a concentration of 0.1%. Especially in the case of loose soils, spraying is a better option, as like this there is no danger for the nutrient to be washed out. Leaf fertilization is also better in case of heat, because when the soil gets warmer than 28°C, the roots of plants can only take water, not the nutrients. Outside temperature must not exceed 25°C at the time of spreading of product. The favourable period for foliar fertilization is in the late afternoon, or in the early morning, from April to September.
- **On arable land,** the product should be dispensed on 2-4 occasions during the growth season, respecting the allowed maximum dosage and concentration.
- **In floricultures (one summer and perennial)** – considering plant sensitivity – the recommended maximum concentration is 0.7%. Should repeat the treatments every 8-10 days in case of irrigation, or every 10-14 days in case of foliar fertilization.
- **In vegetables,** should start treatments 2-3 weeks after set out, with a 0.5% concentration spray, repeating it every 10-14 days with a concentration of 1.3% at most. The number of treatments – alike to floricultures – can change depending on the length of the growth season.

Recommended use in home gardens: to supplement the nutrients of indoor, potted and balcony and container ornamental plants in a concentration of 10 ml/l of water (0.1 l/10 l water). In the period of growth once a week, and once every three weeks in the winter. In case of freshly planted or replanted plants, it is recommended that spraying start on the following week after planting or watering on the third week after planting. For garden plants, 0.1 litre of fertilizer/10 liters of water/ distributed evenly on a surface of 100 sqm. In flower gardens, a maximum of 0.07 litre of fertilizer/10 liters of water/ on 100 sqm (usually a flask of 0.25 liters of fertilizer/30 liters of water /distributed evenly on a surface of 300 sqm). Until the period of flowering, the plant needs a more significant supply of nutrients, as compared to the period during flowering or after that. Mixed fertilizer solution should be dispensed immediately after preparation, early in the morning, in the time of the day without direct sunlight.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products.

We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters.

Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.

VOLIGOP®

Zinc

EC FERTILIZER

Nutrient content	m/m %	m/v %	g/l
Zinc (Zn, sulphate)	4.0	5.0	50
Nitrogen (N), from which	15.0	18.7	187
urea (N)	14.8	18.45	184.5
ammonium (N)	0.2	0.25	2.5
Boron (B, borate)	0.03	0.037	0.37
Sulfur-trioxide (SO_3)	5.7	7.1	71
Elemental sulfur (S, sulphate)	2.3	2.9	29
Manganese (Mn, sulphate)	0.15	0.187	1.87
Molybdenum (Mo, molybdate)	0.04	0.05	0.5
Copper (Cu, sulphate)	0.03	0.037	0.37
Iron (Fe, sulphate)	0.05	0.062	0.62
pH (original solution)	4.0 - 4.3		
Density (g/cm^3)	1.250 ± 0.005		

Maximum deviation in active substance content is in accordance with regulation 2003/2003 EC.

Appearance: green odorless solution – ***sodium and chlorine free*** – premium fertilizer.

Role of constituting nutrients in plant life

Zinc is an essential micronutrient for plants, a determinant enzyme activator and constituent of enzymes, playing an important role in cell division, protein

synthesis and production of auxin. Beside damage of the vegetative organs, in case of advanced deficiency a damage of generative organs is easy to spot.

In soil, generally, it is present but cannot be uptake by plants; its uptake is not possible from soil overdosed in phosphorus and/or calcium. It has a low mobility in soil, this increasing with pH decrease. Usually, zinc concentration in soil is low, strongly lime-treated (high pH) and/or phosphate-fertilized soils are often zinc-deficient; an antagonistic effect between zinc and calcium can be noted. Zinc deficiency occur in sandy, alkali, cold, excessively dry or humid soils. A zinc deficiency it is sure in calcareous soils, due to the antagonistic effect of phosphorus excess.

Zinc transport in plants - from older leaves towards younger leaves - depends on zinc supply of the soil; therefore, deficiency symptoms appear at first on the intermediate levels.

In case of zinc deficiency, frost resistance of plant decreases due to inhibited carbohydrate metabolism. Zinc deficiency is the most common micronutrient deficiency, which can lead to crop losses up 20% before noticing any other deficiency symptoms.

Corn, flax, bean, sugar beet, potato, tomato, alfalfa respond to lack of zinc by significant or medium crop losses.

By applying it for rape, should significantly increase the root mass; roots will penetrate deeper, thus rape resists better to dry periods.

Zinc is a regulator for fruit trees (stone fruits, pomes), regulating harvest, and its lack results in branch necrosis, poor flowering and bad crops. Zinc is also a major nutrient for seed formation in table and wine grapevines (together with boron), it has an impact on more intensive photosynthesis and on the increase of crop amount.

Apart from some vegetables (garlic), most of the plants have a zinc demand higher than the average. By foliar fertilization that can be largely fulfilled. In zinc-deficient production areas, correctly performed foliar fertilization can result in improvement of up to 30% of value-measuring properties of the cultivated plant.

Zinc deficiency cause mosaic-like chlorosis at the veins of older leaves, followed by entire whitening. Because of the deficiency, chlorotic stripes appear on both sides beside the central vein of the corn leaves; thus starting from the base of the leaf until its peak, in the meantime, the central vein of the leaf, the peak of the leaf and its margins remain green. In case of long-term deficiency, leaves turn to greyish bronze colour, and then necrosis takes place. “Bud whitening” of young corn leaves covers an almost entire whitening of the leaves.

In case of critical zinc deficiency beside damage of vegetative organs generative organs are damaged as well, perturbation of flower and fruit formation can be noticed which could even lead to drastic crop losses.
Molybdenum is an essential micronutrient for plants. Molybdenum is indispensable for bacteria bonding nitrogen from air, blue algae, etc. Lack of molybdenum causes deficiency diseases in some higher plants. The molybdenum is an electron transfer agent and an activator of many enzymes. The sulphate ions inhibit, in contrary the phosphate ions presents in soil promote his uptake. Is not transposable within the plant, Mo uptake is impeded in acid soils, and therefore the importance of Mo-containing foliar fertilizers is increasing.
In vegetative organs of plants, (corn) concentration of some elements is higher than in the generative part. In case of application of the molybdenum-containing Voligop foliar fertilizers molybdenosis, which is harmful from the point of view of forage, should be avoid.
Molybdenum is a very mobile nutrient in the soil-plant system. On calcareous soils, plants can take up even extra doses of molybdenum.

The importance of the product
Voligop® Zinc is an EC foliar fertilizer in the form of a liquid real solution, enriched with micronutrients that are most important for plants. Recommended for nutrient supply of many plants, simultaneously with herbicides or other plant-protecting treatments, by performing preliminary mixing tests.
The recommended dose for field and horticultural crops, fruit and grape production is 1-5 l/ha, according to the particular needs of the plants and their phonological phase, following the local expert's advice.
General recommendation: for foliar fertilization in concentrations of 0.5-2%, for fertigation in concentrations of 0.1-0.5%.

Field of application

- **Pome trees** at bud break, then treatment repeated one-two times every 14-21 days after flowering, finishing one month before harvesting. Formation of primary leaves and their supply with nutrients is very important for fruit size and quality at harvest. Applied early in the spring it moderates the unfavourable effect of cold. Then, after harvest, but before shedding of leaves, on the still green, active leaves starting from October, to fill up the

trees with zinc before winter. We do not recommend for plum. Sprayed during the autumn, it boosts winter hardiness of sticks.

- **Berries:** post-harvest, but before shedding of leaves for foliage preservation (in the framework of preparation for winter).
- **Peas, beans:** from 4-6 leaf stage to flowering, during pod formation for enhancing pod and bean formation.
- **In potato** at one week after full sprouting and appearance of first leaves, until row closure.
- **In sugar beet** during leaf closure; after lime treatment in the following year 2-3 times, as required, starting from row closure, to stop the zinc deficiency produced.
- **Stone fruits (cherry, sour cherry, plum):** after flowering, in the period of intensive growth; post-harvest, but in the state of still active foliage, for combatting zinc deficiency. After big crops, zinc supplementation is indispensable for seed formation in the following year.
- **Stone fruits (peach and apricot):** before flowering! (It can be assimilated through breathing, mist-free books as well) for the development of young parts and then during intensive growth; post-harvest, but before shedding of leaves.
- **Onions:** helps rooting, it prevents garlic leaves from cracking.
- **Nuts (walnut, hazelnut, almond, and chestnut):** from sprouting, as required, as a combination partner for enhancement of fruit bud differentiation.
- **Grasses (lawn)** from the stage of two real leaves, every 14 days, at a concentration of 1%.
- **Legumes (soy, peas, and beans)** from four leaves stage to flowering one time, for enhancement of the pod and bean production.
- **In eared cereals** in the autumn, from 3-4 leaf stage until the appearance of a flag leaf, enhancing of rooting and increase of resistance towards stress (simultaneously with herbicide treatment).
- **In corn (sweet, field and hybrid types)** simultaneously with herbicide treatment, at 5-8 leaf stage, or at 10-leaf stage. In the absence of a tractor with boom height adjustment, upon tasselling until beginning of flowering (to facilitate corn ear differentiation, to increase the number of grain lines and the number of the grains in the lines, to improve the condition of young ears, to improve bonding, especially for hybrid corn. Efficiency of nitrogen utilization improves in corn after zinc fertilization. The sugar component of the product is necessary for

formation of corn germs, thus influencing the starch content of the grains. Chernozem soil zinc-deficient, excessive phosphorus supply can impede zinc uptake in plants due to phosphorus-zinc antagonism. Sweet corn is particularly sensitive to micronutrient deficiency, foliar with zinc, manganese and molybdenum is must.

- **Outdoor ornamental plants, ornamental trees and bushes, trees, bushes, conifers:** after sprouting, at concentrations of 0.4-0.5 % for facilitation of shoot growth and differentiation of young plant parts, mandatorily in zinc-deficient areas.
- **Green/red pepper, paprika and tomato:** from the beginning of flowering, systematically in critical weather conditions, every 7-10 days.
- **Leguminous plants and roughages:** at the green bud stage for boron and molybdenum supply, by adding Voligop Sugar as required.
- **In rape** at 2-6 leaves stage, then after flowering during seed formation for improvement of crop safety and crop quality.
- **In soy** at a development, stage of 10-15 cm height of 4-6 leaf stage, simultaneously with other plant-protecting treatments.
- **In grapevine** between bud break and flowering and during bonding, for differentiation of young plant parts. During flowering, the proper zinc supply, zinc demand of grapevine can be ten or twenty times higher than its iron demand.
- **Vegetables (outdoor and greenhouse)** starting from outdoor planting, simultaneously with plant-protecting works for the enhancement of flower formation and fertilization.

Precautions and Liability

The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products. The product should be mix with most of herbicides and crop enhancing products, but in every case, we strongly recommend a mixing test before dispensing it together with other foliar fertilizers or plant protection products. We recommend reading carefully and following the instructions for use. The data and the procedures listed in the product description has the aim exclusively for consultation purposes. A series of factors that cannot be under the control

of manufacturer such as weather conditions, storage and conditions of use should influence the efficiency of the product, and, therefore, the manufacturer is not responsible for any damages resulting from such circumstances.

Should be avoid dripping, leakage or accidental swallowing of the concentrated product. Thorough hand washing is required after finishing work. It must do not discard the product, its unused residues or packaging into rivers or still waters. Avoid when storing the product, temperatures below 5°C and above 20°C as well as frequent temperature fluctuations. Keep the product in the original container until application. Shelf life: 2 years in original, unopened packing in a dry, cool, and frost-free guaranteed storage room.