Variplast Kft.

TERMÉSZETES TÁPANYAGOK

BioPlasma
BioNitroPhos

ÖKOGAZDÁLKODÁSHOZ AJÁNLOTT · BIOKULTÚRA

INTRODUCTION OF THE COMPANY AND ITS PRODUCTS

Variplast Industrial Trade and Services Ltd. was founded in 1991.
In the beginning, within the frameworks of researches and developments in chemical industry, its activity consisted of resolving problems related to the utilization of waste. In this scope of activity, we achieved results of great importance in the reutilization of rubber and leather wastes.

Our services comprise mainly investigations of water and waste water, giving a solution to problems established by these investigations and technical advice. At the present time, in compliance with current challenges of life, our most important considered profile that may be deemed as the principal one at same time, is our bioproducts, which can be applied with excellent results in agriculture and in all fields of cultivation, furthermore designing, developing and manufacturing of the necessary productive equipments.

We achieve significant results in this field. One of our products is Bioplasma: a natural fertilizer prepared of algae that are nutritious for plants, and stimulates their development, and the productive equipment of this product, furthermore, a microbiological preparation called BioNitroPhos, which increases soil fertility.
Both products can be applied with excellent results either in traditional or in biocultivation.

Tablets and capsules utilising the physiological effects of algae, garlic and gelatin and conditioning human and animal organisms, are classed among our very important products. Besides domestic marketing, we also export these products and equipments. We have set up three Bioplasma productive enterprises in Hungary and two in Sweden. But such plants are operating also in Spain and Australia.
We export basic material necessary for the manufacturing of Bioplasma from Hungary to other plants of Europe.

Our products hold the trademark of Bioculture Association and the trademark of KRAV in Sweden. The production in Hungary is inspected by Biokontroll Hungária Kht.

It is known that the emmission related to the spreading of intensive agricultural practices, traffic and extensive increase of industrial production has caused adverse changes in our environment and plant cultivation.

This change can be measured as an unfavourable change in the chemical composition and microelement content of soil, surface waters, flora, fauna and even of foods. It is characterized by an accumulation of toxic microelements and a decrease in concentration of essential microelements.

Its consequence is an adverse physiological effect and promotion of disease development in humans and animals at the end of the food chain.

That is why nowadays agriculture undergoes a change throughout the world. The most important task is the formation of a social conception, which prohibits the destruction of wildlife. In agriculture, this may be realized by establishing new, up-to-date cultivation methods and by applying environment-friendly nutrients. Forward-thinking people, having recognized their responsibility, are looking for new ways and methods for recovery and rehabilitation, in order to form our present and joint future with Earth conscientiously.

Application of Bioplasma and BioNitroPhos encourages the realization of these purposes in the scope of plant cultivation.

Applying bionutrients in ecological farming is a future determining tool, and applied environment protection at the same time.

According to the expectations of the European Union, in our own interest we have to stop pollution of the soil and environment in the course of plant cultivation, by means of manufacturing products without any harmful effects on living organisms, and which do not contain any toxic material.

NEW WAYS IN THE ENVIRONMENT-FRIENDLY PLANT CULTIVATION

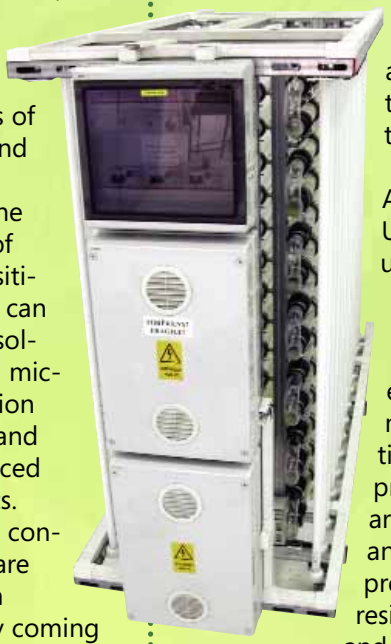
BIOPLASMA

Bioplasma is a bionutrient of complex effects developed for agricultural plant cultivation. With starting its production, we have made available a natural substance for agriculturists, which serves and stimulates the development and growth of plants in a higher degree compared with previous results.
Bioplasma is produced by the propagation of algae on a nutrient mixture of special composition with a so-called photobio-fermentation method. As the number of algae increases, more and more nutrients undergo a transformation into a substance of a favourable chemical structure for plants. Plant nutrients produced in this way contain algae in an immediately absorbable and incorporatable form and in an optimal ratio at the same time, and all elements and substances stimulating the development of plants, macro-, meso- and microelements, furthermore vitamins and amino-acids, which are needed for the development of plants. Therefore, Bioplasma can be applied in all kinds of plant culture, both in conventional and biocultivation.
Bioplasma has a complex effect on the joint system of soil and plants. One of the reasons thereof lies in its composition. Through their root system plants can easily absorb the macroelements dissolved in Bioplasma and the meso- and microelements of an optimal concentration range, which facilitate physiological and biochemical processes and the balanced development of plants. Nutrients in alga cells contained by Bioplasma are present in a very high concentration, and by coming into contact with plants of low nutritient concentration, nutrients flow into the plant cells by the effect of diffusion (difference in concentrations).
Cultivation investigations with Bioplasma conducted in the recent years in Hungary, Europe and several countries of the world (eg. Italy, Sweden, Denmark, Slovakia, Turkey, Finnland etc.) have clearly proven that Bioplasma is suitable for chemical-free plant cultivation.

Crop results achieved with different plants (eg. cereals, tomato, capsicum, cucumber, fruits and flowers, etc.) has also confirmed that usual average yields can be exceeded. In addition, the pulp, colour, taste and shape of plants cultivated with bioplasma were also much more favorable.
Treated plants are extremely resistant to diseases and pests.
In several cases, ill plants started to develop again after having treated them with Bioplasma.

EFFECT ON SOIL AND PLANTS

Plants absorb nutrients from the dissolved phase of Bioplasma sprinkled on the soil through their secondary rootbranch. After having been transformed by the effects of favourable conditions (sunshine, inorganic nutrient residues) algae begin to propagate. In case of decay, they serve as nutriments for microorganisms present in the soil.
It improves soil structure and water balance and stimulates soil life.
Abundant nutrients of algae are transferred into the plants through their leaves facilitated by diffusion.



ADVANTAGES
Upon its effects, odds of sprouting, taking root and growing increase, the green weight of roots and plants rises, blooming takes place earlier, and crop adhesion is more favourable. Yield quantity increases. It facilitates the production of flavour and aroma substances in the crops and prolongs the period of preservation. It increases the resistance of plants to diseases and helps to survive rigours of weather. It can be spred with irrigation systems being currently in use. Soil and ground water pollution decreases with its application.

PRODUCT
Bioplasma is available on the market in form of a green coloured liquid of a pleasant odour. It is a concentrate, which may be used after dilution with water to a concentration specified in the instructions for use or according to the expert advice.
It is a non-toxic, inflammable and non-explosive material, the use whereof does not involve any hazard to humans or animals. Waiting period

after use: zero day. Bioplasma is a 100% utilizable, environment-friendly plant nutrient.

WHERE CAN IT BE APPLIED

- In field vegetable growing
- In vegetable and fruit cultivation
- In transplant growing
- In greenhouses and foil tents
- In the cultivation of flowers and ornamental plants
- In biocultivation
- In viticulture and fruit cultivation
- In forestry
- Where irrigation is carried out
- In hobbi gardens, in case of small-scale producers

As it clearly appears from the above, Bioplasma has an extremely wide range of application, so there is hardly any small-scale or large-scale producer, who could not make a benefit from the advantageous effects of Bioplasma.

RECOMMENDED USE

Bioplasma is suitable either for foliar or soil fertilization in plant cultures of all kind. It shall be used after diluting with water, in a concentration depending on the growth stage of the plant and its nutrient requirements. As a general rule of use, following shall be taken into consideration: it shall be used in 80-120-fold dilution as foliar fertilizer, and in 40-60-fold dilution as soil fertilizer, depending on plant species. Please, do not hesitate to contact the manufacturer for advice. Bioplasma may be spread together with other substances, for example with plant protection chemicals, in the manner that first the adequate dilution of the plant protection chemical shall be prepared and Bioplasma added only after that by continous mixing and then the substance shall be immediately sprayed out.

Please, find below some examples for common methods of use and the obtained results.

CEREALS

The product was applied as a foliar fertilizer in the cultivation of corns in the ear, maize and sunflower. In case of corns in the ear, it was sprayed out as a foliar fertilizer mixed with other plant protection chemicals at the time of foliation and earing. The plants were more resistant to drought and fungal diseases. Withering and partly desiccated cultures could be saved with two to three plants spraying. Yield average was 10-20% higher. Proportion of gluten was 32-34. In case of sunflower, pumpkin and shell-

less pumpkin yield average was 30-50% higher, depending on environmental conditions. Plant spraying was carried out by the traditional method or from helicopter. Concentrated Bioplasma was applied three times in a quantity of 8 litres per hectare, but other producers applied it in a schedule of two times 8 litres per hectare and 1-10 litres per hectare respectively. It could be observed that by increasing the number of application, plant cultivation became more productive.

By rape and mustard similarly good results were achieved with the application of Bioplasma three times in a quantity of 8 litres per hectare.

VEGETABLES

Bioplasma can be applied in transplant growing as a nutrient solution or foliar fertilizer. According to the data of KITE, capsicum brought a yield in the lack of fostering soil, cultivated only on Bioplasma solution. Cabbage transplants grown on soil block also developed excellently.

Experiences are good both with plants grown under foil and in open field. If applying Bioplasma for tomato grown under foil, less other plant protection chemicals are needed, and several producers have reported that they totally ceased to apply them. Tomatos had a thick stem, and were healthy. Experiments in field vegetable production conducted by SZIE showed that ripening of industrial tomato is more healthy and begins 5-7 days earlier.

It surpassed the control plants both in quantity and quality.

As for capsicum, the observations are the same. We achieved 15-20% higher yield quantity, a green foliage and healthy fruits without applying any chemicals. In case of capsicum, we have very good experiences with Bioplasma supplemented with Ca.
Diseases, such as brown rot, etc. did not occur.
We have received positive feedbacks with spice peppers too.
If applied for cucumbers, only first class fruits were produced.
Having applied for potatoes as a foliar fertilizer (3x8 L/hectare), we obtained 20-30% higher yield average and a strong green foliage.
If applied for salad crops, cabbage, chinese cabbage etc. plants had wonderful succulent leaves.

GRAPE VINE:

If spreading it into the root zone, it is extremely effective in vine-stock planting or replacement. According to the unanimous opinion of producers, nursery stocks took better root and loss was minimal even if the weather was dry.
Plants on treated areas are characterized with a strong sprouting. Stock plants are more freeze resistant and more safely pass the winter.
We have received back reports from several producers that new plantings became yielding one year earlier. /Bioplasma was spread into the soil in a concentration of 1-2%/

Nurseries have also reported good results in plant stock growing.
After a cold winter, if grape cultures suffer frost damages, they can be excellently restored and freshened.
If applying as foliar fertilizer, BP is also very efficient in dry, rainless periods.
Its effects can be almost immediately observed. Shrivelling of the leaves stops.
Plants are characterized with a strong sprouting in spring, and with an excellent adhesion when blossoming. Producers have also reported an increased resistance to fungal diseases.
In the average of several years a surplus yield quantity of 10-15% can be expected in treated vinelands, accomplished by a higher sugar degree.
It shall be applied in a schedule of 3 x 8 L/ha by general use, but experiences show that Bioplasma is used to appy by every spaying, however, in a reduced dose.

The amount and frequency of Bioplasma application strongly depends on the quantity of precipitation.

FRUITS:

It is spread into the soil by stock planting, similarly to vine grape, but immersion into Bioplasma solution of 3-5% before stock planting is also commonly applied. Bioplasma proved to be valuable by all kinds of fruit, however, as many kinds of fruit, as many methods of application as a foliar fertilizer.
It is applied in an amount of 3x8 L/ha in case of stone fruits and berries, however, for apples and pears, which usually need much more plant protection, it is used as much as 5 times.
Results:
Plants become more resistant not only to fungal diseases but also to pests eg. rust mites.
Adhesions are good, in case of apples there are no colouration problems, and Bioplasma supplemented with calcium bears a great importance in the prolongation of apple preservation period. In general, producers reported on perfect and healthy fruit crops.
In fruit cultures it became common that Bioplasma is applied also by flushing spraying /before sprouting/ in a concentration of 1%.

In case of berries, ripening shortens by 3-5 days. Experiences are very favourable with strawberries /Fragaria/.
A surplus yield quantity of 15-25% can be expected /dropping irrigation/ and the quality of strawberries is also very advantageously affected, its preservation period lengthens.

BIONITROPHOS

BioNitroPhos is a microbiological preparation intended to increase soil fertility, facilitate the development of normal soil conditions, increase yield quantity and promote the utilization of stubble fields. It contains apathogen fungi, nitrogen-fixing and phosphorus-mobilizing bacteria, polysaccharids, polipeptides, enzymes and other additives. It is a known fact that microorganisms present in the soil play a prominent role in the decomposition of organic substances, mobilization of minerals, forming a thick humus-layer, in the continuous nutrient supply of plants and in the inhibition of phytopathogens. In an area of one hectare, soil contains 3-15 tons of microorganisms, depending on the conditions. The three most important kinds of microorganisms can be found in the following quantity in an are of one hectare.

Bacteria	approx. 3t/ha
Fungi	approx. 6-8t/ha
Algae	approx. 0.03-3t/ha

Soil serves as a natural medium for plants and microorganisms. Under natural circumstances the existance of the one determines the existance of the other. In the past decades we restricted only to the replacement of soil nutrients, without having considered that for a succesful plant cultivation quantities of microorganisms are also necessary.
With its activity aimed at increasing yield results (soil tillage, nutrient replacement, plant protection), mankind has completely disturbed the balance, which had been established for millenia. The environmental burdening of soil has increased and hereby the number and composition of soil bacteria changed.
Agricultural areas have became acidified, waters have been contaminated with nitrates and in plants such substances have appeared, which exert unfavourable effects on wildlife (heavy metals, residues of plant protection chemicals and their metabolits).
The direction of future is the restoration of soil conditions by applying such environment-friendly substances, which increase soil fertility and at the same time, do not endanger the environment and reconstruct the original ecosystem.
Natural soil is a system of complex substances of different quality and physical condition, it is a nutrient medium for plants consisting of 4 mean components:

- Organic substances
- Inorganic components (minerals)
- Soil solution (groundwater)
- Gases (air, carbon-dioxide)

In course of the top-soil formation, complex physical-biochemical processes take place with the participation of soil constituting substances. From the aspect of plant cultivation, the most important conditions to these processes are the chemical elements and the energy, carbon, nitrogen and phosphorus cycle, which is essential to the life functions of cells. BioNitroPhos exerts an effect on the different soil constituting systems, in order that natural processes influence the cycle of nutrients, the fertility, the energy processes and the water balance properties of the soil.

Microorganisms present in BioNitroPhos provide decomposition of organic soil substances, introduction of nitrogen into the soil and mobilization of phosphorus. Our aim is to promote the formation and spreading of environmental-friendly farming systems besides increasing yield results and improving crop quality with regard to the expectations and regulations of the EU.

BioNitroPhos, as a bioproduct, possesses the certification of Bioculture Association and its production is inspected by Biokontroll Hungária Kht.
Soil carbon source is produced predominantly by the utilization of sun energy, by photosynthesis. 50-90% of carbon assimilated hereby ends up in the soil, gets mineralized and moves to the humus-layer. Humus is the end product of organic decomposition. It consists of very small particles. This formation contains nutrients in the root zone, which are important for plants. Nitrogen, an important element necessary for the growth of plants can be introduced into to soil by means of artificial or natural fertilizers. Nitrogen source supplied by artificial fertilizers can not be entirely utilized, as a part of it gets washed out and another part escapes. The decomposition product of organic substances of animal or plant origin introduced into the soil, is ammonia. Green plants are unable to take up the nitrogen of ammonia. It is transformed into nitrites and nitrates by nitrifying bacteria. These ions can be directly utilized by plants. Air is an inexhaustible nitrogen source with a nitrogen content of 78v/v%. Plants are unable to take up and assimiliate the nitrogen of air. We can provide a continuous

nitrogen-supply for our plants with the help of microorganisms present in BioNitroPhos. These are nitrogen-fixing microorganisms and microorganisms changing the structure of soil ammonia. Hereby 40-60% of artificial fertilizers can be substituted. Soil phosphorus can be found in bound form in organic and inorganic substances. It is mostly insoluble or hardly soluble, in an unabsorbable form for plants. By introducing phosphorus-mobilizing strains present in BioNitroPhos into the soil, after their propagation, complex phophorus-compounds normally unavailable for plants become soluble.
BioNitroPhos is a non-toxic, to humans, animals and to the environment non-hazardous microbiological concentrate of natural origin.
Storage rot causing fungi present in BioNitroPhos are able to produce enzyimes (eg. ligninolytic enzymes, cellulase, hemicellulase, ligninase, lignin-peroxidase, laccase, etc.) necessary to degrade structure substances of plants (lignine, cellulose, hemicellulose). One of the fungal strains possesses a significant lignin-degrading activity, whereas the other one decomposes lignin and cellulose at the same rate. These fungi considerably facilitate the complex degradation of hemicellulose and provide an excellent carbon and energy source for cultivated plants and soil bacteria fixing molecular nitrogen and mobilizing phosphorus.
Fungi present in the preparation are apathogen and do not infect living plants. One of the nitrogen-fixing bacterium strains of BioNitroPhos lives normally in the soil.
This microorganism is able to fix themolecular nitrogen of air, and to reduce it into ammonia with the help of an electron mediator molecule and a nitrogenase enzyme.
Ammonia is transformed by nitrifying bacteria into nitrites and nitrates, which is easily absorbable for plants.
It is able to fix as much as 20-30 kg nitrogen per hectare from the air during one plant cultivation cycle. The other nitrogen-fixing bacterium strain is able to fix nitrogen in the proximity of another pre-organism, eg. root-system of a plant. In addition to providing the necessary nitrogen for the growth of plants, its importance lies also in the fact that it is able to produce hormones, substances stimulating the growth of plants.

It is able to fix as much as 40-60 kg nitrogen per hectare during one plant cultivation cycle.
The phosphorus-mobilizing bacterium strain of BioNitroPhos plays a role in iron absorbation at the same time.
Under natural conditions, phosphorus can be found in organic and inorganic compounds of the soil. These phosphorus-compounds are

hardly soluble or insoluble in water. Their availability for plants is minimal. By introducing and propagating phosphorus-mobilizing microoganisms into the soil, complex phosphorus-compounds normally not available for plants become soluble.

In addition, the persence of phosphorus-mobilizing microorganisms has an important role, as they are able to capture iron also if low iron concentration is present, and to form so-called sideophores.
The result thereof is an inhibition of harmful bacteria and fungi growing in the rhizosphere eg. propagation inhibition of the potato pathogen Ervinia caratovora by means of iron-deficiency, or growth stimulation of potato, sugar beet and radish on an iron deficient soil by delivering captured iron directly for the cultivated plants.

It has a great importance from the aspect of plant cultivation that phosphorus-mobilizing bacteria are able to synthetize hormones stimulating the development of plants (eg. gibberelin acid).

Advantages of the application of BioNitroPhos

Effects exerted by fungi

- Facilitates quick decomposition of organic substances and formation of humus
- Supersedes stubble burning and hereby stops the related environment destruction and pollution
- Enables the decompositon of lignin and cellulose containing organic substances ploughed into the soil

Effects exerted by bacteria

- Reduces the needed amount of chemical fertilizers to an economic extent and at the same time, increases their efficiency and decreases the loss
- Inhibits the propagation of other pathogen bacteria and fungi growing in the rhizosphere
- By fixing nitrogen from the environment (air), reduces the amount of other substances of nitrogen content necessary to introduce into the soil

Joint effects

- Improves soil structure and water balance and hereby reduces soil crustation
- Favourably influences the pollution of surface and groundwaters
- Favourable influences the quantity and structure of the root system
- Under appropriate conditions, in addition to improving fruit quality, it increases crop capacity

Recommended also for biocultivation

RECOMMENDED USE

BioNitroPhos increases soil fertility, and can be applied for all kinds of plant culture.
It can be applied:

- In field vegetable production
- For treating meadow-lands, pastures, grasslands
- In horticulture
- In viticulture
- In tree and forest plantation
- In the cultivation of flowers and ornamental plants
- In top-dressing

Conditions of spreading:

- Windless weather
- Preferably wet soil
- Temperature between 10-25 °C

Quick and favourable results can be expected, if the soil meets the following requirements:

- pH value is between 6-7.5
- Organic soil content exceeds 1.5%
- Carbon-nitrogen ratio (C/N) is 12:25

If the soil does not meet these requirements, it is advisable to perform soil conditioning first. BioNitroPhos may also be applied in case the organic soil content does not reach the 1.5%. In this case 35-40 kg substance of nitrogen content shall be spread into the soil, per hectare.

Time of spreding:

- 2-3 weeks previous to sowing, planting or transplant planting
- In case of grape vine, 2-3 weeks previous to sprouting
- In case of fruit cultivation, after fruit harvest
- 2 weeks before tree or forest plantation
- 2 weeks before planting flowers or ornamental plants

Until restoration of normal soil conditions regular use is extremely important, thereafter it is recommended.

Manner of spreading

The water dilution of BioNitroPhos, or its solution prepared with 35-40 kg inorganic substance of nitrogen content (if it is needed because organic soil content does not reach the 1.5%) shall be evenly spread into the soil by

- Irrigation or
- Spraying

and superficially ploughed into the soil.
BioNitroPhos may be spread into the soil at any time, however, expected results will manifest only after the propagation of microorganisms.

Storage conditions

at 4-5°C	6-8 weeks
at 6-8°C	2-3 weeks
at 10-12°C	6-8 days

The product is a bacteria and fungi concentrate containing living organisms in a great number, so its preservation period depends primarily on the temperature. It can be stored together with other materials in cellars, as it is not dangerous to the environment.
Because of its high organic and microorganism content, temperature of BioNitroPhos may not permanently exceed 15°C during transport and storage.

Recommended quantities for application

By the application of BioNitroPhos following shall be taken into consideration:

- PH value of the soil
- Organic soil content
- Amount of precipitation
- Soil type
- Growing season of the plant

Depending on soil pH: pH=6.5-7.5 10L/ha
It soil pH deviates in either direction from this range, quantity shall be increased by 1 litre per 0.5 pH unit.
Depending on organic soil content: 2%, 12 L/ha
If organic soil content rises by 1%, 1 litre less material shall be spread.
Depending on the amount of precipitation: on wet areas: 10 L/ha On rainless areas: 12 L/ha
Depending on soil type

- Clay soil 11 L/ha
- Sandy soil 13 L/ha
- Adobe soil 10 L/ha

Depending on the plant's vegetation period:
In case of cultures of a longer vegetation period, it advisable to apply the product also for top-dressing or side-dressing.
BioNitroPhos quantity recommended for application shall be diluted with water to 300-500 litres and spread into the soil.

Experiences with the application of BIONITROPHOS

According to the experiences of users, spreading with BNP technology shortens the period of time necessary to the decomposition of stubbles, stem and root residues. It also showed to be effective in the decomposition of vineshoot and reed residues.
Considerable sum of money can be saved by the users, because conventional nitrogenous fertilizers are not needed any more to the decomposition of stem residues.

If applied for stubbles after reaping or for sunflowers or maize in autumn, it promotes the development of appropriate soil quality necessary to the preparation of seed-beds.
In spring, sreading of BNP takes place simultaneously with soil preparation, so the costs of spreading can be minimalized.

On the basis of experiences obtained during years, due to the favourable effects of BNP 510q
more yield quantity can be achieved by cereals, but in an extremely rainless period of time a yield increase of even 70-80% could be measured by sunflowers, compared to the control plants.
Besides cereals, BNP produced a significantly high yield average in case of sugar beet and soy bean. These plants' average of 35-41 q/ha rose by far above the average of untreated areas, which amounted to 32 q/ha.

In addition to surplus yield, producers always emphasise the improvement of soil quality, which makes further soil farming easier and saves work.

If applying for field vegetable production, experiences are very favourable with fruit cultivation, in particular with berries.

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