

# Instructions and recommendations for use fertilizers based on humus substances "ECO-SP" for crops

1. Understanding the principle of operation
2. Preparation
3. Processing of seed material
4. Processing during the growing season
5. Table of consumption norms of the workflow
6. Contraindications
7. Recommendations for improving soil fertility
8. Transportation and storage

## Understanding the principle of action

It is well known that plants have only a chemical signaling system, chemical regulation of growth and development. Therefore, in response to any impact (changes in light, temperature, CO<sub>2</sub> concentration, humidity, etc.), the plant produces strictly defined chemicals (hormones). They concentrated in certain parts of the plant, cause a strictly defined response (turning to light, closing stomata, the outflow of nutrients to the root, etc.). Thus, plant hormones-auxins, gibberellins, and others-in various combinations and concentrations are responsible for plant reactions, the direction of biochemical processes, and overall development.

Fertilizer based on humus substances "ECO-SP" made from plant raw materials, centuries-old lowland peat contains in its composition, in addition to humic and fulvic acids, most plant hormones, amino acids, trace elements, and simple organic acids. The effect of the "ECO-SP" fertilizer on the plant is like a complex of chemical signals that inform the plant about the favorable conditions around it. This language is quite clear to the plant. The plant responds to the received signals by producing appropriate hormones that trigger or accelerate a whole set of biochemical processes that are characteristic of development in comfortable and favorable conditions.

That leads to the fact that the plant is activating the processes of metabolism, protein synthesis, consumption of mineral nutrition elements, and others, gets a significant advantage in the competition for some necessary growth factors. Acceleration of root system development improves for water and food elements; an increase of leaf surface and chlorophyll content - for light and speed of synthesis of organic compounds, etc. This "signal" theory is supported by the fact that the maximum response in plants is observed in direct contact of humic acids with plant tissues: during seed processing and vegetation processing.

When applied to the soil, the fertilizer based on humus substances "ECO-SP" primarily improves the physical properties of soils, increases the moisture capacity of light soils and water permeability of heavy ones, improves their structure, reduces the density of the soil. That contributes to the accumulation of humus and changes in the biological characteristics of the soil. Getting into the soil, the drug increases the vital activity of

soil microorganisms. Moreover, the increase in microbiological activity is observed both in the first year of fertilization and in subsequent years. Simultaneously with the increase in the number of microorganisms, the mobility of soil nutrients, especially nitrogen and phosphorus, increases. They pass into a form that is accessible to plants and is better absorbed. Also, the drug "ECO-SP" combined with mineral fertilizers, increases their effectiveness.

## Preparation

A) Fertilizer based on humic acids "ECO-SP" is included in the State catalog of pesticides and agrochemicals (subsection "Fertilizers based on humic acids"), allowed for use in the territory of the Russian Federation under the number 520-18-2066-1, and is allowed for use in agriculture without restrictions until 2029.

Fertilizer based on humic acids "ECO-SP" (ECOR-SP company is accepted from the Union of Organic Farming <https://soz.bio/suppliers/ekor-sp/>) can be used in the cultivation of environmentally friendly products, according to the Federal law of the Russian Federation 03.08.2018 N 280-FZ "On organic products".

B) Before starting work on processing seeds and crops, read the container label of the drug. To pay special attention to safety measures when working with it, as well as first aid measures in case of poisoning.

C) Check the serviceability and necessary settings of the equipment that you are going to use for processing.

D) to increase profitability, it is recommended to use in tank mixtures (a common solution of several chemicals). Agro-product "ECO-SP" is highly compatible with existing pesticides and fertilizers. Before use, be sure to follow the recommendations for use.

## Processing of seed material

Pre-sowing treatment of seeds is carried out by etching or soaking in a working solution.

Before processing the seeds, thoroughly clean them from dust and impurities.

**Recommended dose rate:** 0,2-0,3 litre appropriate "ECO-venture" - for 1 ton of seeds.

**Recommended consumption of the working solution:** 10-15 liters per 1 ton of seeds.

**Preparation of the working solution:** 0.2-0.3 liters of fertilizer "ECO-SP" diluted in 10-15 liters of water.

Table 1 - The rate of application of the drug "EKO-SP" when processing seed, depending on the consumption of the working solution of dressing machines

CULTURE	APPLICATION PHASE	CONSUMPTION					
Cereals Legumes Rape, mustard Corn Sunflower	Seeds	Working solution amount, l					
		10	11	12	13	14	15
		The amount of the agro-preparate "EKO-SP", l.					
Potatoes	Tubers	0,2	0,22	0,24	0,26	0,28	0,3

\* Always mix the working solution thoroughly until the agri-product is completely dissolved. When preparing a tank mixture for processing seed material from several preparations, add each subsequent component only after the previous one is completely dissolved.

## Processing during the growing season

Application of fertilizers based on humus substances "ECO-SP" during the growing season is carried out in the form of foliar and root fertilizing, depending on the agrotechnical requirements and technological maps of crop cultivation.

Foliar application is carried out by spraying, for greater profitability, combined with the introduction of plant protection products, macro fertilizers in one tank mixture. Also practiced and monobromide if there is a need to improve the biological stability or to support the immune system of plants.

Treatment is carried out by repeated spraying of plants with a working solution during the growing season. The application phases are not regulated. The earlier the plants begin to interact with the drug, the more effective its effect will be. The application interval is 2 weeks. A 2-fold application is usually sufficient to show a positive effect.

Recommended application dose: 0.6 to 1.8 liters of appropriate "ECO-venture" - for 1 hectare.

Recommended consumption of the working solution: according to the table of application standards for field sprayers (see below).

Preparation of the working solution: dilute 0.6-1.8 liters of fertilizer "ECO-SP" in the tank mixture, according to the table of application standards for field sprayers (see below).

The recommended concentration of the working solution is in the range of 0.005% - 0.01%.

Table 2 - The rate of application of the drug "EKO-SP" for foliar treatments, depending on the consumption of the working solution for field sprayers

CULTURE	APPLICATION PHASE	CONSUMPTION													
Cereals	Tillering	Working solution amount, l													
	Exiting the tube - earing	up to 90	from 91 to 105	from 106 to 120	from 121 to 135	from 136 to 150	from 151 to 165	from 166 to 180	from 181 to 195	from 196 to 210	from 211 to 225	from 226 to 240	from 241 to 255	from 256 to 270	
Legumes	Branching stems														
	Budding														
	Bean formation														
Rapeseed, mustard	Leaf rosette ovary														
	Budding														
Sunflower	4-5 pairs of leaves		The amount of the agroprepareate "EKO-SP", l.												
	7-10 leaves														
	Budding - development of the rosette														
Potatoes	Formation of tops														
	Budding - flowering														
	Tuber formation	0,6	0,7	0,8	0,9	1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	
Sugar beet	4-6 leaves														
	8-10 leaves														
Corn	3-4 sheets														
	6-8 leaves - panicle ejection														

When using low-volume and ultra-low-volume spraying technologies, it is recommended to adjust the dose according to the formula prescribed in the application Regulations (table 3).

Application of fertilizer based on humus substances "ECO-SP" for root feeding of plants during the growing season, is usually carried out with irrigation water 1-10 times with an interval of 14 days.

Recommended dose rate: 15-30 liters of appropriate "ECO-venture" - for 1 hectare.  
Consumption of the working solution: depending on the irrigation rate-100-200 cubic meters/ha.

Recommended consumption of the working solution: according to the requirements of irrigation water consumption for the needs of crops.

The recommended concentration of the working solution is in the range of 0.005% - 0.01%.

## Treatment to improve soil fertility

To replenish the fertility and reserves of organic matter, the fertilizer "ECO-SP" can be used in conjunction with CAS, nitrogen-containing fertilizers by processing crop

residues, followed by embedding them in the soil. The application does 2-2.5 liters per 1 ha. The use of the appropriate tank mixture contributes to the faster decomposition of plant residues, activation of soil microflora.

## Recommendations for the use of

1. Before use, thoroughly mix (shake the canister several times).
2. the sprayer Tank should be two-thirds full of water at the beginning of the preparation of the tank mixture.
3. The agitator must work while adding all the components in the tank mixture. Moreover, it is necessary to achieve complete dissolution of the drug before adding the next one.
4. to check the compatibility of the agro-product "ECO-SP" and pesticides, its recommended to mix the preparations in small quantities and make sure that there is no precipitation, flakes.
5. If you are in doubt about the mixing of agricultural products, it's recommended to study the literature on this topic or contact specialists for advice.
6. with all liquid substances "ECO-SP" fertilizer must be mixed already diluted, as concentrates in the case of a difference between pH levels can react.
7. Spend processing of plants in the morning or evening when the wind speed is not more than 4-6 m/sec. At the same time, follow the recommendations on the technology of the application of agricultural products, as well as on the protection of flora and fauna, and exclude the possibility of use in water protection zones of water bodies.
8. when selecting filter elements, it is important to take into account the dispersion of the drug, to avoid downtime of sprayers and watering units. The dispersion of the agro-product "ECO-SP" is less than 100 microns (microns), i.e. less than 0.1 mm. That makes it possible to use the drug with filters in front of 100 mesh injectors.

**Table 1. Norms of application of fertilizers based on humus substances "ECO-SP" for agricultural production:**

Culture	The dose rate	Time, application features
All culture	2-2.5 l / ha working solution Consumption* - 400-500 l / ha	Application before tillage (plowing, cultivation)
Cereals, legumes, technical, forage crops	0.07-0.08 l / t working solution Consumption-15 l / t	Pre-sowing seed treatment
Vegetable, melon, fruit and berry, flower, and ornamental crops	0.07-0.08 l/15 l of water	Soaking seeds before sowing- for 12-24 hours; planting material (tubers, bulbs, etc.) - for 6-8 hours; cuttings, the root system of seedlings – seedlings) - for 14-24 hours
All culture	1.0-1.5 l / ha working solution Consumption-200-300 l / ha	Non-root feeding of plants during the growing season, 2-6 times with an interval of 14 days
Fruit and berry crops, grapes	2.0-2.5 l / ha working solution Consumption-800-1000 l / ha	Non-root feeding of plants during the growing season, 2-6 times with an interval of 14 days
Vegetable, melon, fruit and berry, flower, and ornamental crops	15-30 l / ha Consumption of the working solution: depending on the irrigation rate-100-200 cubic meters/ha	Root feeding of plants during the growing season 1-10 times (with irrigation water) with an interval of 14 days

\* Working solution – an aqueous solution of chemicals of the required action (tank mixture). It is used for processing plants for care or protection from diseases and pests.

\* The working solution must not contain other humic preparations.

\* When applying a different number of the working solution, the dosage is calculated according to the formula:  $X = (A \times C) / B$ , where X is the required amount of drug And the recommended amount of the drug (see table), the actual consumption of the working solution, With the recommended amount of working solution (see table).

## Contraindications

Fertilizer based on humus substances "ECO-SP" is not recommended to be used together with phosphorous-containing products, as the result will be formed difficult-to-dissolve compounds.

It is prohibited to use spraying for planes.

The drug is prohibited for use in water protection zones of water bodies.

## Transportation and storage

Transportation and storage are carried out under the requirements of GOST 12.1.004-91 "Fire safety, General requirements", SanPiN 1.2.2584-10 "Hygienic requirements for the safety of testing, storage, transportation, sale, use, neutralization and disposal of pesticides and agrochemicals" and SP 1.2.1170-02 "Hygienic requirements for the safety of agrochemicals".

Storage of agrochemicals is carried out in the original factory packaging, in a dry place separate from food, medicines, and feed, in places inaccessible to children and animals.

Storage temperature is from +5 to +35 Grad under Celsius.

IMPORTANT! Avoid direct sunlight.

The guaranteed shelf life is of 3 years when closed.

\* After opening the container package and partial consumption of the drug, in compliance with the rules of storage and transportation, it is recommended to store the canister in a closed state for no more than 90-120 days.

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