



#### Germany

# Perl Humus Pro Humic acid + fulvic

**The German machinery innovation** Humic and fulvic in one package



#### **Introduction :**

Foundation fertilizer to improve soil properties, treat the effects of salinity, and plant growth stimulant.

The high benefits of pearl humus as a soil improver and as a plant growth enhancer (as a base fertilizer) and also as an aid to resist drought and soil salinity and get rid of the bad effects of toxic pesticide residues are due to its high property in cationic exchange and its neutralization of soil acidity in addition to its high property in preserving water and its natural chelating effect.

It is a very effective substance in increasing the growth of plant roots, and the high percentage of organic carbon in it helps to increase the multiplication of beneficial microorganisms in the soil. Based on these properties, Pearl Humus increases plant growth, which leads to increased production and improved fruit specifications for all plants and in all types of soil.



#### What are humic and fulvic acids:



Humic and fulvic acids are humic substances that are formed through the process of chemical and biological degradation of plant and animal materials (the degradation process is the conversion of organic matter and organic residues of plants and animals in the soil into shapeless, insoluble, black organic matter) through the biological activities of soil microorganisms . The best source of humic acids is the sedimentation layers of fine brown coal, which is referred to as Leonhardites and in which humic acids are found in high concentration.

Humic substances can be found in all types of soils as they originate from the decomposition products of plants. It is divided by extraction into humic acid and fulvic acid.

Where their salts are called humates and fulvic. Fertile soil contains humic acid, where it is present in a certain layer of soft brown coal, which has not yet reached the stage of lignite or coal transformation, in which humic acid can be found in a concentration of up to 85%. This soft brown coal bed is internationally called Leonhardites. Leonhardite differs from soft brown coal with a higher oxidation rate and a higher content of humic acid. The main compound of all natural humic substances are humic acids, which contain humic acid and fulvic acid. Humic acids are an excellent natural and organic way to provide plants and soil with a concentrated dose of essential nutrients, vitamins and trace elements



#### **Structural composition of humic matter:**

The humus in its structural composition does not consist of long-chain humic substances as in Figure A, but of short-chain chemicals from a combination of different substances as in Figure B, which are cations (yellow), polysaccharides (blue), polypeptides (green), groups Aliphatic (lipid-like) (purple), aromatic lignin compounds (brown)



## Why Perl Humus Pro is better than other organic fertilizers:

Compared to other organic and humic materials, leonhardite is very rich in humic acids. While leonhardite is the final product of the 70-million-year-old decomposition process, and by comparing leonhardite to peat moss, for example, the formation period of peat moss in the soil is completed within only a few thousand years. Leonhardite differs in its molecular structure from the rest of the organic materials, which illustrates the highly bioactive properties of leonhardite. This biological activity is five times more potent than other organic and humic substances. For example, one kilogram of leonhardite is equal to about five kilograms of other organic sources of humic acids in terms of their humic acid content.

Leonhardite works as a soil healer and as a bio stimulant for plants compared to other organic products.

Leonhardite promotes plant growth in particular (green mass production) and greatly increases soil fertility.

Another advantage of Leonhardite is its long-term effectiveness, as Leonhardite is not quickly consumed like compost, compost, or peat moss.

Leonhardite is distinguished from those other organic fertilizers in that it does not consume soil nitrogen like it, as most of these fertilizers are incomplete decomposition and complete decomposition in the soil and thus consume large amounts of nitrogen that the plant needs to complete its growth stages

Leonhardite improves soil structure for up to five years, unlike other organic materials.

# How Perl Humus Pro raises cation exchange in alkaline soil :-

#### From the following figure, it is clear how much alkaline soil needs humic matter:

A cationic exchange of various positively charged nutrients occurs with the positively charged hydrogen proton present on the soil grains, where it replaces it on the grains. Holding and binding positively charged nutrients to soil particles.

Gradual liberation of positively charged nutrients from soil granules and organic matter to the roots of plants and facilitating them for absorption.





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#### **Benefits of Perl Humus Pro for Plants:**

- 1) Existing scientific studies show that soil fertility is largely determined by the humic acid content. and its high cation exchange capacity (CEC), oxygen content as well as water holding capacity
- 2) The most important feature of humic acids is their ability to bind insoluble metal ions, oxides and hydroxides, slowly and continuously releasing them to plants when needed.
- 3) Humic acids modify soil structure by preventing the loss of water and nutrients in light sandy soils. And at the same time turn it into a rich soil by decomposition.
- 4) In heavy and compacted soils, the soil is improved by improving its aeration, water holding, preventing soil cracking, reducing surface water runoff, and preventing soil erosion by increasing the ability of colloids to aggregate.
- 5) Increasing the soil's ability to retain water and thus helping to resist drought, especially in light sandy soils.
- 6) It darkens the color of the soil and thus helps absorb the sun's energy.
- 7) Adjusting the pH of acidic and alkaline soils.
- 8) Improve plant absorption of nutrients and water.
- 9) Increasing the storage capacity of the soil.
- 10) It acts as a natural chelator for nutrients in alkaline soil conditions and enhances root uptake.
- 11) Rich in organic and mineral substances necessary for plant growth.
- 12) Retaining nutrients around the roots and thus reducing their loss with drainage.
- 13) Raise the rate of cation exchange in the soil.
- 14) Increasing the conversion of many nutrients such as (nitrogen phosphorus - iron - potassium - zinc) and other trace elements into forms available for rapid absorption by plant roots.
- 15) Increasing the percentage of seed germination and increasing its vitality.



#### **Benefits of Perl Humus Pro for Plants:**

- 16) Stimulation of plant growth (higher green mass production) by accelerating cell division, resulting in higher dry matter yield.
- 17) Improving the quality of crops and fruits and their external appearance and raising their nutritional value.
- 18) Enhancing plants absorption of nitrogen.
- 19) Reducing the interaction of phosphorus with the elements (calcium iron magnesium aluminum) and providing it in a free and beneficial form for plants.
- 20) Freeing carbon dioxide from calcium carbonate in the soil and facilitating its use in the photosynthesis process.
- 21) Helps eliminate iron deficiency in plants.
- 22) Reducing the availability of toxic substances in the soil such as pesticide residues, heavy elements and other toxins.
- 23) Stimulating plant enzymes and increasing their production.
- 24) It acts as an organic catalyst in many biological processes.
- 25) Stimulating the growth and proliferation of desirable microorganisms in the soil.
- 26) Enhancing the plant's natural resistance against diseases and pests and raising its immunity.
- 27) Stimulating root growth, especially vertical ones, enabling better absorption of nutrients and increasing root respiration and building.
- 28) Promote the building of chlorophyll, the production of sugars and amino acids in plants, support the process of photosynthesis, and increase the content of plants of vitamins and minerals.
- 29) Increasing the thickness of the cell walls of the fruits, thus increasing the storage period and carrying the transportation.

#### PERL HUMUS

# **Benefits of Perl Humus Pro for sandy soil :**

- 1) Humic acids provide and maintain nutrients around the roots in an easily absorbable form, thus a high yield increase of up to 70% can be achieved, as well as a reduction of up to 30% of fertilizer and pesticide use, as well as better and healthier growth of vegetables, fruits, ornamentals and landscaping and agricultural crops.
- 2) The water holding capacity of the soil increases dramatically, as it is noted that the water in the untreated soil has a rapid drainage and loss in the soil due to its rapid downward vertical movement, in contrast to the soil treated with Perl Humus Pro High water consumption.
- 3) These results can be obtained with regular application of high quality Perl Humus Pro.



# Study the effect of soil salinity and alkalinity on the growth of different plants









# Effect of soil salinity on tomato plant growth





# PERL Coranules

## **Composition :**

Organic Matter	Humic Acid	Fulvic Acid	РН
% Organic Matter	% Humic Acid	% Fulvic Acid	РН
60 - 70	45 - 47	5 - 6	6:7

## How to use and doses :

Сгор	Doses	Usage
Vegetables	8 - 15 Kg/100m² or 400 Kg/Ha	During soil preparation
Fruit trees and nurseries	0.4 - 1.5 Kg/Tree or 400 Kg/Ha	According to the age of the tree and the density of trees in hectares
Gardens	8 - 15 Kg/100m <sup>2</sup> or 8 Kg/100 m <sup>3</sup> soil	During lines and soil preparation
Lawn and landscape	20 - 25 Kg/100 m <sup>2</sup>	During soil preparation
Agricultural fields	400 Kg/Ha	During soil preparation

#### **Usage recommendations:**

- 1) It can be used alone directly or mixed with other fertilizers.
- 2) It can be mixed with soluble or granulated fertilizers such as compound fertilizers.
- 3) It is preferable to mix it with Double One Pro to get higher results.
- 4) It is preferable to place it in the heart of the planting line, with planting, or in the hollow during planting, or by scattering.
- 5) Store in a dry place.
- 6) It is safe for health and the environment and is non-flammable, as it is extracted from an organic substance.

### **Packing** :

Perl Humus Pro is available in 20 kg packages.