

# NOVOPHOS-PLB

THE SMARTEST PHOSPHORUS SOLUTION



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SUSTAINABLE NUTRITIONAL TECHNOLOGIES FROM FERTINAGRO BIOTECH

# NOVOPHOS-PLB

The latest intelligent NOVOPHOS® - PLB technology provides the crop with adequate and balanced phosphate nutrition throughout its whole development stages.

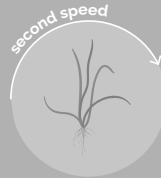
With the combination of **three different types of technological phosphorus** that are added to the traditional phosphorus, NOVOPHOS® - PLB **offers four types of phosphorus-availability** to cover the whole real nutritional demands of the crops.

From yesterday to today, we evolved from chemistry to biology. Evolving from a chemical processed phosphorus only for industrial benefit and with a low efficiency, to a smartest phosphorus which activates the natural processes in the crops involved in its transformation. Facilitating the phosphorus availability in every phenological stage of the crops, to increase the quality and yields.

NOVOPHOS® is the first phosphate technology in the market that combines maximum phosphorus availability throughout the entire crop development with greater sustainability by reducing CO2 emissions.

**Welcome to the smartest phosphorus.**





**NOVOPHOS® - PLB brings three technological developments which intervenes naturally in the soil-plants systems, including the biological and mineral systems in the phosphorus cycle.**

## TRADITIONAL APPLICATION

### TRADITIONAL PHOSPHORUS SOLUBLE IN WATER AND AMMONIA CITRATE

Traditional system (\*). Soluble industrial phosphorus with fast chemical transformation (48 hours availability)



## TECHNOLOGY 1

### PHOSPHORUS PROTECTED WITH SELECTED ORGANIC COMPLEXES

Technology (\*\*) currently distributed in the markets by different manufacturers, Fertinagro Biotech amongst them.



## TECHNOLOGY 2

### PHOSPHORUS GRADUAL ACTIVATION DUE TO ROOT EXHUDATES

Technology developed (\*\*) with the cooperation of the main research centers and universities.



## TECHNOLOGY 3

### PHOSPHORUS TRANSFORMATION BY THE SOIL MICROORGANISMS ACTIVITY

Owned and patented technology (\*\*\*) as a result of our experience during more than 35 years in Research and Development.

(\*) Types of phosphorus normally marketed by the large traditional fertilizer manufacturers, such as OCP, Phosagro, Eurochem, Yara, Fertiberia, etc...

(\*\*) Technical developments marketed by fertilizer manufacturers with technology similar to Timac Agro, ADP Fertilizers and Fertinagro itself.

(\*\*\*) Phosphoactive: Technology awarded by the United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) to Fertinagro as a next generation fertilizer to promote agricultural sustainability.

Since 1843 the traditional companies in our sector have tried to convince us of the idea that water-soluble and ammonium-citrate soluble phosphorus were the only types of phosphorus valid for the correct nutrition of crops.

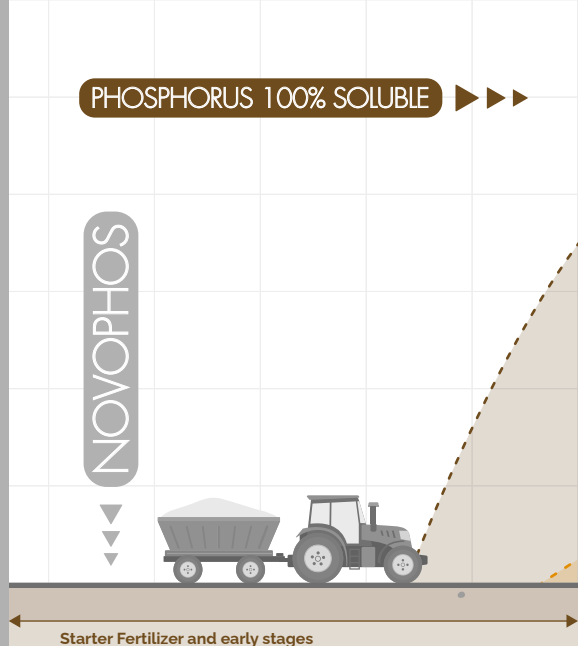
However, the modern agriculture that focused on sustainability and the use-efficiency of the NPK units provided, has clearly proven that this was not true and that it is an obsolete concept. Fertilizers with fast soluble phosphorus, from inorganic origin and processed industrially, have shown a really low efficiency incorporating a high amount of this nutrient in a short period of time to be assimilated by the crop in the initial stages.

On the one hand, all the units that are not utilised by the crop become blocked in the soil, generating considerable economic losses for the growers in addition to an obvious risk of environmental pollution.

On the other hand, we are contributing phosphorus that in no case covers the needs of the crop throughout its all development stages, limiting the quantity and quality of the harvest.

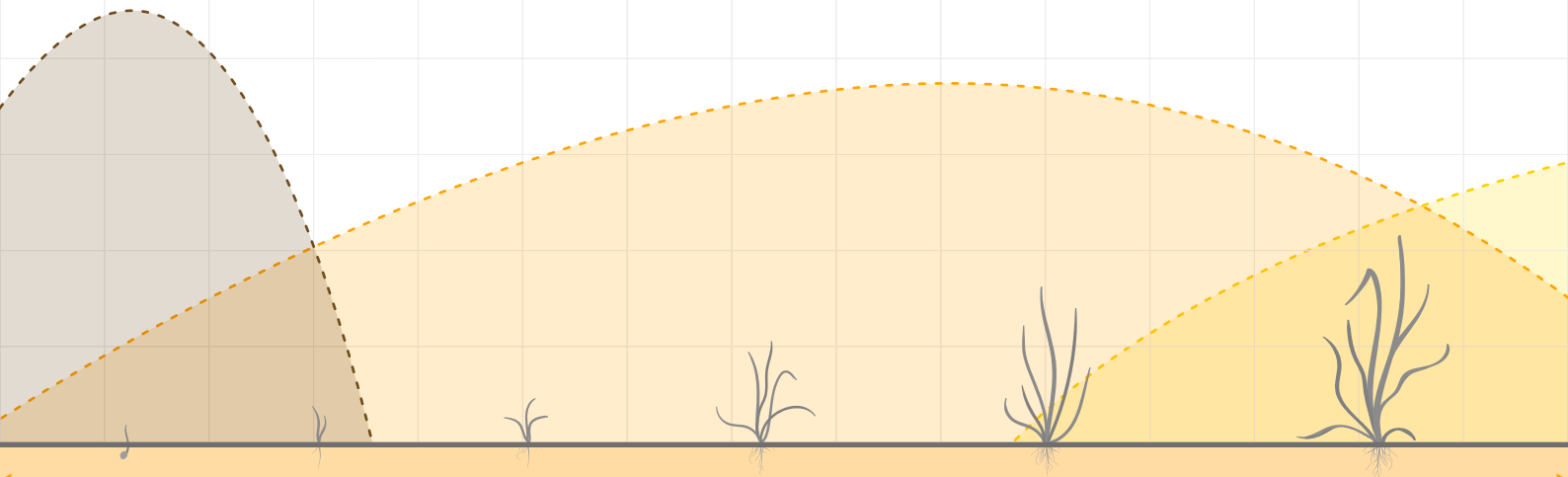
Many manufacturers have been trying for years to find technological development, either by protecting the phosphorus units provided or by activating those present in the soil, in order to guarantee the phosphorus availability to meet the crop needs during its growth development stages. However, to date, none had been able to find the solution.

**Today NOVOPHOS® - PLB is born.**



When we apply the fertilizer, because the phosphorus in its totally soluble form, the crop will absorb it directly. This type of phosphorus, without any technological protection, is available for a very limited time, being only suitable for nutrition during the first stages of the crop. In approximately 48 hours it will become insoluble and not bioavailable.

PHOSPHORUS SOLUBLE PROTECTED



Crop settlement stage

## second speed

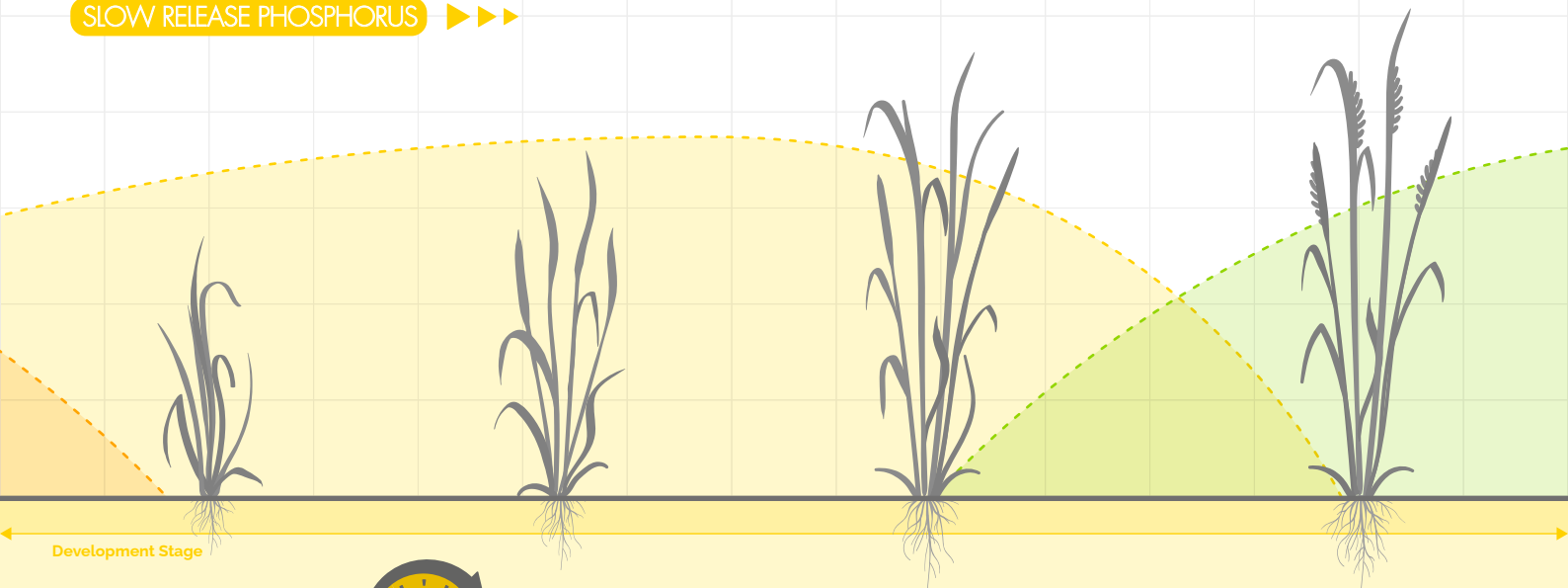


Protected with  
selected  
organic complexes

In order to prolong the availability of the phosphorus soluble in water and ammonia citrate and not become blocked in the soil, mostly in alkaline or acidic soils, it is necessary to protect it against the attack of other elements present in the soil, such as calcium, iron and aluminium.

**The NOVOPHOS® - PLB, technology, due to its content of humic substances with selected organic carbon, interacts with the soluble phosphorus forming humophosphates that have a temporary protective function that prevents its insolubilization. In this way, we ensure that the crop has bioavailable phosphorus for a longer time, until it grows to the appropriate size so that its organic acid exudates be able to dissolve the next form of phosphate.**

## SLOW RELEASE PHOSPHORUS



## third speed

Gradual  
activation due to  
root exudates

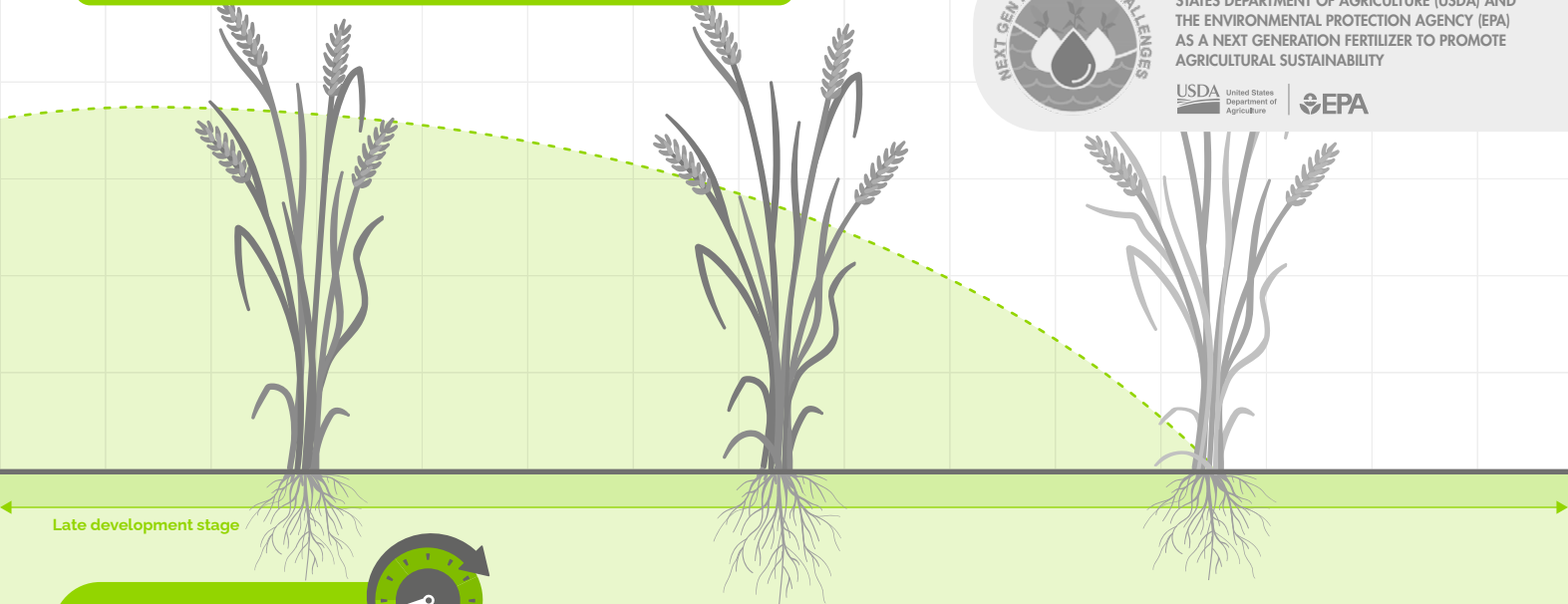
Once the plant has assimilated all the soluble phosphorus units in the early stages of its development, it is necessary to provide another type of phosphorus that continues to be available for proper crop nutrition.

The NOVOPHOS® - PLB, technology incorporates improved phosphorus to avoid its blockage, which will remain in a reserve state until it is activated and solubilized, through the action of the organic acids exuded by the roots developed in the secondary capillary system of the crop. This type of phosphorus is released gradually, covering the crop needs during the intermediate stages of their development.

## NATURAL PHOSPHATE ACTIVATE WITH SLOW SOLUBILIZATION



OWN TECHNOLOGY AWARDED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND THE ENVIRONMENTAL PROTECTION AGENCY (EPA) AS A NEXT GENERATION FERTILIZER TO PROMOTE AGRICULTURAL SUSTAINABILITY



Late development stage



## fourth speed

Transformation  
by the soil  
microorganisms activity

When the crop reaches the last growth stages and the chemical solubilization no longer covers its real phosphorus demand, we need an extra contribution of this nutrient to guarantee the correct completion of the crops and the subsequent success in the harvest quality and quantity.

The NOVOPHOS® - PLB, **technology incorporates phosphorus units protected with a set of organic acids and exclusive micronutrients capable to potentiante the development of beneficial microorganisms in the soil. Through the microorganisms activity induction, NOVOPHOS® - PLB technology manages to exert a natural solubilizing and mobilizing action of the phosphorus, transforming it into bioavailable and usable by the crops. Thus, it always maintain a constant level of this nutrient in the soil.**

# NOVOPHOS-PLB

The smartest and sustainable Phosphorus,  
exclusive for the most professional growers

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NOVOPHOS® - PLB, a new way for the phosphorus fertilization.



FERTINAGRO BIOTECH, S.L.

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