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Phosphites
PLANT DEFENSE INDUCTORS

IMPORTED
FROM EU

Presentation
Fertilizers-use Efficiency

As part of the nucleic acids DNA and RNA, the phospholipids in cell membranes and the key energy nucleoside ATP, phosphorus (P) plays a very important role in genetic heredity, membrane structure, signal transduction pathways, and metabolism, and is therefore considered essential to all forms of life existing on Earth, including both lower and higher plants (Ashley et al., 2011; Butusov and Jernelöv, 2013).

Phosphite, has increasingly been used as a Biostimulant, Pesticide and Fertilizer.

As a Biostimulant, Phosphite has been proved to improve nutrient uptake and assimilation, abiotic stress tolerance and crops quality. Moreover, Phosphite promotes root growth, yield and nutritional value of crops.

As a Pesticide, Phosphite is largely used for controlling pathogens as a fungicide and bactericide. Phosphite has proved to be effective in controlling important plant diseases caused by Oomycetes, particularly the genera Peronospora, Plasmopara, Phytophthora and Pythium (Lobato et al., 2008, 2010; Silva et al., 2011; Burra et al., 2014; Dalio et al., 2014; Brunings et al., 2015; Groves et al., 2015) and some Bacteria (Lobato et al., 2010, 2011; Acimovic et al., 2015).

As Fertilizer, applying Phosphite to plant roots in the presence of sufficient Phosphate may result in synergic effects between Phosphate and Phosphite, promoting the absorption of phosphorus into plants (Bertsch et al., 2009), and suppressing the negative effects of Phosphite itself (Varadarajan et al., 2002), which confirms that the effects of Phosphite depend strongly on the phosphorus state of the plant (Thao and Yamakawa, 2009).

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Phosphites (1 of 2)

The phosphite molecule contains three oxygen atoms that give high mobility in the plant tissue and soil. They are systemic compounds, easily absorbed and translocated through the xylem and phloem to all areas of the plant.

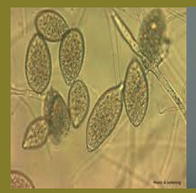
The phosphite is highly mobile within plants, unlike many fungicides. This means that you get protection throughout the plant.

PLAN INDUCTOR DEFENSE (PIS) is easily absorbed by leaves, roots and also through bark of trees. Due to its up and down systemic action, it acts readily over sensitive tissues:

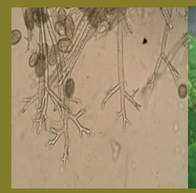
INDIRECT ACTION Increasing the host resistance against fungi attacks.

DIRECT ACTION Slowing the growth of the pathogen and inhibiting the formation of spores.

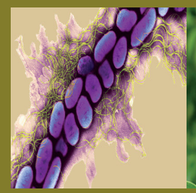
Its stimulates the production of Phytoalexins, which enhance host natural defences against Oomycets fungi: Phytophthora spp., Plasmopara viticola, Bremia, Pseudoperonospora, Peronospora, Pythium and also some bacterias: Pseudomonas and Erwinia.


Phytophthora


Effects on plants


Pseudoperonospora


Effects on plants

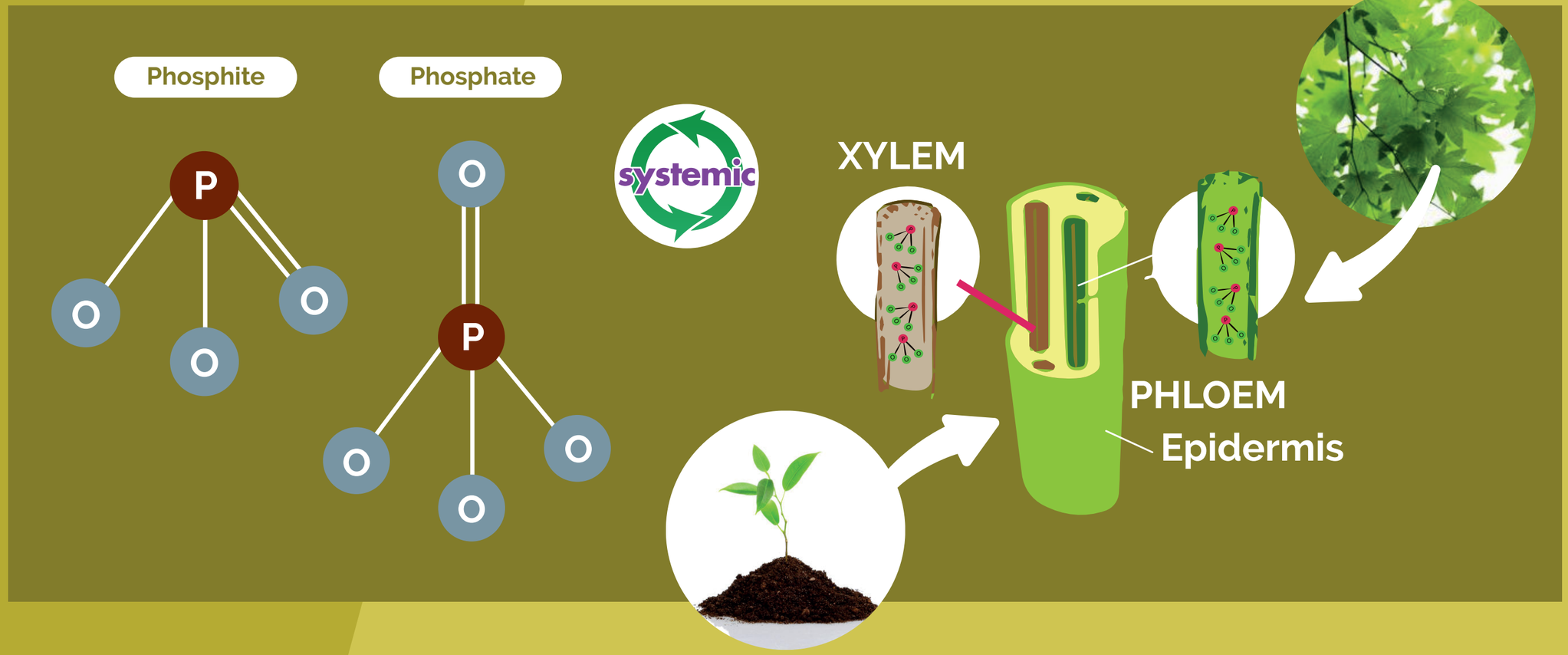

Erwinia


Effects on plants

It is specially recommended to prevent diseases caused by these pathogens, such as:

- Water spot and brown rot in citrus (fruits).
- Foot rot and trunk-branch canker (Gummosis) in avocados, citrus, top furits and ornamental trees.
- Fire blight in top fruits.
- Downy mildew in table and vine grapes, lettuces and onions.
- Blight of pepper.
- Root rot and downy mildew in: strawberries, tomatoes, cucurbits, vegetables and ornamentals.
- Brown blight of conifer fences.
- Damping-off in turf and lawns.

Phosphites (2 of 2)



Phosphites application

Sonaragro phosphite products are particularly flexible and can be applied to the plant in at least seven different ways.

FERTIGATION

Fertigation is the application of nutrients using a crop irrigation system. The nutrients are introduced into the water flowing through the system. Both solutions and suspension can be injected into irrigation systems using calibrated injection pumps that ensure precision over both space and time.

FOLIAR AND SPRAY

Foliar spray is the application of treatments to the leaves using appropriate spray equipment and sufficient water to provide adequate penetration and coverage. Equipment settings and water volume may need to vary , depending on the growth stage of the crop. Foliar solutions can be applied with the aid of conventional spray equipment i.e. fan sprayer, backpack sprayer, hi-boy, low or high volume

TRUNK SPRAY

Trunk spray is the application of treatments to the bark using appropriate spraying equipment. For tree crops it is highly recommended that trunk application is made in conjunction with Agrichem's patented basal translocation agent Pentrabark.

TRUNK INJECTION

Trunk injection is the application of treatment injected via a syringe into a driller hole at the stem or trunk of a tree. There is an art and a science to properly injecting chemicals. This treatment should only be conducted by a skilled tree care specialist who has been trained in the procedure.

TRUNK PAINT

Trunk painting is the process of painting the trunk and lower limbs of a tree with a chemical solution and should be conducted only during weather. The trunk paint treatment is used mainly to clean up wounds and infections.

IN-FURROW

In-furrow is a chemical application that occurs during the seeding process. A tractor is used to plough a furrow in the ground. As the furrow is being dug seeds are dropped and chemical tratment is applied at the same time. After treatment application is complete the furrow is covered over with soil.

SOIL DRENCH

Soil drench is the technique whereby a liquid (fertilizer, fungicide or other) is applied to the soild around a plant or seed. It can be applied at seeding or early planting or later, using a hand spray, boom spray or watering can depending on the size of area requiring treatment.

Fertilizer or fungicide

Phosphite based plant treatments have produced remarkable results not only in terms of disease control but also in terms of the nutrition results.

DISEASE CONTROL AND BACTERICIDE

Effective control of Phytophthora , Downy Mildew and Pythium, as well as other diseases.

Increased production of the natural fungicides (phytoalexins) effectively providing organic disease control.

Multiple sites of action inhibiting the developement of phosphite resistant strains.

Low environamental toxicity.

BIOSTIMULANT

- Better abiotic stress tolerance.
- Promotes yield and nutritional value of crops.
- Better yields and fruit quality.
- Enhanced plant and root developement.
- Improved plant health.

NUTRITIONAL

- Improve nutrient uptake and assimilation.
- Rapid Phosphorous Uptake, compared with conventional phosphates.
- Controlled release of phosphorous through various growth stages of the crop.

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Sonar Phosphite Products

Excellent

sonar Phos Pk

sonar agro

Excellent

soil foliar

sonar agro

Phosphites - Plant Defense Inductors

Sonar Phosphite Products

Composition	%w/w
Phosphorus (P_2O_5)	30
Potassium (K_2O)	20
Free aminoacids	4
pH: 4,5 - 5,5	
Density: 1,42	

Phosphopeptides

Phosphopeptides with: Global Protection, Fungicide Action

Humic-Fulvic Acids. Biostimulant

Characteristics

EXCELLENT actives the natural mechanisms of the plants defense to protect them against the attack of pathogens.

The incorporation of phosphopeptide, makes the absorption of phosphorus faster and more systematic. This way, their fungicide and ambient anti-stress are strengthened.

Double effect in the global stress:
Against biotic stress: It causes a specific response in the vegetable, stimulating the Proteins of Pathogenic Stress, that protects the plant against a biotic stress by pathogen attack.

Against abiotic stress: Amino-acids contained in offer a great generic response, increasing the tolerance of the plant against the abiotic stress (hydric, temperature, etc.).

This response increases the resistance (for generic causes) of the plant. These amino-acids help keeping the osmotic potential against foliar drying caused by a fungus infection.

Application

All crops	Dose	Nº of applications
Foliar application	250 - 350 mL/Ha	Depending on the stress intensity, make between 2 and 4 applications each 7-14 days
Soil application	8 - 12 L/Ha	

In case of “paint the trunk”, apply the product concentrated in a 50%.
In case of submerging the plants, use a dose of 1,0 and 1,5 liters of product each 100 liters of water.

Re-entry to the treated area

0 hours. Not applicable.

Make between 2 and 4 applications each 7-14 days.

EXCELLENT can be applied in every moment. There aren’t contradictions or use limitations. It can be use even in the most critical phenological moment (budbreak, flowering, harvest, etc).

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Phos Pk

soil foliar

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IMPORTED FROM EU

Phosphites - Plant Defense Inductors

Sonar Phosphite Products

Composition %w/w

Potassium Phosphonate	95,0
Phosphorus (P_2O_5)	58,0
Potassium (K_2O)	38,0

Characteristics

SONAR PHOS PK is a greater activator of the natural defense of the plant against certain pathogenic fungi and bacteria. It stimulates the production of Phytoalexins, whichenhance the host's natural defences against Oomyces fungi: Phytohtora spp., Plasmopara viticola, Bremia, Pseudoperonospora, Peronospora, Pythyum and also bacteriae: Pseudomonasand Erwinia. It is specially recommended to prevent diseases caused by these pathogens, such as:

- Water spot and brown rot in citrus fruits.
Foot rot and trunk-branch canker (Gummosis) in avocados, citrus, top fruits and ornamental trees.
- Fire blight in top fruits.
- Downy mildew in table and vine grapes, lettuces and onions.
- Blight of pepper.
- Root rot and downy mildew in: Strawberries, tomatoes, cucurbits, vegetables and ornamentals.
- Brown blight of conifer fences.
- Damping-off in turf and lawns.

Application

CROP	APPLICATION	DOSES/ TREATMENT	SPRAY VOLUME	REMARKS
CITRUS AVOCADO TOP FRUITS	Foliar spray (H.V.)	250 g/hl	1.000 - 3.000 l/ha	Three (3) preventive treatments per season are recommended: in the beginning of Spring, Summer and beginning of Autumn. In top fruits, treat once or twice in pre-blossom or/and petal fall, to prevent fire blight.
	Foliar spray (mistblower)	600 g/hl	300 - 1.200 l/ha	
	Trunk painting	300 g/l	-	Scratch the infected part of the stem and paint the affected area. In case of the high pressure of the disease, make three (3) treatments per season.
	Soil (through drip irrigation)	5 - 7 kg/ha	-	Make 2 preventive treatments: 1st in spring: 2nd in autumn.
STRAWBERRIES	Soil (through drip irrigation)	2,5 - 5 kg/ha	-	Make 2-3 treatments to rooting to flowering to prevent attack Phytophthora cactorum.
	Foliar spray	250 g/hl	800 - 1.000 l/ha	From the start of flowering to the end of harvesting, make 3-4 treatments.
VINEYARD	Foliar spray (mistblower)	500 g/hl	300 - 500 l/ha	Treat every 15 days from flowering to ripening. A tank mix with preventive fungicide as Folpet or Mancozed are recommended.
TABLE GRAPES	Foliar spray	250 g/hl	600 - 1.000 l/ha	
LETTUCE and leaf crops	Foliar spray	2,5 Kg/ha	600 - 1.000 l/ha	Two (2) treatments are recommended: 1st: 7-10 days after transplanting. 2nd: 15 days later
ONIONS	Foliar spray	1,5 - 2,5 Kg/ha	300 - 500 l/ha	Three (3): preventive treatments per season are recommended:1st: three (3) true leaves stage. : 2nd: 15 days later. 3rd: 15-21 days later.
FENCES OF CONIFERS	Foliar spray	250 g/hl	600 / 1.000 l/ha	Make 4 treatments every month from Spring to mid Summer. Use up to 20-30 g in case of isolated big trees (soil drenching).
	Soil (drip irrigation or drenching)	10 g/m of fence	-	
TOMATOES/ CUCURBITS	Foliar spray	150 - 250 g/hl	800 - 1.000 l/ha	To prevent attacks of Phytophthora infestans/ Pseudoperonospora cubensis fortnightly (15 days) from flowering until mid-end harvesting. A tank mix Aliado is also recommended to control Alternaria.
PEPPERS	Soil (through drip irrigation or drenching)	2.5 Kg/ha	-	To prevent Phytophthora capsici attacks, treat every 15-21 days from one week after transplanting to harvesting. A tank mix with Hymexazol is recommended to also control Pythium.
TURF & GOLF COURSES	Foliar or sprinkler irrigation	0,75 -1 Kg/1000m2	-	Monthly treatmentsfrom beginning of Spring to mid Autumn are recommended. To control also Helminthosporium sp.and Rhizoctonia, treat (in tank mix) with Chlorothalonil and Flutolanil .

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