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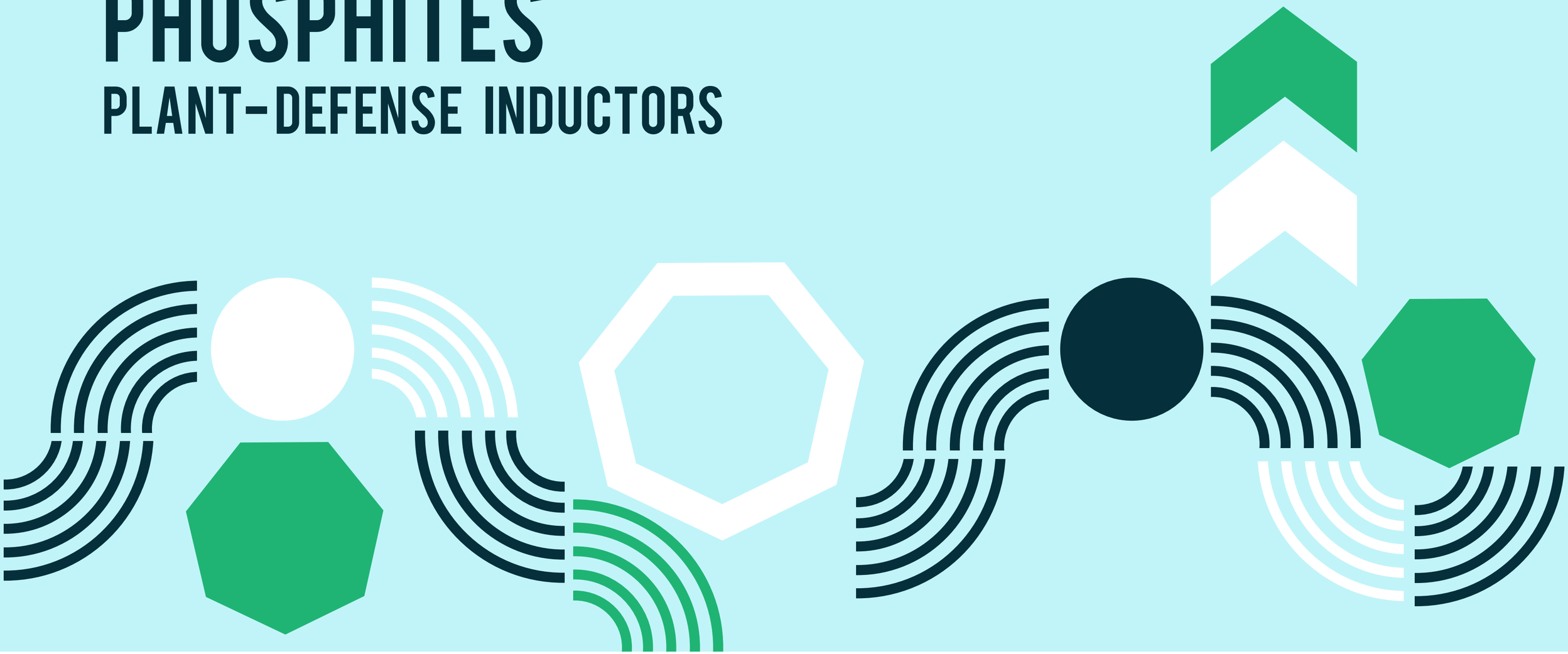
PHOSPHITES

PLANT-DEFENSE INDUCTORS



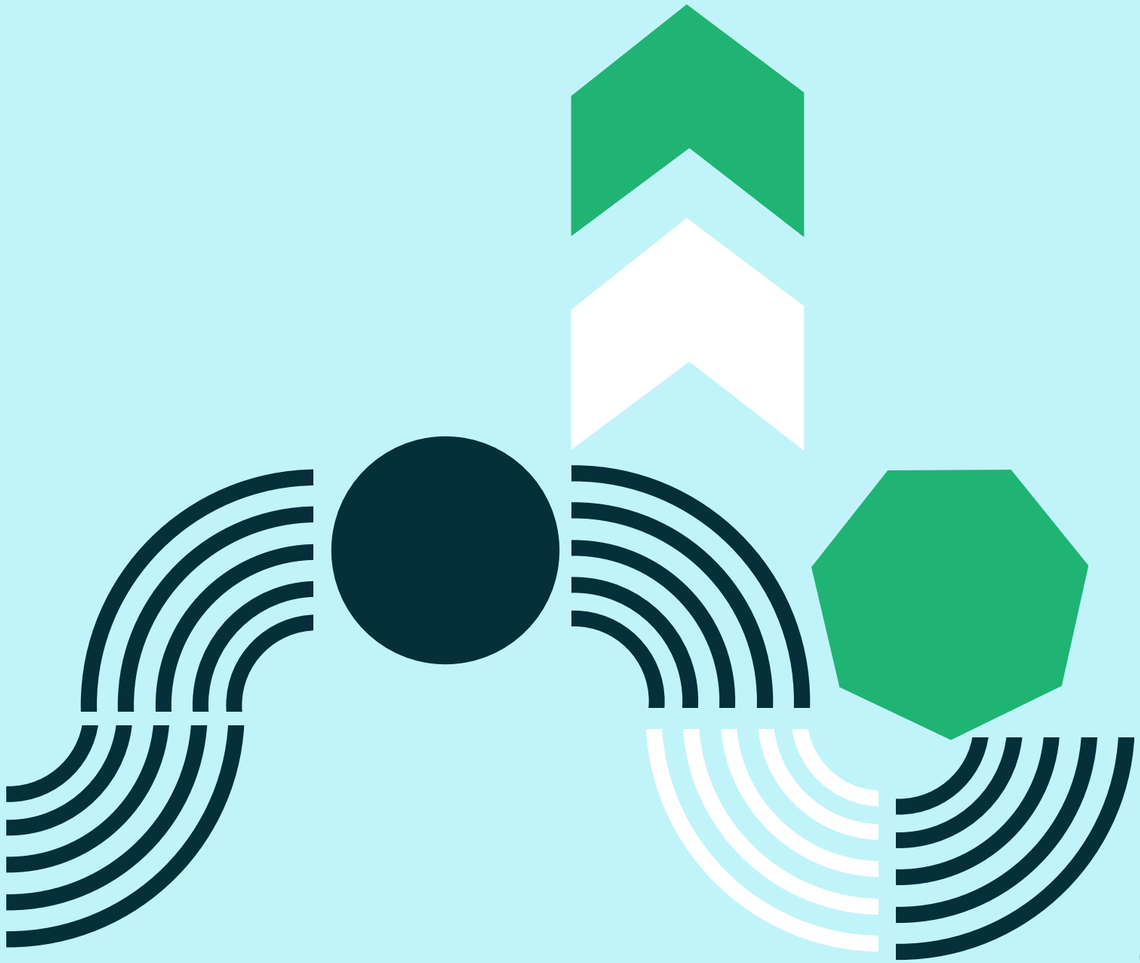
FERTILIZER-USE EFFICIENCY

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).



FERTILIZER-USE EFFICIENCY

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:

1) INDIRECT ACTION. Increasing the host resistance against fungi attacks.

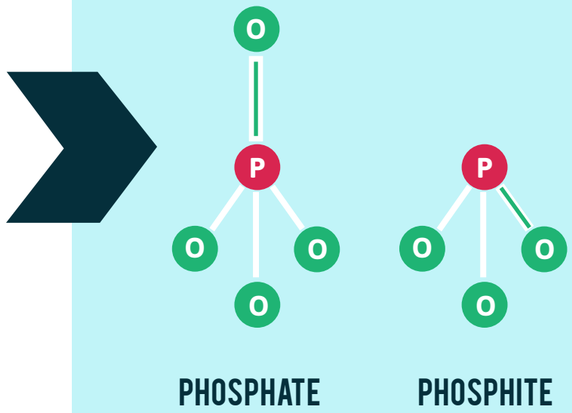
2) DIRECT ACTION. Slowing the growth of the pathogen and inhibiting the formation of spores.

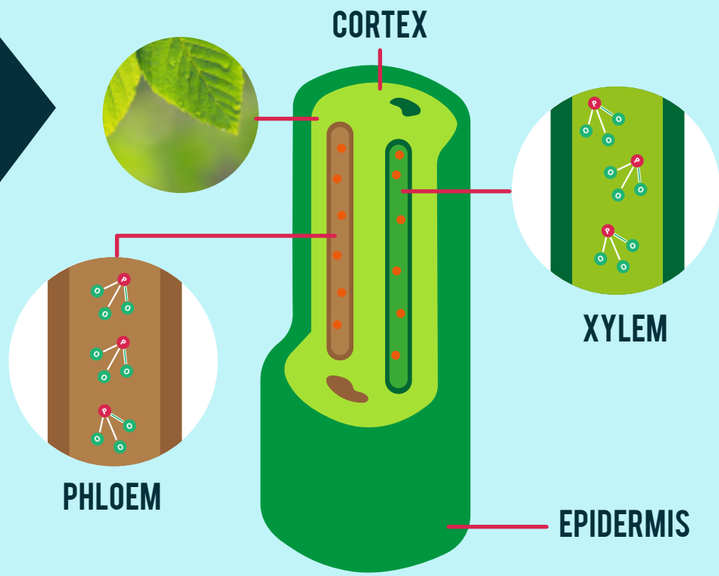
Its stimulates the production of:

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

It is 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.





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PHOSPHITES APPLICATION

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

FERTIGATION

Is the application of nutrients using a crop irrigation system. The nutrients are introduced into the water flowing throguh 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 ground sprayer, aerial sprayer etc.

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 lowerlimbs 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.

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 splray, boom spray or watering can depending on the size of area requiring treatment.

IN-FURROW

In-furrow is a chemical application that occurs during the seeding process. A tractor is used is 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.

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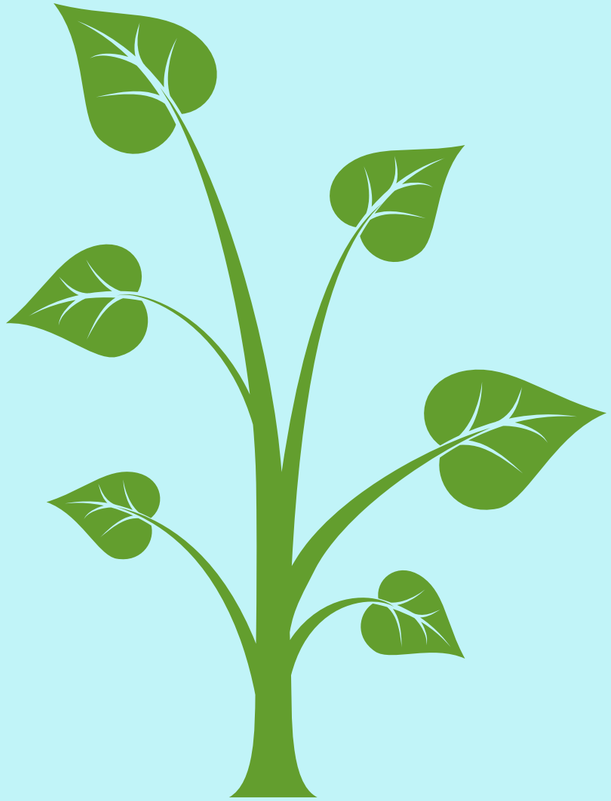
FERTILIZER OR FUNGICIDE

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.ol of Phytophthora , Downy Mildew and Pythium, as well as other diseases.
- **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.

PRODUCTS

Phosphite self defense
Soil/Foliar

Systemic

Phosphite self defense
Soil/Foliar

Systemic

PHIT-MZ

COMPOSITION	%w/w
Phosphorus (P_2O_5)	14,5
Zinc (Zn)	5,0
Manganese (Mn)	3,0

Density at 20°C 1,3 g/cc
pH 2 - 3

PHIT MZ is a soluble liquid that has in its formulation phosphites of manganese (Mn) and zinc (Zn) used as contribution of these elements and in the correction of shortcomings due to deficiencies or imbalances in the assimilation of them by the plants in all vegetable crops.

PHIT-PK

COMPOSITION	%w/w
Potassium Phosphonate	95,0
Phosphorus (P_2O_5)	57,0
Potassium (K_2O)	38,0

PHIT-PK is a water-soluble and stabilized product for: foliar, soil drenching, drip irrigation, trunk painting and hydroponic applications. Stimulates production of Phytoalexins, which enhance host natural defences against Oomycets fungi. Soluble and stabilised powder. It solves quickly and homogeneously in water.

PHIT-PK is easily uptaked by leaves, roots ans also through bark of trees. Dues its up and down systemic action, acts readily over sensible tissues increasing the host resistance against fungi atacks.

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