

**WHAT IS IT?**

Pre-Tect is a powder that contains a blend of buffers, de-chlorinating agents, patented chelated micronutrients and the patented harpin-protein

WHAT IS THE HARPIN PROTEIN?

The Harpin protein is a plant HR (hypersensitive-response) elicitor. It is a small protein that most pathogenic diseases produce in small amounts when attacking a plant. In Pre-Tect the protein is increased in concentration, and when sprayed topically over the plant, will fool the plant into thinking it is under attack by a pathogen, resulting in the plant both 'defending' itself and growing away from a pathogenic attack.

WHAT DOES THE HARPIN PROTEIN ACTUALLY DO?

The harpin protein binds to a specific receptor on the cell surface, and causes a change in cell signaling through changing the calcium concentration within the cells, resulting in a systemic response to the external application of Harpin. The treated cells respond to this signal by producing an initial defence response (phytoalexin production, oxidative burst sequence, increases in salicylic acid synthesis, etc.) followed a few days later by an increased growth response. This increased growth response is as a result of the expression of many genes within the plant, relating to cell division, nutrient transport (around the plant) and increasing photosynthesis.

HOW DOES THE PLANT RESPOND?

The plants respond in 2 distinct ways.

Initially they 'harden'. The treated cells think they are under pathogenic attack and produce stress-reducing proteins, toughen cell walls and start a chain-reaction of defence response. Then a few days later the plants will start to show an increase in growth, where photosynthesis capacity is maximized and cell division occurs. This is most clearly seen in young, emerging crops.

IS IT A SPECIAL FORM OF PROTEIN?

PHC Pre-Tect contains the active protein from 4 different plant pathogens, maximizing the efficacy and increasing the broad-spectrum of plants that are able to be treated. 99% of all monocot and dicot plants can be treated by PHC Pre-Tect, with all current commercial plant varieties being treatable.

WHY USE ADDITIONAL CHELATED MICRONUTRIENTS?

Because when growing a crop the presence of nutrients where and when they are needed is one of the most important factors to get right, PHC have formulated this product to enhance the response from the plant, maintaining colour and enabling maximal growth to occur. Photosynthesis is increased as a result of Harpin application, so it is important to maintain adequate supplies of the essential micro-nutrients involved in photosynthesis (Iron, Manganese, Zinc and Copper).

WHY ARE THE MICRONUTRIENTS SLOW-RELEASE?

Due to the delay in the growth response of the plant. The 'friendly' manner of the patented polysaccharide chelation enables a calculated release of micro-nutrients for several days after application. This release will coincide with the delayed growth response of the plant, delivering what is required, when it is required.

WHAT WILL IT DO TO MY CROP?

Increase the photosynthetic capacity of the leaves, increasing growth, increasing flowering uniformity, increasing fruit set and fruit filling. Increase the shelf life* of treated crops and help to reduce nutrient related deficiencies (eg: calcium related tip-burn or cracking of fruit)

** application timing before harvest is critical in shelf-life extension*

WHERE WOULD I USE IT?

It is a topical spray application to the leaves of the plant, although the protein is not systemic, the effects of the protein are.

A fine spray will ensure better coverage. A weak surfactant can be used to improve penetration (0.05% solution of PHC Yuccah as final spray)

WHEN SHOULD I USE IT?

Application is advised at physiologically important stages of the life-cycle of the plant.

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| For flowering crops: | Apply 7 days before first flowering, and every 14-28 days until final fruit set. |
| For leaf crops: | Apply between 21 and 7 days before harvest, several applications may be required - dependant upon crop. |
| For root crops: | Apply at 30 and 14 days before harvest. |

For specific information about your crop please contact PHC for technical support.

OTHER THAN FOR INCREASING GROWTH, ARE THERE ANY SPECIAL USES FOR PRE-TECT?

Yes. It can also be used to reduce any stressful event in a crop's cycle, e.g.: when used with a graminicide the harpin will suppress the slightly toxic effects of the graminicide on the harvested crop, thus increasing yield, whilst increasing uptake of the graminicide on the target crops, increasing efficacy. It can also be used just after transplanting or cropping, to reduce the effects of stress on the plants.

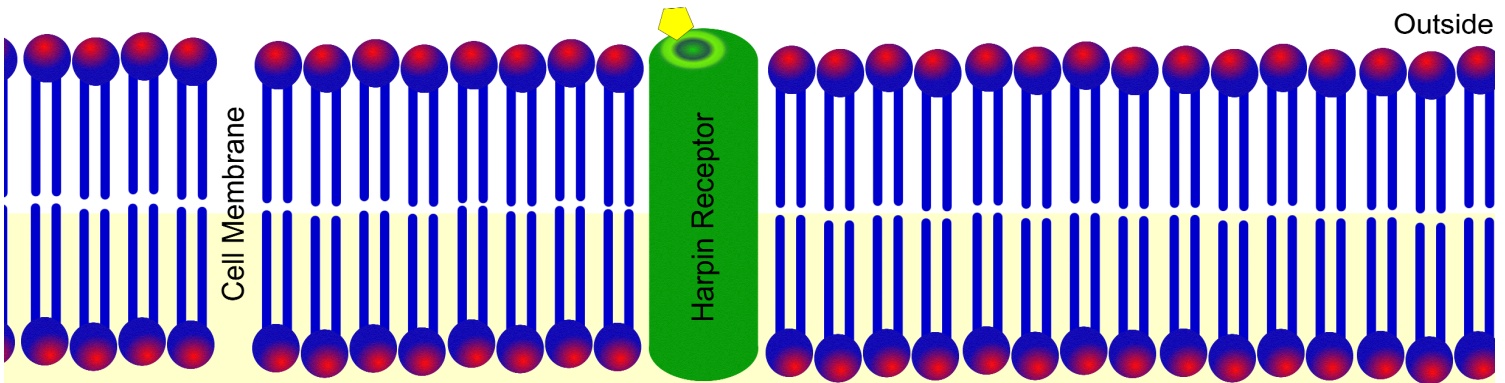
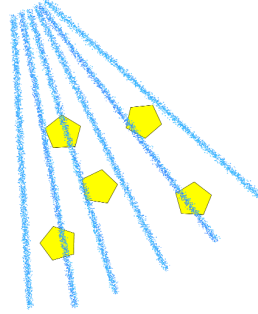
ANY HANDLING ISSUES?

Although we have formulated the product for tank-mixing in most scenarios, the protein 'active ingredient' is still susceptible to attack by chlorine, or any hydrolyzing agent. Also please be aware that extremes of pH and poor water quality will also have a detrimental effect on the protein and its ability to dissolve.



TECHNICAL BULLETIN
PHC™ PRE-TECT

Spray Harpin Protein



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Direct Response:

- Stronger Cell Walls
- Increased Phytoalexins
- Increased Nutrient Transport
- Increased Photosynthesis

Cell Nucleus

Gene Expression

Indirect Plant Response:

- Growth
- Increased Flowering
- Increased Fruiting
- Stress reduction

