



**Improved plant health for  
higher more consistent yields**

## The Benefit of Employ's Plant Health Response



- Improved Plant Health & Vigor
- Increased Yield
- Superior Tuber Quality
- Disease Resistance
- Better Tuber Size Uniformity
- Reduced Storage Loss
- Nematode Resistance

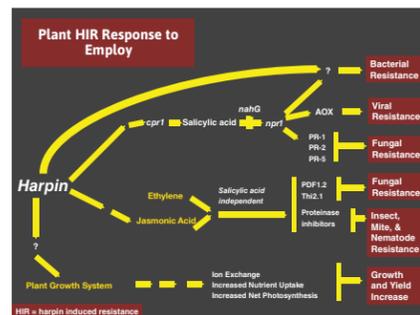
Harpin Proteins in Employ generate a biological response within the plant, initiating and inside out defense response improving plant health and adding a layer of protection towards many diseases, nematodes and environmental stress conditions.



# Improved plant health for higher more consistent yields

## What is Employ?

Employ is a biochemical pesticide that triggers a systemic plant health response. The Harpin protein active ingredient binds to receptors on the plant. Harpin Proteins are naturally occurring Plant Health and Growth Promoters proven to increase yields, improve plant health and extend storage life. Discovered at Cornell University in 1992, Harpin Proteins were found in the fire blight pathogen in apples when scientists had aimed to identify specific bacterial proteins responsible for triggering the Hypersensitive Response. Simply stated, Harpin Proteins “trick” the plant into generating a localized Hypersensitive Response, which is followed by a Systemic Acquired Resistance response (SAR<sup>\*</sup>), resulting in increased plant health and plant yields.



## Trial Results

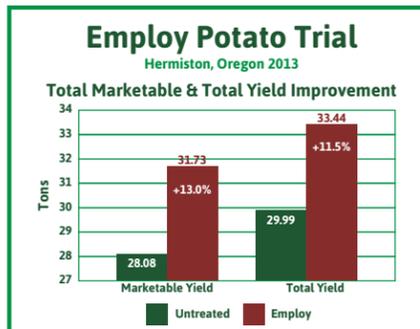
Harpin Proteins have over 20 years of research, including over 138 University and Field Trials on potatoes.

Notable potato trial results include:

- Increased yields from 4-15 %
- Increased marketable yields from 6-15%
- Reduction of disease incidence & severity
- Reduction of nematodes up to 40-70%
- Reduced storage loss of 28-62%

## Tuber Sizing Effect on Potatoes

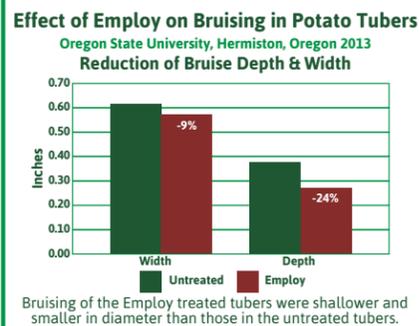
When Employ is applied in the tuber set stage, the plant responds by accelerating growth, nutrient uptake and cell division, increasing tuber cell division and development of larger tuber cells. The results are larger potatoes at harvest time. The average yield response is 8% increase in total yield and marketable yield.



## Improved Tuber Quality

The potato stress defense response to Harpin helps increase the level of antioxidants, antibacterial and self-healing properties of the tuber skin resulting in

better storing potatoes. The benefits are a reduction in post-harvest disease and more importantly reduction of storage loss due to normal respiration. The internal benefits are reduced effects of tuber bruising reducing both the width and depth of bruising.



## Storage Loss Prevention

Potatoes storage loss due to respiration occurs primarily in the early storage phase. Normal metabolism, continues to reduce tonnage during storage. Trial work from 20 locations showed an average of 28% reduction of storage from in season Employ applications. Washington trials resulted in storage loss reductions as high as 52%. In many cases the storage benefits alone will more than pay for the cost of the treatments.



## Disease Suppression

Employ's activation of the plants defense system; “triggering the SAR response”, improves the plant's overall immune system, offering protection against plant diseases. Increased immunity produces healthier plants and greater resistance to many fungal, viral and bacterial diseases. The systemic plant response typically leads to a thickening of cuticle walls, and an increased level of

disease fighting properties within the plant. This inside out defense results in an added mode of action to compliment most conventional disease control programs. Employ has demonstrated suppression of Scab, Silver Scurf, Black Scurf, White Mold and Rhizoctonia in addition to bacterial diseases.

**Couldn't decipher which was the Rhizoc graph in the powerpoint**

## Nematode Suppression

The harpin protein in Employ itself has no direct effect on nematodes; application to the crop causes a systemic response that primes the plant's nematode defenses in the roots. Plants have a variety of tactics available to respond to nematode attack. These tactics can include the production of nematode hormones, reactive oxygen compounds, thickened cell walls, toxic proteins, defensive proteins, or even volatile compounds that attract enemies of the nematodes. While this defense does not provide 100% nematode mortality, it can greatly reduce their ability locate and penetrate the roots and tubers. The results from numerous university and independent trials demonstrate the interference of the nematode lifecycle reducing nematode eggs, juvenile and adult populations as much as 40-70% in all tested crops. See graphs below.

## Environmental Stress Defense

The plants defense response initiated by Employ helps pre-condition potatoes for an upcoming stress event, helping with improved plant functioning under high heat or water stress events. This improved stress defense helps maintain, active growth, apical dominance, and reduces brown center caused by heat events. See *Employ Influence on Potato Brown Center & Storage Loss graph under Storage Loss Prevention on previous page.*

## The Employ Advantage

Adding Employ to your potato program helps increase yields and protects your crop from adverse disease incidence or environmental stresses throughout the growing season. The benefit of improved plant health, results in reduced crop variability, improved yields, and higher quality better storing tubers.

## Useful Information

**Duration:** The harpin defense response last 21-28 days in potatoes

**Food Tolerance:** Employ is exempt from EPA food tolerance and has no crop export restrictions

**Zero Residue:** Within a few hours after application there is no detectable residue of harpin

**Application:** Employ can be applied through sprinkler systems, by ground or air applications.

**Tank Life:** Once tank mixed, use within 12 hours to ensure product viability.

**Regulatory:** 4 hour REI / 0 day PHI / Caution Signal word

## Application Timing

Tuber Sizing, Uniformity and Storage Improvement: (Market Potatoes)

Apply first application during tuber set (dime size tubers) to increase cell division & size. Apply up to two additional applications on 21-28 days intervals.

Increase Tuber Set: (Seed, Fingerling or Baby Red Potatoes)

For increased tuber set make first application when new growth starts up first hook and 21-28 days later. For continued sizing addition application can be made on 21-28 day intervals.

Always read and follow label directions before using Employ

Available at your local Ag Supplier  
For More information ask your crop advisor or contact Peter Bierma at 503-799-4551  
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