



AmyProtec[®] 42

Biomangement





AmyProtec® 42

A biological bactericide for the reduction of *Pectobacterium* / *Dickeya* spp. (originally *Erwinia*) causing bacterial soft rot and black leg in potatoes.

AmyProtec® 42 contains spores of the beneficial bacteria *Bacillus amyloliquefaciens* strain FZB42, which have been widely used for their potential to suppress plant pathogenic fungi and bacteria.

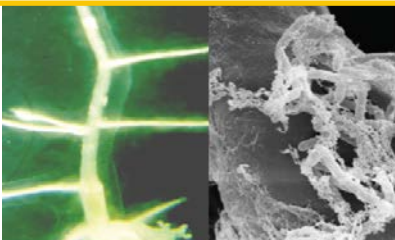
Why Use *AmyProtec*® 42?

Features	Benefits
Produces antimicrobial metabolites	Suppresses pathogen multiplication and spread
Root growth stimulation	<ul style="list-style-type: none"> Improves general root health and development Increases plant vigour and vitality
Root, tuber and bulb colonisation	Insurance against root disease
Stimulates Induced Systemic Resistance (ISR)	Reduction in disease intensity and frequency when used as a preventative measure
Easy to use	Versatile application strategies. Compatible with most crop protection products and fertilisers
Highly concentrated liquid formulation	Cost effective solution with economical application rates
One of the most thoroughly researched bacterial products available in South Africa	Proven history of performance and efficacy
Non-toxic, non-GMO and no withholding period. OMRI Listed	Suitable for use in organic agriculture

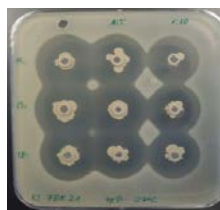
How does *AmyProtec*® 42 work?

AmyProtec® 42 is a concentrated liquid formulation of *Bacillus amyloliquefaciens* strain FZB42, a non-pathogenic microorganism occurring naturally in the soil.

These beneficial bacteria, when applied to plant roots, quickly colonise the root system forming a protective biofilm in which other bacteria and fungi cannot survive. Plant pathogens are therefore outcompeted and unable to infect and proliferate in plant tissues.



Microscopic and scanning electron microscope images of *Bacillus* spp. bacteria forming the protective biofilm on root surfaces.

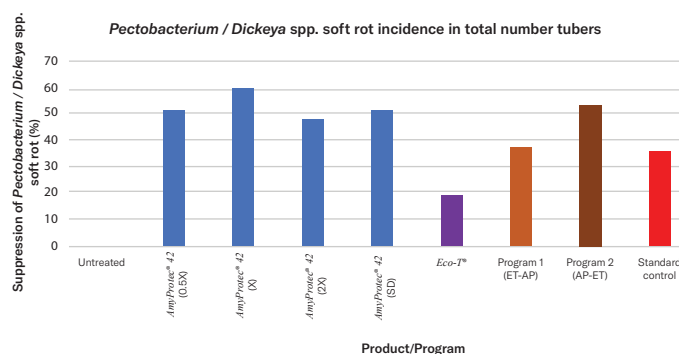
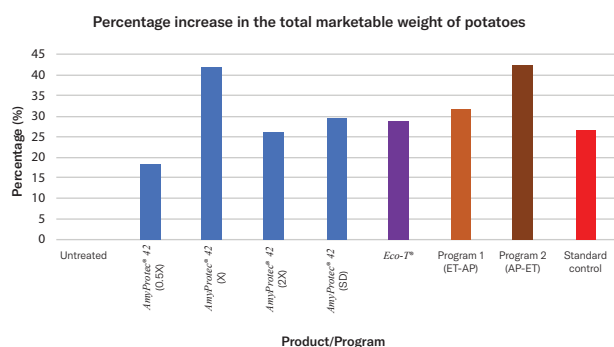


Bacillus amyloliquefaciens plated onto agar with pathogenic bacteria. The clear zone indicates a zone of inhibition where pathogenic bacteria will not grow due to the presence of antibiotics.

These pictures illustrate the mode of action of *AmyProtec*® 42 in protecting plant roots and any associated tubers from disease. (Pictures courtesy of Andermatt BioControl).

Trial data:

The below results show that *AmyProtec*[®] 42 and *Eco-T*[®] used individually or in combination programs are suitable for use as in-furrow potato tuber seed treatments. The combination of after plant and emergence soil drench applications increases healthy vegetative growth and marketable tuber yield with good suppression of fungal and bacterial pathogens, causing powdery scab, *Fusarium* dry rot, common scab, and *Pectobacterium* / *Dickeya* spp. (originally *Erwinia*) soft rot in potato grown under field conditions.



Graph 1: Percentage increase in the total marketable weight of potatoes compared with the untreated control.

Significant increases in the weight of marketable potatoes (class 1 & 2) were observed compared to the untreated control. *AmyProtec*[®] 42 at 500ml/ha (X) and spray Program 2 (see below) proved most effective with >41% increase in the total marketable weight of potatoes and differs substantially from the standard.

Graph 2: Percentage reduction in *Pectobacterium* / *Dickeya* spp. (originally *Erwinia*) soft rot in tubers.

Substantial suppression on the tubers were observed when compared to the untreated control. *AmyProtec*[®] 42 at all dosage rates proved to be very effective on potato tubers as well as Program 2 (see below). *AmyProtec*[®] 42 applied in-furrow at planting (500ml/ha) with a follow up soil drench application after planting, delivered a suppression level of more than 60% of *Pectobacterium* / *Dickeya* spp. (originally *Erwinia*) soft rot.

Program 1: *Eco-T*[®], *AmyProtec*[®] 42

Program 2: *AmyProtec*[®] 42, *Eco-T*[®]

Application timing with dosage rate of product in ml or g per hectare

1. ET in-furrow with planting: 500 g
2. AP soil drench 2 weeks after planting: 500 ml
3. ET soil drench 4 weeks after planting: 250 g
4. AP soil drench 8 weeks after planting: 500 ml

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Volume water in litre per hectare: In-furrow, 80 L. After plant soil drench: 10 000 L

The combination of *AmyProtec*[®] 42 and *Eco-T*[®] is suitable for use on potato tuber seed in-furrow and as after planting soil drench applications to tubers and emerged potato plants.

Diseases:



Soft rot on potato tubers



Powdery scab on potato tuber



Complex of fungal diseases including *Fusarium* dry rot, common and powdery scab symptoms on potato tubers

Pectobacterium / Dickeya spp. (originally *Erwinia*) is part of a complex of disease causing bacteria that result in the diseases commonly known as soft rot, black leg and stem rot of potatoes.

Pectobacterium / Dickeya spp. is a tuber-borne pathogen that results from and spreads with infected tubers which may be contaminated without showing symptoms of disease. Under favourable, wet conditions with high temperatures, the disease develops and spreads quickly making it difficult to manage. Soft rot and black leg may also occur at any stage and potatoes are at risk of developing the disease throughout the growing season. Harvested tubers that are infected, in field and during processing, may also develop symptoms during storage. These factors give *Pectobacterium / Dickeya* spp. the potential to cause significant direct and indirect crop losses.

Cultural management practices, such as planting dates, soil drainage, irrigation practice and proper sanitation, are commonly used in an effort to manage this disease. Chemical fungicides have little effect and often promote the disease as they leave a biological vacuum in which *Pectobacterium / Dickeya* spp. may proliferate. Building the crop's natural immunity and ensuring a balanced soil environment of beneficial organisms that will compete with *Pectobacterium / Dickeya* spp. therefore presents an opportunity for better disease management.

Registered Usages:

Crop/Pest	Rates & Volume	Remark
Potatoes <i>Pectobacterium / Dickeya</i> spp. (originally <i>Erwinia</i>)	Apply 500 ml/ha	Application timing and intervals <ul style="list-style-type: none"> · 1st <i>AmyProtec</i>® 42 application in furrow at planting or alternatively as a drench immediately after planting. · 2nd <i>AmyProtec</i>® 42 application 4 weeks after 1st application as a soil drench. · 3rd <i>AmyProtec</i>® 42 application 8 weeks after 1st application as a soil drench. Under conditions that are particularly favourable to the disease or in the soil known to have a history of disease additional applications of <i>AmyProtec</i> ® 42 may be done at 12 weeks and 16 weeks after the first application. NOTE: Product should be applied to ensure maximum infiltration into the root zone. In dry conditions it may be necessary to irrigate before and/or after application.

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