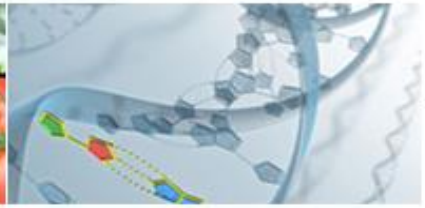
COS-OGA
A new active substance controlling powdery mildew

Pierre Van Cutsem
Géraldine van Aubel & Raffael Buonatesta

ABIM, Basel
20 – 22 October 2014





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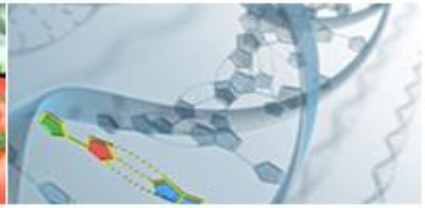

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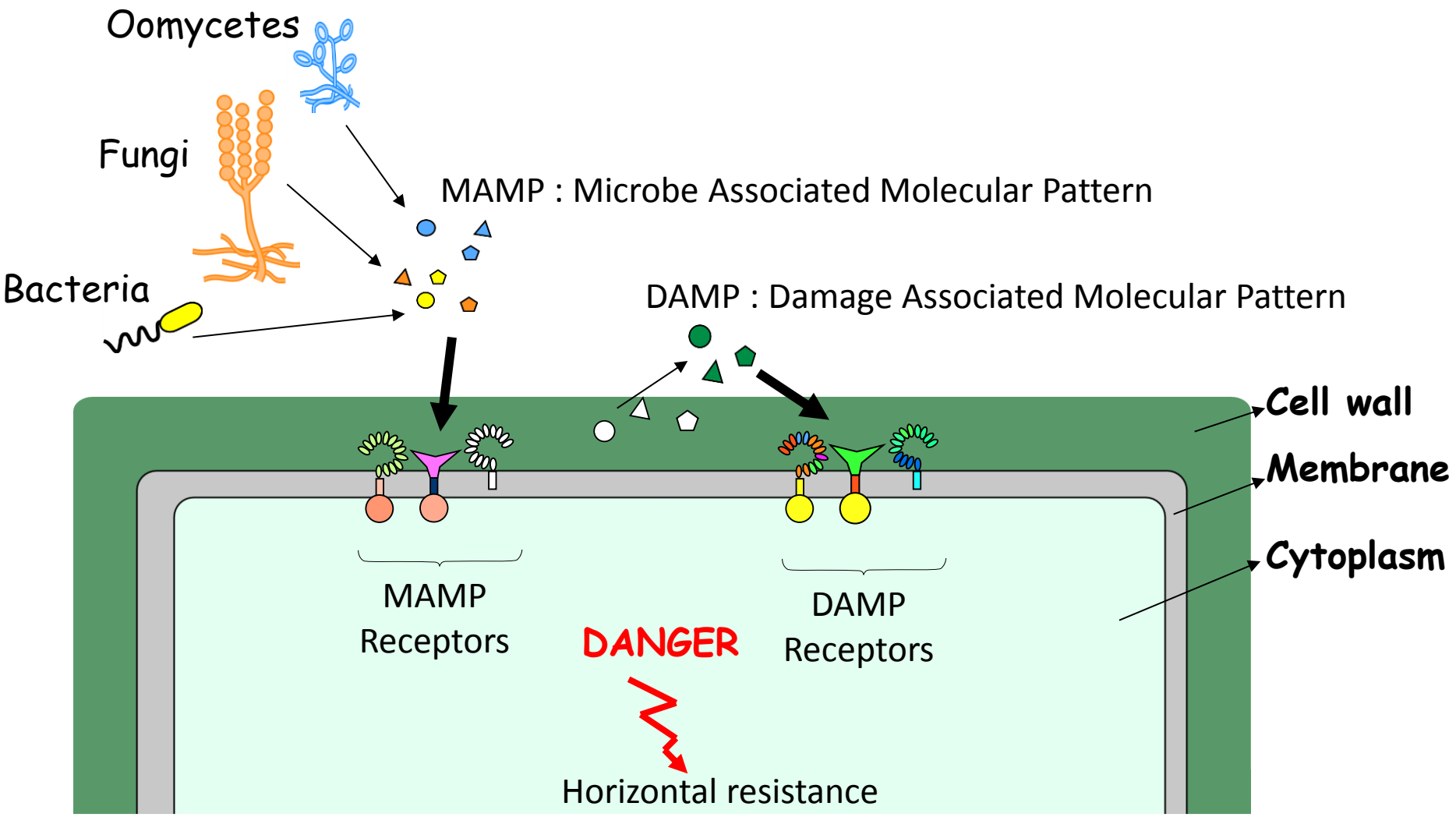
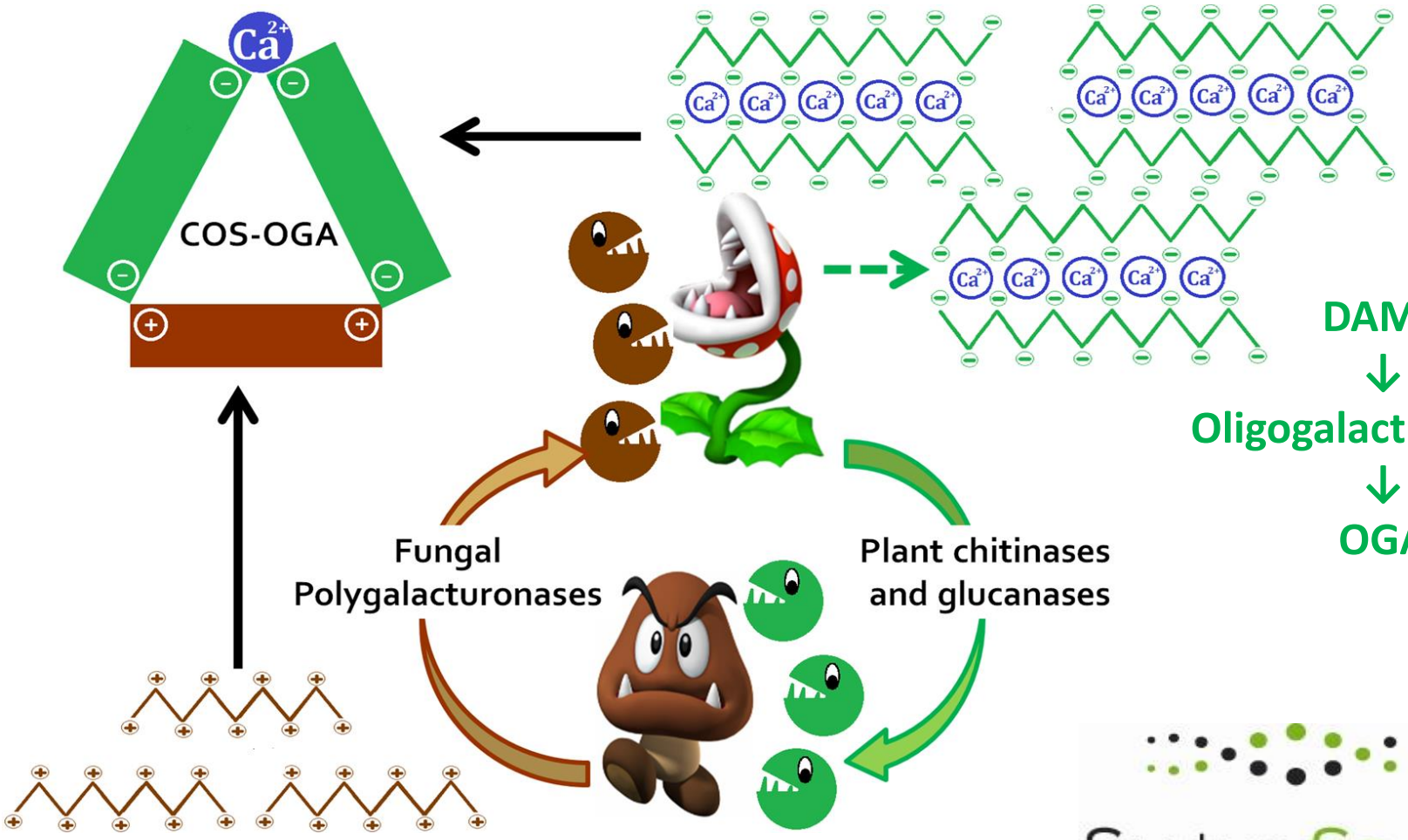
Plant immune system



Boller & Felix Ann. Rev. Plant Biol. 2009

An oligosaccharide complex as elicitor

Cabrera et al.,
Glycobiology, 2010



DAMP
↓
Oligogalacturonides
↓
OGA

MAMP → Chitooligosaccharides→ COS

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COS-OGA composition

Complex of oligosaccharides comprising:

COS
(chito-oligosaccharides)

→ Product from chitosan depolymerization

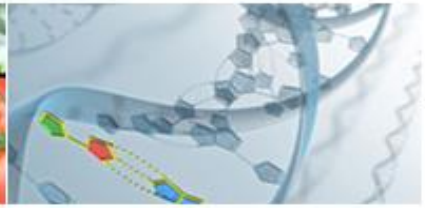
→ Chitosan is extracted from shellfish exoskeleton

OGA
(oligo-galacturonic acid)

→ Product from pectin depolymerization

→ Pectin is extracted from citrus/apple peel





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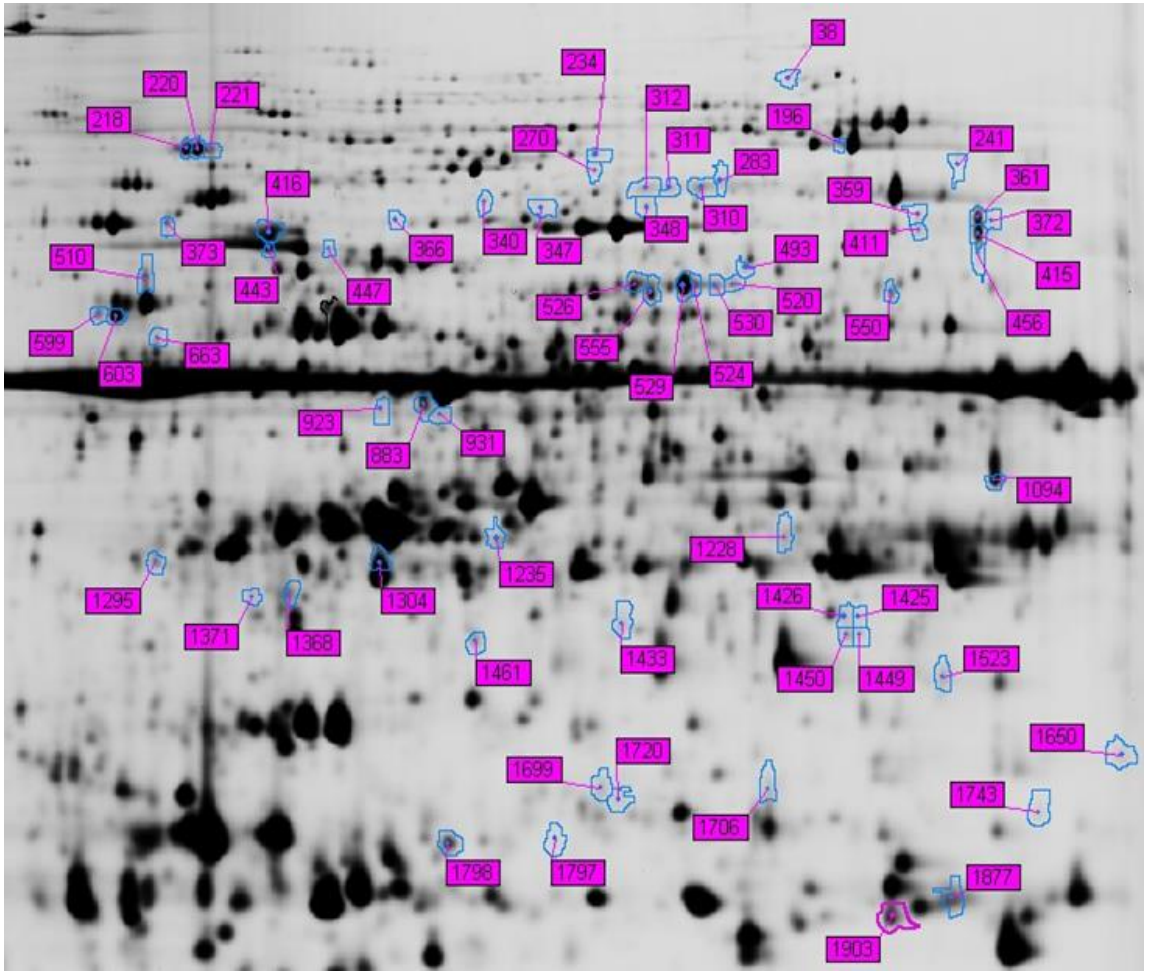
Proteomic study: 2D-DIGE

pI 4 → pI 7

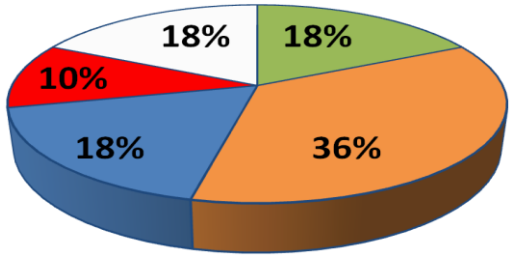


- Tomato leaves sprayed
- 64 spots regulated by COS-OGA with at least 1.2-fold variation ($p \leq 0.05$)
- Mass spectrometry
- 4 most regulated groups based on metabolic process

Proteomic study: MS identification

Met. process	Protein name in Uniprot	Regulation
Defense and stress response	Acidic 26 kDa endochitinase (CHIT3)	++
	Basic 30 kDa endochitinase (CHIT9)	+
	Glucan endo-1,3-beta-glucosidase A	+++
	Subtilisin-like protease (P69 b)	+++
	Subtilisin-like protease (P69 b)	++
	Subtilisin-like protease (P69 b)	+++
Protein folding	ER Luminal binding protein, BiP (Hsp 70)	+
	Heat shock protein 70 family Hsc 70 (Hsp 70)	+
	Heat shock cognate 70 kDa protein 2 (Hsp 70)	+
	Endoplasmin putative (Hsp 90)	+
DNA/RNA remodeling	MAR-binding filament-like protein 1 (MFP1)	++
	DEAD-box ATP-dependent RNA helicase	+
	DEAD-box ATP-dependent RNA helicase	+
Photosynthesis and energy metabolism	NADP-dependent glyceraldehydephosphate dehydrogenase subunit B (GPB1)	+
	Isocitrate dehydrogenase (IDH)	+
	Ribulose bisphosphate carboxylase/oxygenase activase, chloroplastic (RuBisCO activase)	+++

Proteins with significant variation sorted by metabolic process.



Regulation by COS-OGA is scored:

+ for 1.2 to 1.5-fold

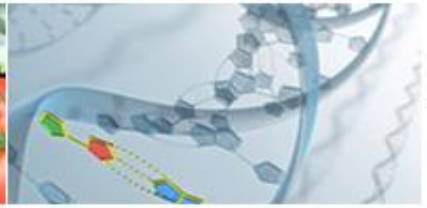
++ for 1.5 to 2-fold

+++ for 2 to 3-fold

FytoSave®: the formulated product

- ✓ 12.5 g/l **COS-OGA** (natural oligosaccharides)
- ✓ Soluble liquid (**SL**) concentrate
- ✓ **Not toxic** (LD_{50} > 2000 mg/kg)
- ✓ **No residue** (no PHI)
- ✓ **Not classified**
- ✓ Compatible with **OF** and **IPM** (safe for bees and beneficials)
- ✓ **Preventive**: induces premunition





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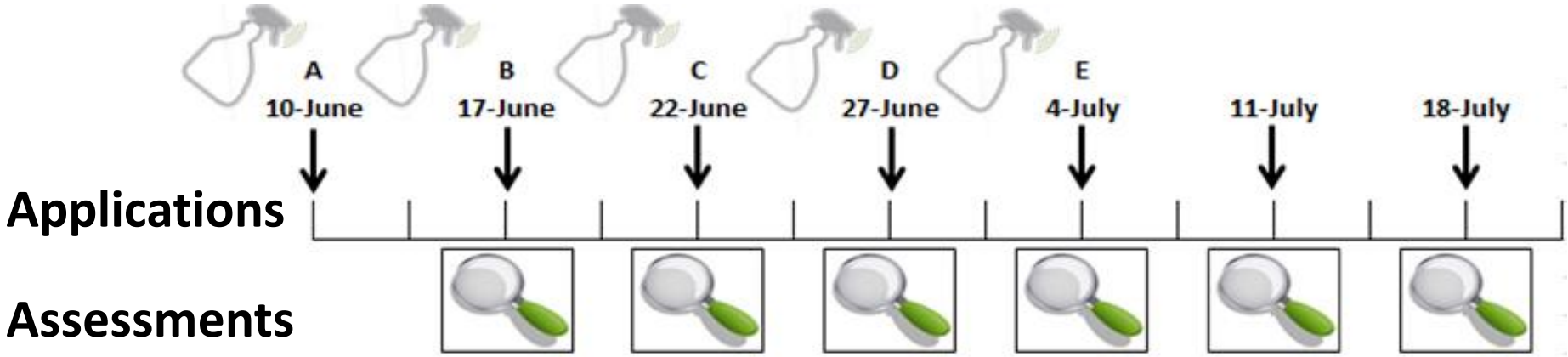
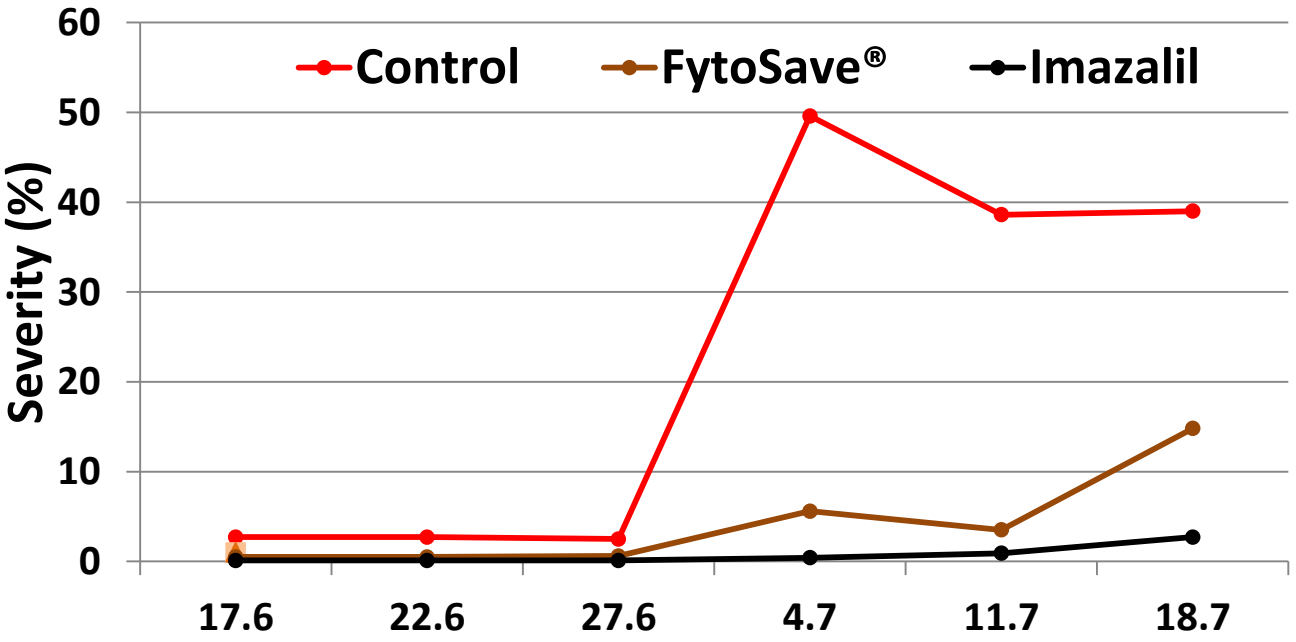
COS-OGA efficacy in tomato (NL)





Published results

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COS-OGA: A novel oligosaccharidic elicitor that protects grapes and cucumbers against powdery mildew

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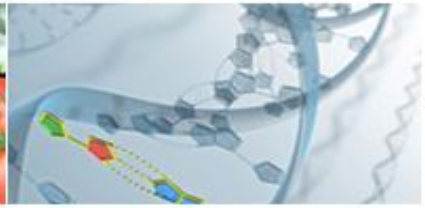
ARTICLE INFO

ABSTRACT





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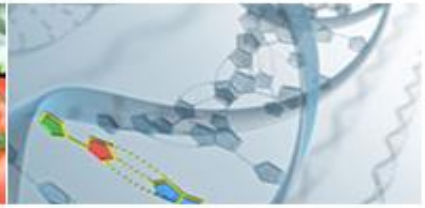
FytoSave®: the GAP

- ✓ **2 L/ha** (25 g COS-OGA/ha)
- ✓ **500 – 1 000 L/ha**
- ✓ Penetration through **stomata**
- ✓ Spray **both sides** of the leaves
- ✓ **7 days** interval
- ✓ **Cumulative** effect of the sprayings
- ✓ **5 sprayings** (BBCH stages 13 – 89)
- ✓ **Very good protection** against **powdery mildew** under **low to moderate disease pressure**





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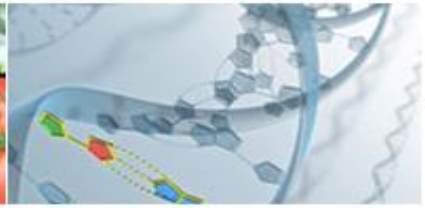
Main uses

- ✓ **Solanaceae** under greenhouse
  - Powdery mildew
- ✓ **Cucurbits** under greenhouse
  - Powdery mildew
- ✓ **Grape**
  - Powdery mildew
  - Downy mildew





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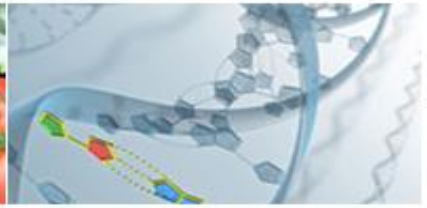
European registration

Date	Milestones
Dec. 2013	**DAR** (BE+FR) sent to **EFSA** (for peer review)
Mar. 2014	Peer review: **no major comments** from EFSA and MS
Oct. 2014	**EFSA approval of COS-OGA published**
End 2014	Registration in **Belgium (zRMS)** for formulated product **FytoSave®**
2015	**Registration in Europe for FytoSave®**





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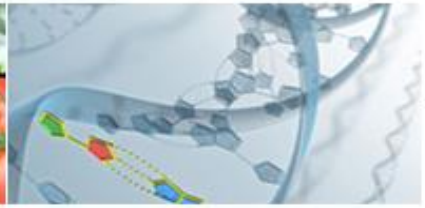
FytoSave®: Key points

- ✓ **Efficient**
- ✓ **Cumulative** effect of the sprayings
- ✓ **No** risk of **resistance** built-up
- ✓ **Not affected by UV** and **rainfastness**
- ✓ **No phytotoxicity**
- ✓ **Stable** at room temperature (at least 2 years)
- ✓ **Additional positive** effects
- ✓ **Patented** technology
- ✓ **Registered** soon





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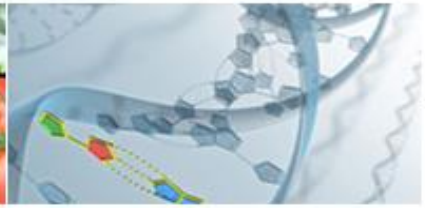
Thank you for your attention





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