Sergomil L60

Product Overview
January 2025

agreya™
Sustainable Agriculture

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Sustainable Agriculture

T.EC TECHNOLOGY

WHAT IS IT?

- Servalesa's exclusive technology, developed to meet farmers' needs.
- Aim is to develop unique and exclusive active substances with the capacity to activate the metabolism.

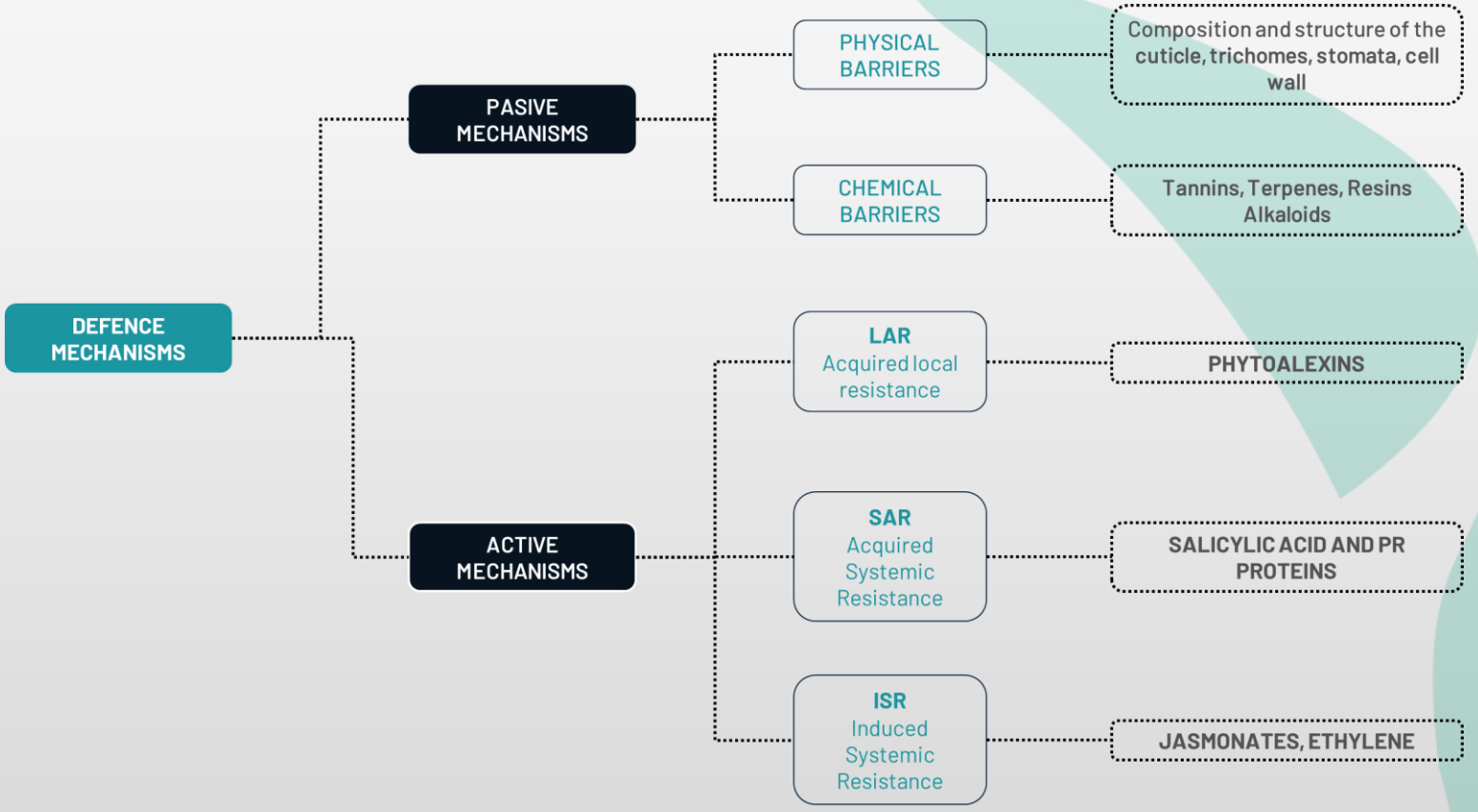
HOW DOES IT WORK?

- Acts on the plant much like a vaccination
- Activating a plant's metabolism to make it more resistant to different kinds of stress (either biotic or abiotic)

T.EC TECHNOLOGY

UNDERSTANDING ELICITORS

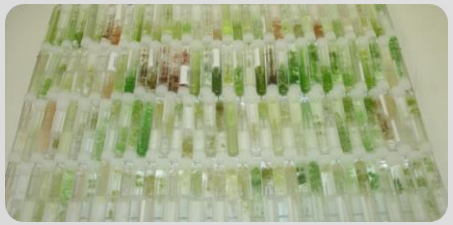
- Elicitors are molecules capable of inducing any type of defense mechanism in the plant and are produced by biotic and abiotic stressors

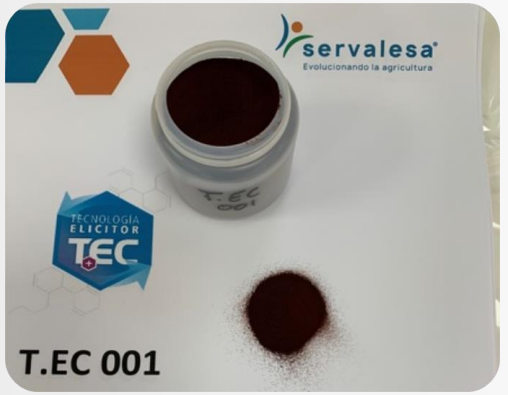


servalesa®

agreya™ Sustainable Agriculture

- A Credible R&D Partner
- Access to optimal sources of natural raw materials
  - Plant extracts and Organic Acids
  - Seaweed Extracts and Secondary Metabolites
  - Microorganisms and Secondary Metabolites
- Develop unique compounds on the market





SERGOMIL® L60

agreya™
Sustainable Agriculture

- SERGOMIL® L60 is used in more than 50 countries around the globe. 1
- SERGOMIL® L60 is a special and unique formulation that has been improved for more than 40 years. 2
- SERGOMIL® L60 is not a simple “copper gluconate” Far beyond that concept! 3

SERGOMIL® L60

What is SERGOMIL® L60

Copper + Saccharide derivatives

Copper sulphate

Saccharide derivatives are extracted and purified exclusively by Servalesa from two vegetal origins:
Pome fruit and non-gmo pectin

Monogluconic acid + Galacturonic acid

Monogluconates are more effective in agriculture because they provide nutrients in a simpler chemical form, allowing **faster absorption by plants**. They are also more stable across a wide range of soil pH levels, ensuring better nutrient availability compared to **heptagluconates**.

Galacturonic acid serves as an activator of plant metabolism by **stimulating** the production of growth-related hormones, enhancing **cell wall strength**, and **triggering defence responses** to improve growth and stress resilience.

- **Cu + monogluconic acid** = complexed Cu, better Cu absorption
- **Cu + Galacturonic acid** = Fungicidal and bactericidal effect (PR proteins, cell wall resistance, Cu)

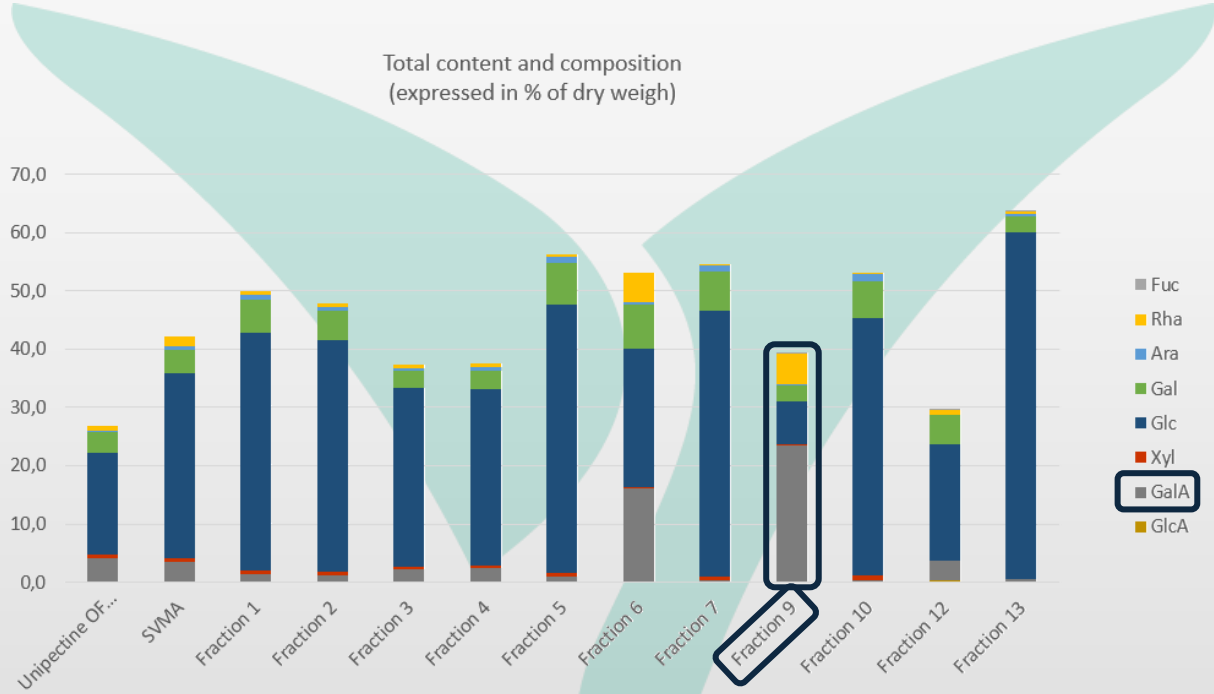
Importance of Galacturonic acid (extraction and content)

Galacturonic acid serves as an activator of plant metabolism by **stimulating** the production of growth-related hormones, enhancing **cell wall strength**, and **triggering defence responses** to improve growth and stress resilience.

Preparation of the fractions

Fraction / Product	*Corresponding code*	Process of preparation					Yield (in % of dry weigh of SVMA product)
		Charcoal	Cationic resin (IR120H+)	Anionic resin (IRA96HO-)	Sephadex	HPLC-C18	
Unipectine OF 605 SB	*EA0029-MA00*						
SVMA	*EA0029-EA00*						
Fraction 1	*EA0029-JA03*	•					59
Fraction 2	*EA0029-JA13*		•	•			46
Fraction 3	*EA0029-JA14*		•				100*
Fraction 4	*EA0029-JA22*			•			100*
Fraction 5	*EA0029-JA04*	•	•	•			26
Fraction 6	*EA0029-GA21*	•	•	•	•		1.6
Fraction 7	*EA0029-GA22*	•	•	•	•		20
Fraction 9	*EA0029-GA02*	•			•		3
Fraction 10	*EA0029-GA01*	•			•		35
Fraction 12	*EA0029-RA01*	•				•	4
Fraction 13	*EA0029-RA02*	•				•	15

* treatment through resins involves neutralization with NaOH or HCl, and thus additional material corresponding to salts are coming in the final purified product



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SERGOMIL® L60

CONVENTIONAL COPPER FUNGICIDES

- Creates a BARRIER across plant bark, twigs, leaves and fruit
- Releases copper ions when moisture is present, only then active against bacterial and fungal diseases
- No contribution to Cu nutrition (molecules too big)
- Soil and water contamination
- Causes stress to the plant
- Easy run-off in the event of rain

NUTRIENT COPPER

- Designed to enter plant tissue through roots or foliage.
- Active within the plant phloem
- Important for plant function
- Photosynthesis, metabolism of other nutrient, cell strength
- Chelated or complexed forms of Cu

SERGOMIL® L60

Let's discover!

MODE OF ACTION

SERGOMIL® L60
Neoestim

Nutritional Function

Plant Strengthener

Increase Cu levels in the crop to:

- Optimize metabolism (assimilation of other nutrients)
- Increased Photosynthesis
- Reduce copper deficiency

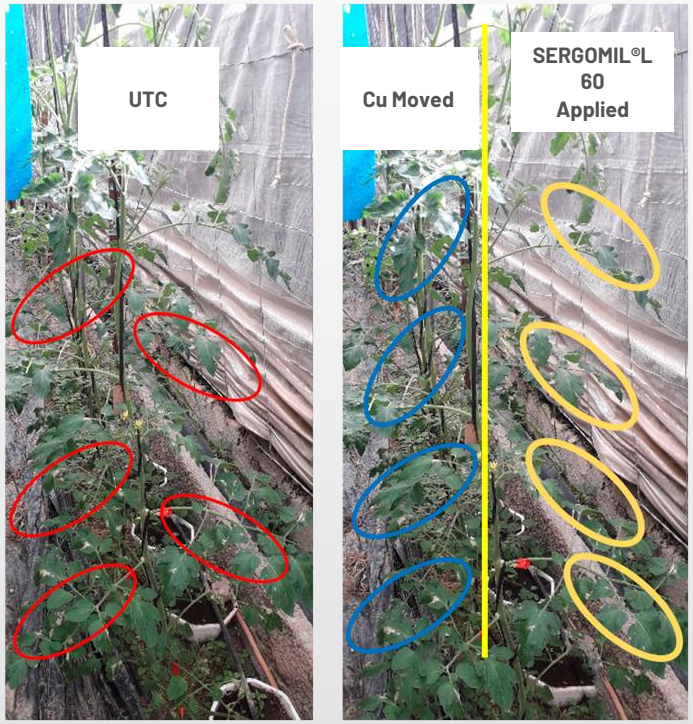
Reinforcement of the cell wall and plant structures

- Synthesis of lignin and callose, achieving a higher quality of fruit and strengthening the plant against stress phenomena, both biotic and abiotic.

Stimulates the synthesis of PR Proteins

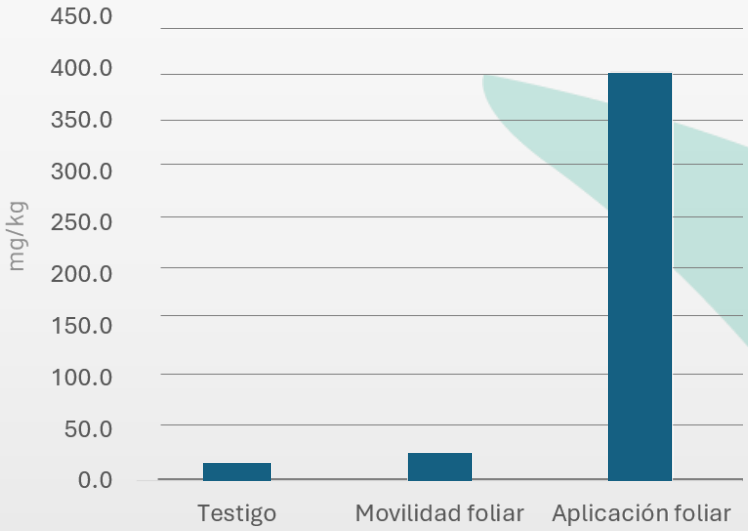
- Triggers production of phytohormone Salicylic acid
- Linked to the response and activation of the plants defence system

Cu MOBILITY IN THE PLANT



ANALYSIS 1 ANALYSIS 2 ANALYSIS 3

Cu Content In Leaves



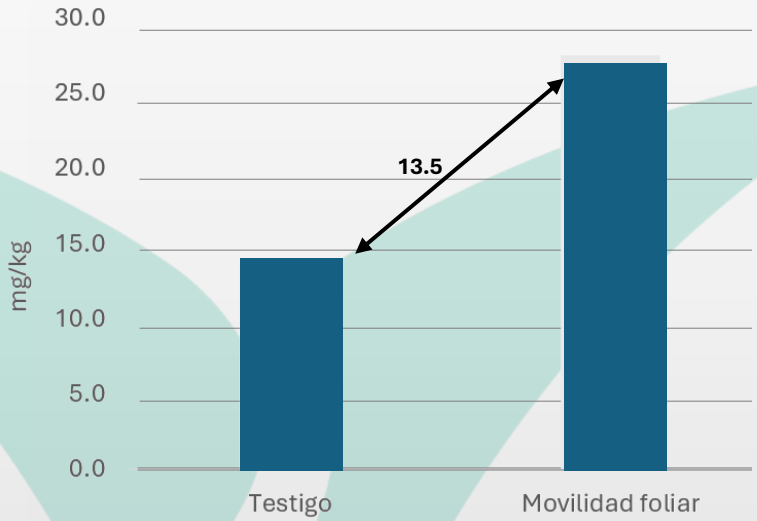


TABLE 1. Treatment Comparison

	UTC	Non Appl	Appl
Cu (mg/kg)	14.0	27.5	397.5

TABLE 2. Movement Across Plant

	UTC	Non Appl
Cu (mg/kg)	14.0	27.5

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Cu MOBILITY IN THE PLANT

- ASSIMILABLE SOURCE OF COPPER: through studies carried out at CSIC, we can confirm the product's high efficacy in supplying systemic copper, complexed by the consortium of saccharide derivatives.

Date	Copper ppm (mg/kg)
Control 1	3.213
Control 2	2.871
Copper sulphate 1	5.416
Copper sulphate 2	4.584
SERGOMIL® L60 1	15.897
SERGOMIL® L60 2	14.278

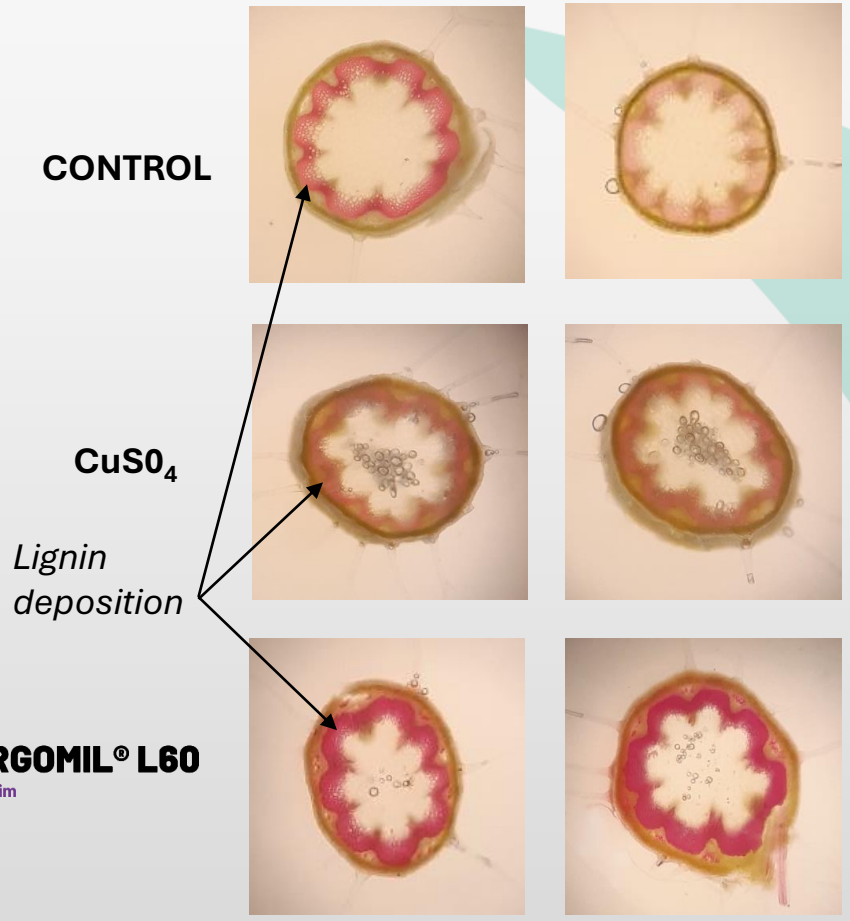
- Copper absorption in plants is enhanced when it enters through sugar transport channels, as these pathways facilitate the uptake of copper-sugar complexes, improving its mobility and bioavailability.

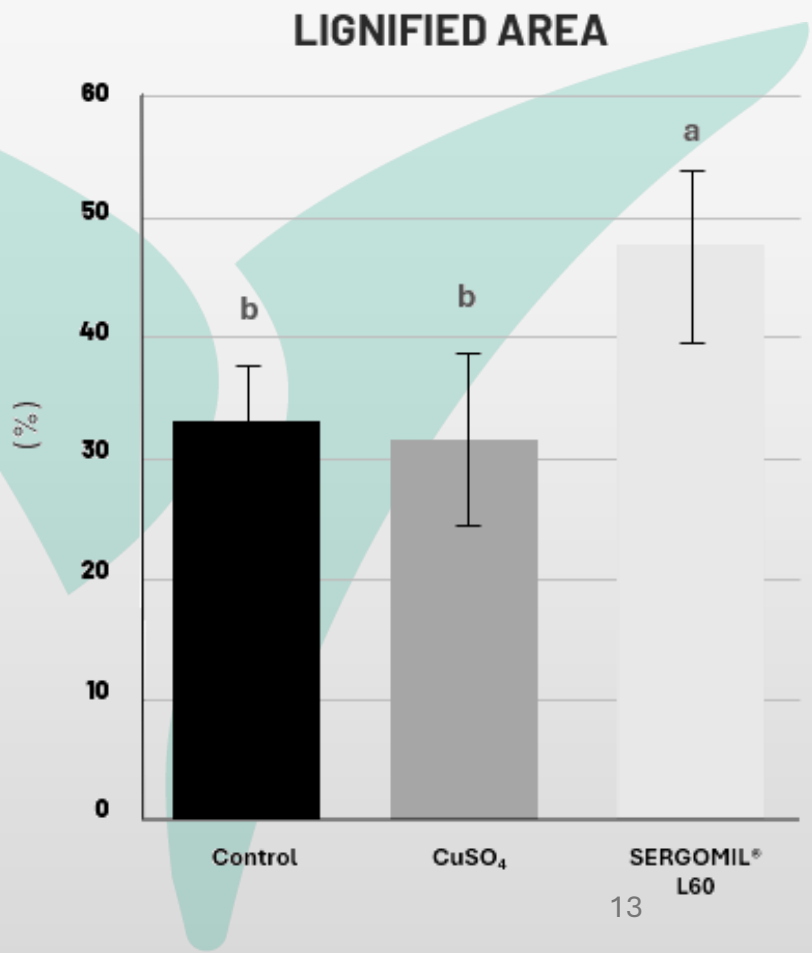
CELL WALL STRENGTH

- Prevention of the infection and subsequent development of the pathogen on the surface of the leaf and on the stems…by SERGOMIL® L60 strengthening the cell wall

- 10 hours after foliar application **LAC4 genes** that are related to **LIGNIN** biosynthesis significantly expressed

- A greater deposition of **LIGNIN** in the **stems** was observed treated plants suggesting a capacity to strengthen the cell-wall.

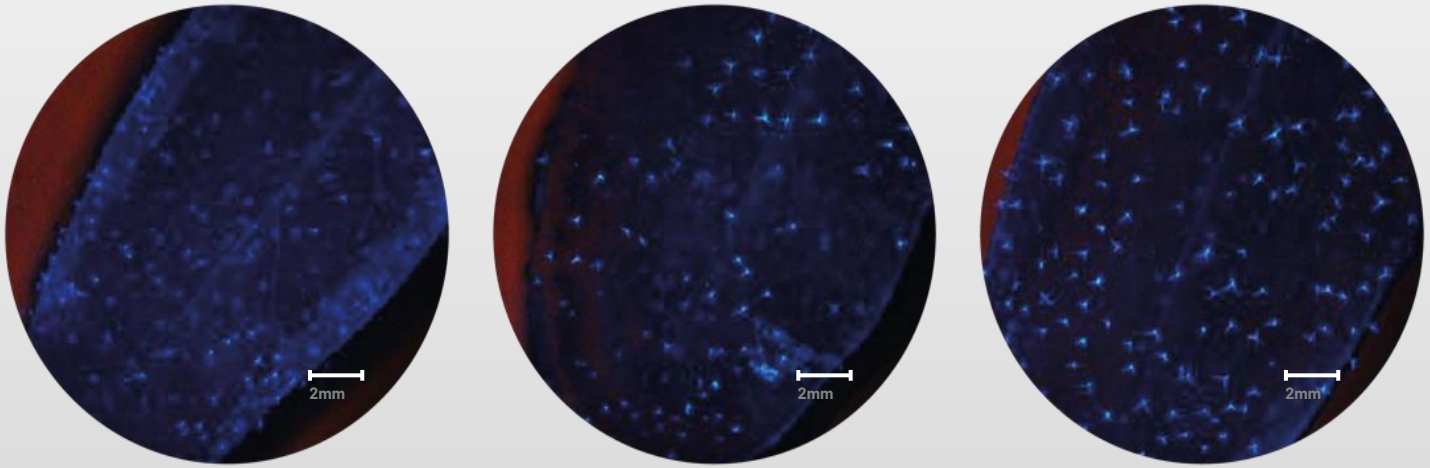




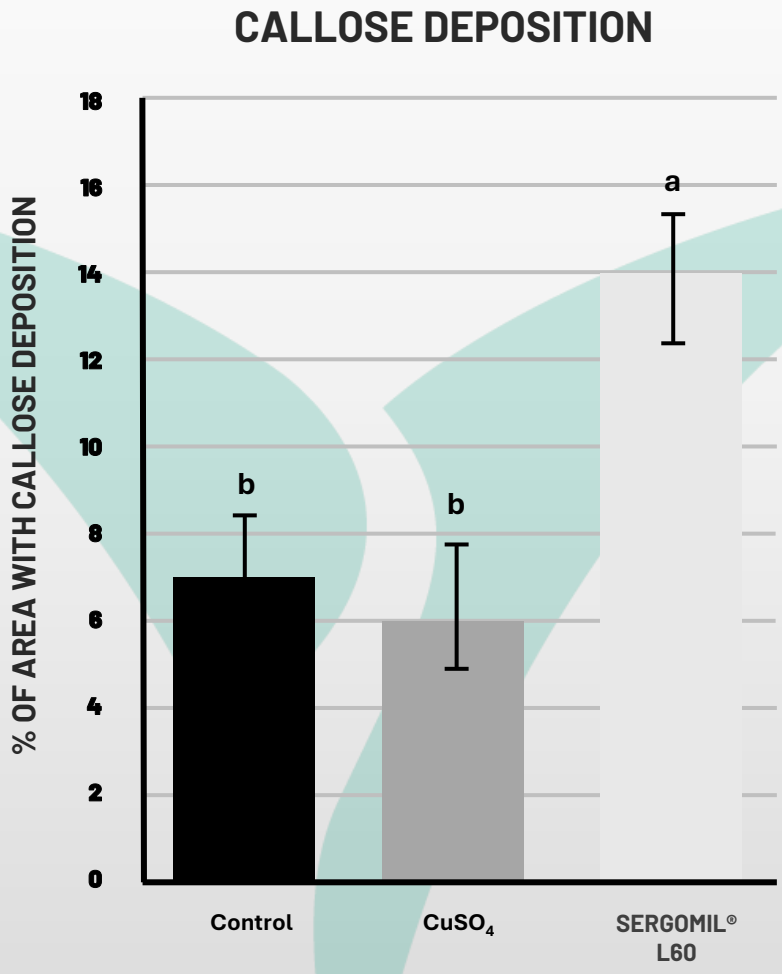
CELL WALL STRENGTH

- Prevention of the infection and subsequent development of the pathogen on the surface of the leaf and on the stems…by SERGOMIL® L60 strengthening the cell wall

- Likewise, by means of optical microscopy, a greater synthesis and deposition of CALLOSE (a polysaccharide that accumulates to reinforce the cell wall in response to different types of stress) was observed too on leaves.



Control $CuSO_4$ SEROMIL® L60

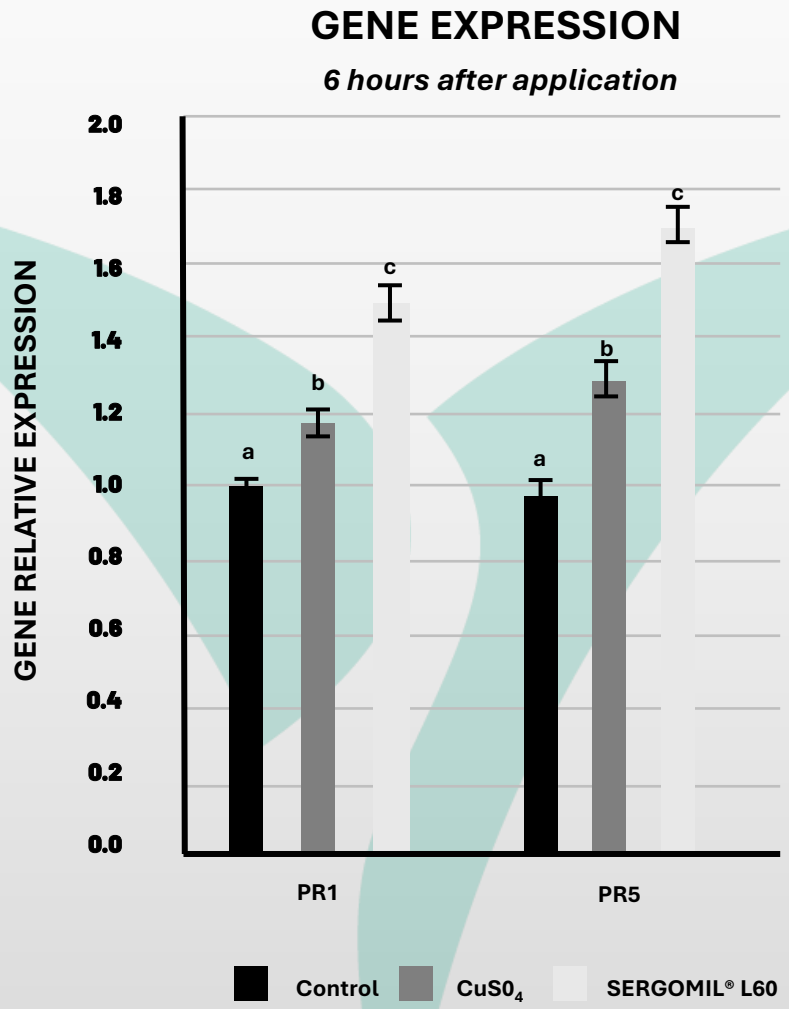


INDUCED SYSTEMIC RESISTANCE

- Pathogenesis-related (PR) proteins in plants are defence molecules produced in response to pathogens, enhancing immunity and stress tolerance.

- In the study, the expression of genes related to pathogenic related protein synthesis by the plant was observed. A higher expression of PR1 and PR5 genes was demonstrated, which encode two of the pathogenesis response proteins via the salicylic acid pathway.

- One of the endogenous signals for the induction of the SAR (system) is salicylic acid. The level of this acid (derived from benzoic acid) increases markedly in the area of infection after the initial attack and establishes SAR in other parts of the plant.



SERGOMIL® L60

Content:

- Copper (Cu) soluble in water - 5.5% w/w
- Saccharide derivatives - 19.5% w/w

Physical – Chemical Properties:

- pH: 3 approx.
- Specific Gravity (SG): 1.3

Incompatibilities:

- Do not mix with products with an alkaline reaction, carbonates or hydroxides or calcium products without undertaken a Jar-Test beforehand to ensure compatibilities between products. Avoid mixing with amino acids (except for olive trees) and/or mineral oils to prevent any phytotoxicity, particularly close to harvest. It is advisable to conduct a test application of any new tank mix on a small area to assess potential phytotoxicity before proceeding with a broader application, especially on crops sensitive to copper.

See label for rates

SERGOMIL® L60

COMPATIBILITIES with biologicals

If sprayed:
SERGOMIL® L60 can be mixed with microbial-based formulations. The Cu comes complexed with saccharides derivatives, and this will mitigate the direct harm of Cu. However, we can expect a reduction in the CFU in the mix. Quantity of Cu is 76 g/L of product which is considered very low.

If irrigated/in furrow:
In furrow, it is compatible with bacterial based formulations. Avoid mixing with fungi based (Trichoderma, mycorrhiza). However, It is recommended to do separate applications if possible. Apply first SERGOMIL® L60 and apply microbials 7 to 10 days later.

SERGOMIL® L60 is compatible with microbial-based formulations when the key mode of action is based on the concentration of secondary metabolites. These formulations are normally recommended by spray.

NB. Some microbial-based products base their efficacy on the **concentration of spores (Mycorhiza, N-fixing bacteria, PK solubilisers, consortia of microorganisms, Trichoderma, etc.)** whilst other group of microbial-based products base their efficacy on the **concentration of secondary metabolites (B.subtilis, B.amyloliquefaciens).**

Some fungicide formulations (especially systemic fungicides) bring **oil-based formulations** to improve penetration and, therefore, efficacy. These **oil-based components might represent a hazard** as penetration will enhance the activity of copper.

Metabolites

Biomass

Thank You

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