

MicrobeBio®

**MICROBEBIO X5:  
ADVANCED  
BIOLOGICAL  
DEFENSE AGAINST  
PLANT PATHOGENS  
AND FUNGAL  
DISEASES**

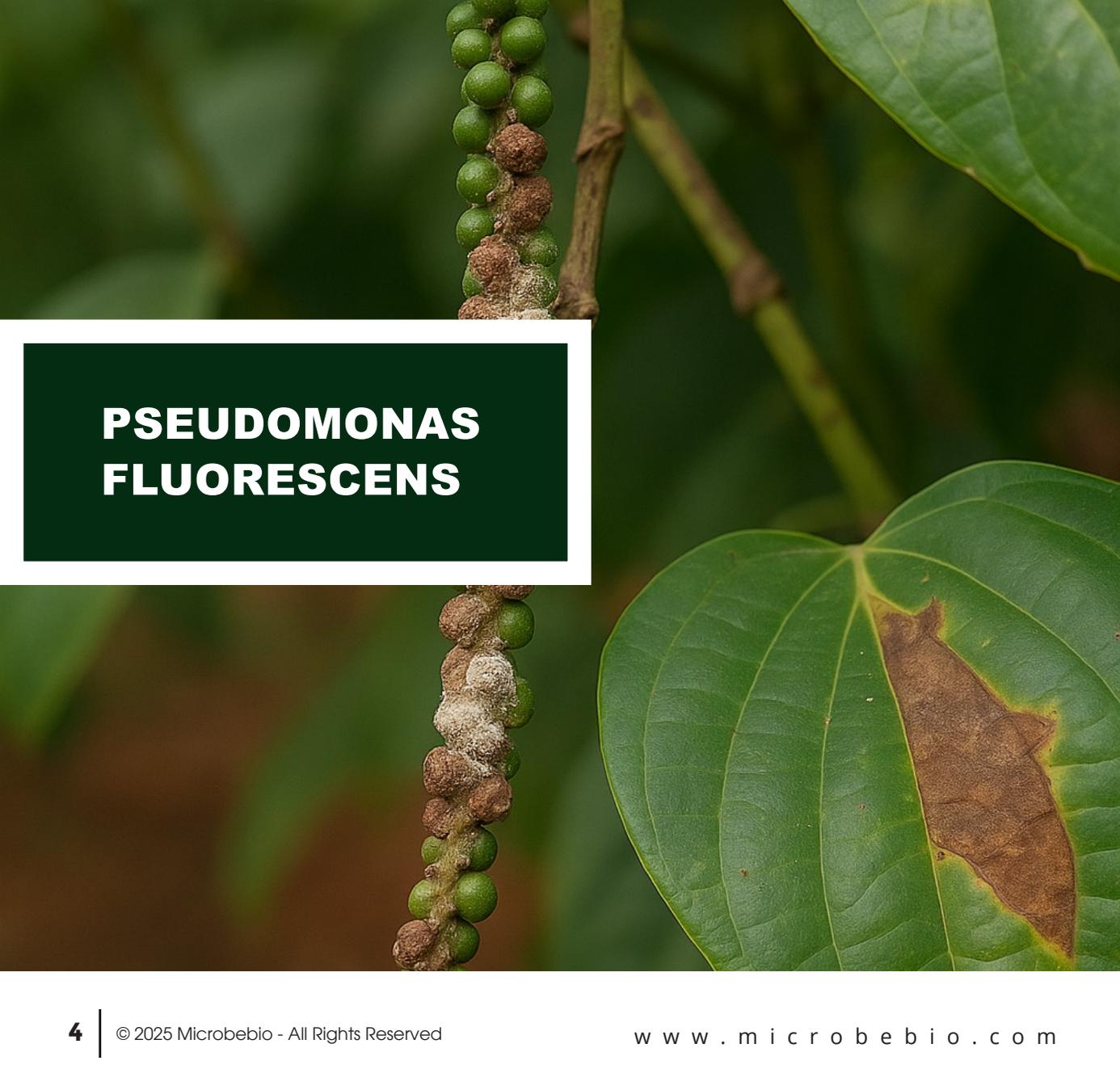




Microbebio X5 is an advanced biological formulation developed to suppress harmful soil-borne pathogens, control fungal diseases, and regenerate soil health naturally. By combining powerful beneficial bacteria, fungi, mycorrhizae, and endophytes, Microbebio X5 creates a dynamic microbial shield around plant roots — enhancing immunity, nutrient uptake, and crop quality while reducing dependence on chemical fungicides.



# MICROBIAL CONSORTIUM AND FUNCTIONS



## PSEUDOMONAS FLUORESCENS

A root-colonizing bacterium known for its ability to inhibit plant pathogens through antibiotic and siderophore production. It competes with harmful microbes and induces systemic resistance in plants.

### KEY FUNCTIONS:

- Suppresses pathogens such as *Pythium*, *Rhizoctonia solani*, and *Fusarium oxysporum*.
- Enhances plant root growth and nutrient uptake.
- Produces natural growth-promoting compounds and defensive enzymes.



## **BACILLUS SUBTILIS / BACILLUS AMYLOLIQUEFACIENS**

These beneficial bacteria act as natural biocontrol agents by forming biofilms on root surfaces and secreting antifungal lipopeptides.

### **KEY FUNCTIONS:**

- Inhibits Alternaria, Botrytis, Sclerotinia, and Rhizoctonia.
- Promotes strong root development and leaf health.
- Increases chlorophyll and photosynthetic activity.

## TRICHODERMA HARZIANUM



A mycoparasitic fungus that aggressively attacks and consumes pathogenic fungi, improving root health and soil balance.

### KEY FUNCTIONS:

- Controls Fusarium wilt, Phytophthora root rot, and Sclerotium rolfsii.
- Enhances root elongation and nutrient absorption.
- Stimulates plant immune response and stress tolerance.

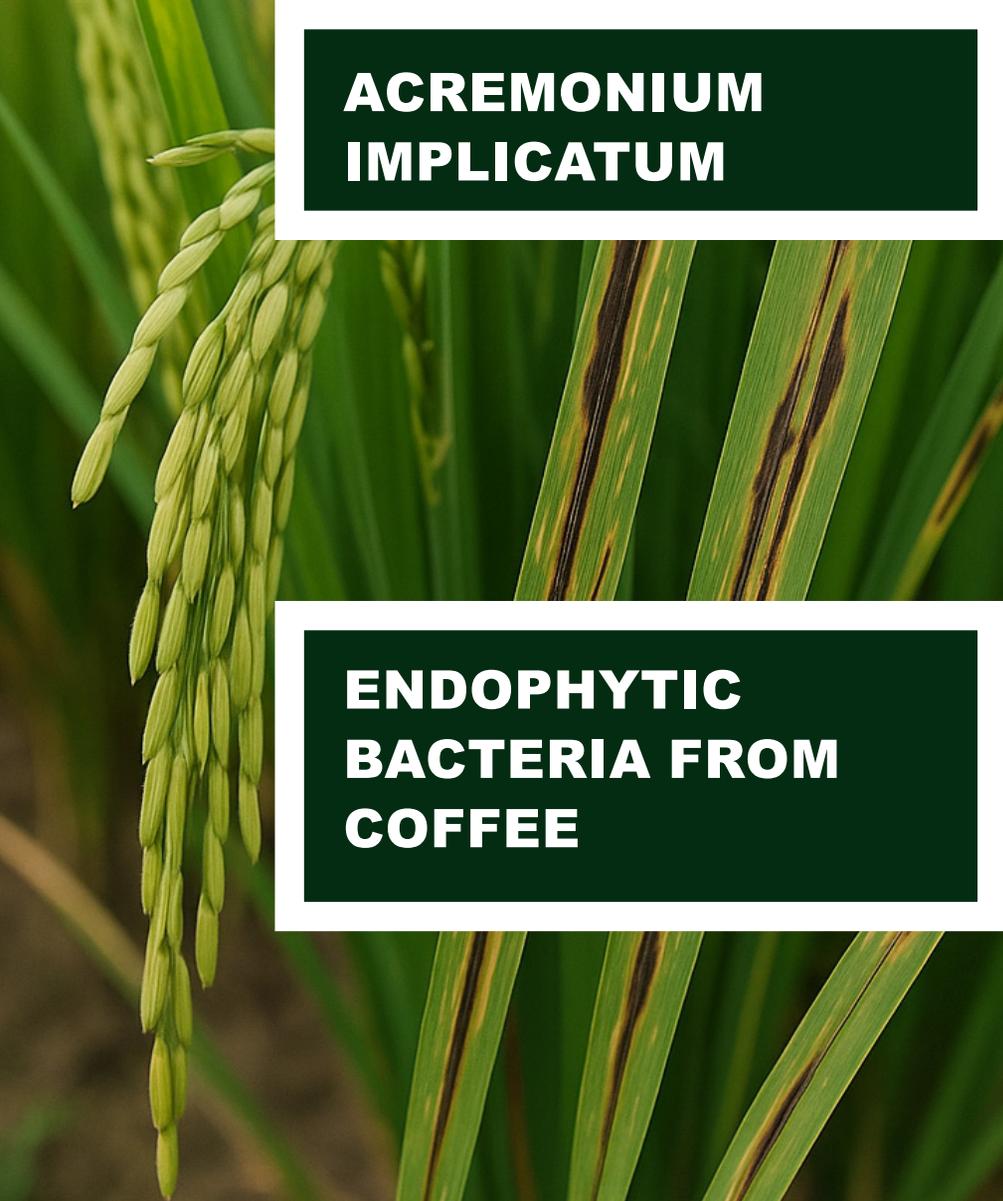
## BACILLUS VELEZENSIS



A powerful microbial species producing antimicrobial peptides and enzymes that disrupt pathogen cell walls.

### KEY FUNCTIONS:

- Suppresses Colletotrichum, Fusarium, Phytophthora, and Pythium species.
- Promotes flowering, fruiting, and stress recovery.
- Improves soil microbial diversity and balance.



## ACREMONIUM IMPLICATUM

A beneficial filamentous fungus that inhabits the rhizosphere and reduces pathogenic infections through competitive exclusion.

### KEY FUNCTIONS:

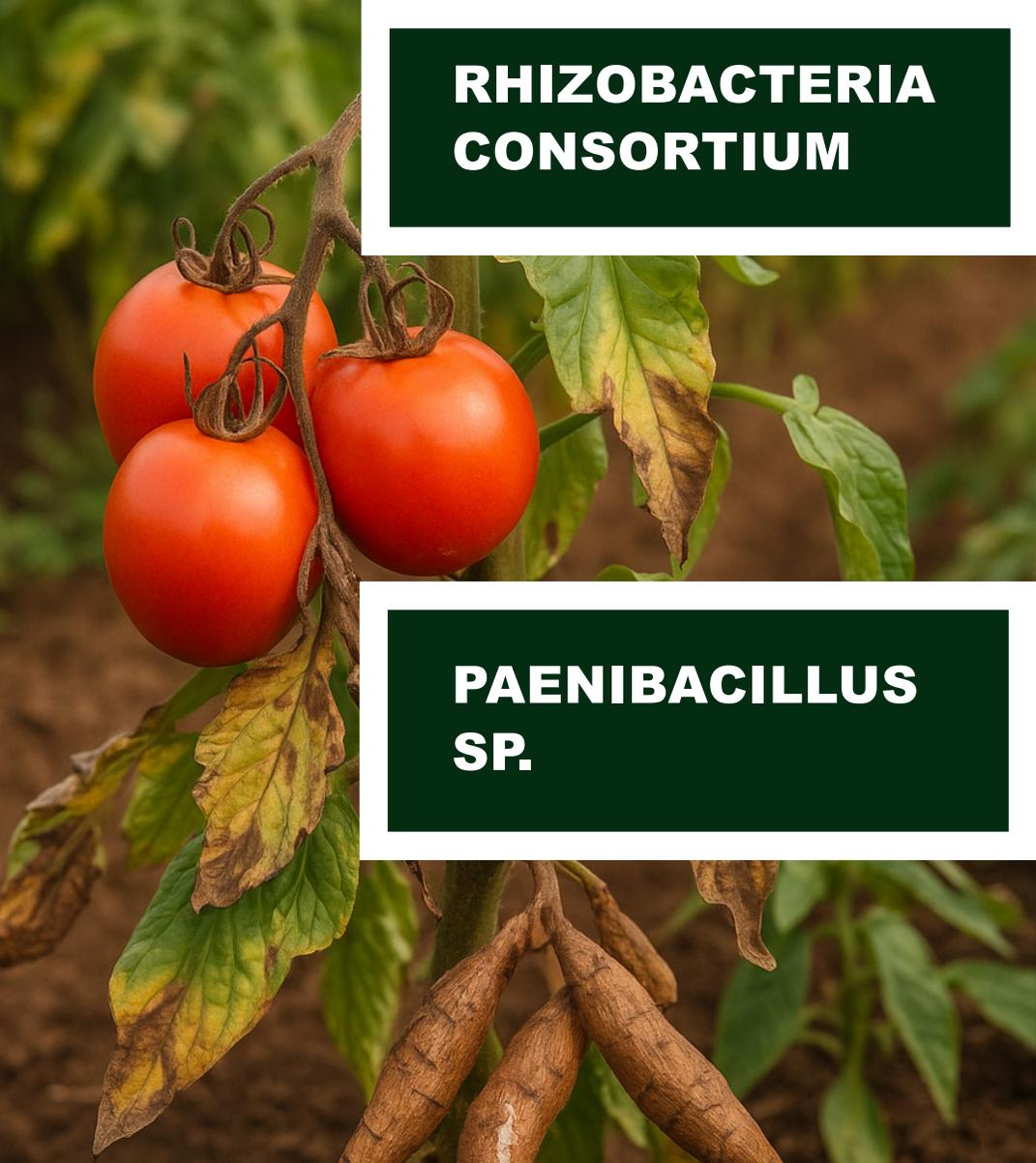
- Inhibits fungal diseases such as Verticillium and Alternaria.
- Promotes seed germination and root vitality.
- Enhances soil structure and organic matter turnover.

## ENDOPHYTIC BACTERIA FROM COFFEE

A unique blend of naturally occurring endophytic Bacillus and Pseudomonas species isolated from coffee tissues, promoting internal plant resistance and health.

### KEY FUNCTIONS:

- Strengthens plant systemic defenses against bacterial and fungal intrusions.
- Improves internal nutrient transport and stress resilience.
- Enhances aroma, taste, and Brix quality of fruits and crops.



## RHIZOBACTERIA CONSORTIUM

A synergistic community of Azospirillum, Pseudomonas, and Bacillus species derived from the coffee rhizosphere.

### KEY FUNCTIONS:

- Fixes atmospheric nitrogen and solubilizes phosphorus.
- Reduces infection by Fusarium, Rhizoctonia, and Pythium.
- Increases root biomass and nutrient efficiency.

## PAENIBACILLUS SP.

A multifunctional soil bacterium known for producing antimicrobial substances and enzymes that degrade pathogen structures.

### KEY FUNCTIONS:

- Suppresses Xanthomonas, Erwinia, and Fusarium species.
- Promotes early seedling vigor and disease resistance.
- Enhances soil enzymatic activity and organic nutrient cycling.

# PATHOGENS AND DISEASES CONTROLLED BY MICROBEBIO X5



## **FUNGAL PATHOGENS CONTROLLED:**

- *Fusarium oxysporum* (Fusarium wilt)
- *Rhizoctonia solani* (Root rot, damping-off)
- *Pythium* spp. (Root rot, damping-off)
- *Phytophthora* spp. (Late blight, crown rot)
- *Sclerotium rolfsii* (Southern blight)
- *Alternaria* spp. (Leaf spot, early blight)
- *Botrytis cinerea* (Gray mold)
- *Sclerotinia sclerotiorum* (White mold)
- *Colletotrichum* spp. (Anthracnose)
- *Verticillium dahliae* (Verticillium wilt)

## **BACTERIAL PATHOGENS CONTROLLED:**

- *Xanthomonas campestris* (Bacterial spot and blight)
- *Erwinia carotovora* (Soft rot)
- *Ralstonia solanacearum* (Bacterial wilt)

## **COMMON CROPS PROTECTED:**

- Rice, maize, soybean, coffee, banana, tomato, chili, pepper, lettuce, potato, and citrus.

# HOW MICROBEBIO X5 WORKS

- 1. COLONIZATION:** Beneficial microbes attach to root surfaces, forming a biological barrier.
- 2. ANTAGONISM:** The microbes secrete antibiotics, enzymes, and metabolites that inhibit pathogen growth.
- 3. COMPETITION:** They outcompete pathogens for nutrients and space in the rhizosphere.
- 4. IMMUNITY ACTIVATION:** They trigger systemic resistance in plants, strengthening internal defenses.
- 5. DECOMPOSITION:** Decomposers break down residues and toxins, improving soil health and structure.





# BENEFITS OF MICROBEBIO X5

## BENEFIT

Controls soil-borne fungal and bacterial diseases  
Strengthens plant immune systems  
Improves soil biodiversity  
Enhances flavor, aroma, and shelf life  
Reduces chemical dependency

## IMPACT

Reduces crop losses naturally  
Increases stress and drought tolerance  
Regenerates long-term soil fertility  
Boosts commercial crop quality  
Supports organic and sustainable farming



## RECOMMENDED APPLICATIONS

- **Seed Treatment:** Protects seedlings from early-stage damping-off.
- **Soil Drench:** Shields roots from soil-borne pathogens and enhances root colonization.
- **Foliar Spray:** Inhibits airborne fungal spores and boosts leaf immunity.
- **Drip Irrigation:** Continuous biological protection for high-value crops.

# MICROBEBIO X5 — NATURE'S INTEGRATED DEFENSE

Microbebio X5 combines the most advanced microbial science with the power of nature to control pathogens, regenerate soil, and protect crops from root to fruit.

It ensures healthy growth, improved yield, and long-lasting sustainability for every harvest.

*THIS REVIEW WAS SUPPORTED BY  
MICROBEBIO. FOR INQUIRIES,  
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MICROBIAL IMMUNITY  
FOR STRONGER,  
HEALTHIER CROPS.**



**MicrobeBio<sup>®</sup>**

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