



SANBIO.

The novel approach of farming.

The multi-functional ferti-activators for cultivation of dates palms.



BACKGROUND

THE DATES MARKET IN MOROCCO

no **12** of TOP20
worldwide

50 thousand
hectare

18 kg per
tree only

5.4 million
palms

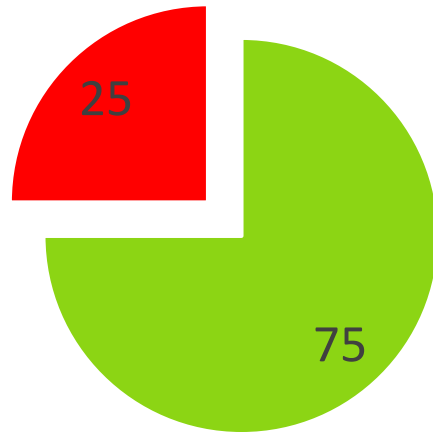
160 thousand
tons/a



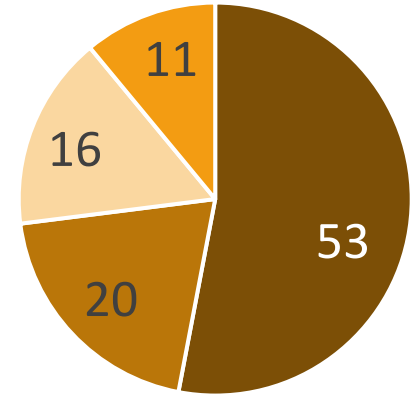


THE DATES UTILIZATION IN MOROCCO

25% LOSS !



■ Utilization
■ Loss / Waste



■ Human consumption
■ Animal feed
■ Industry
■ Export



25 percent
total loss

400000 tons
p.a.

1.3 million
trees yield

CHALLENGES



PRODUCTION **FRAMEWORK**

ABIOTIC STRESS

- Sun radiation
- Temperature
- Wind

BIOTIC STRESS

- Pest and disease management
- Integrated / Biological / Chemical

MANAGEMENT PRACTICE

- Site selection
- Soil conditions (type, salt)
- Cultivar selection
- Orchard design (planting, spacing)
- Irrigation (type, amount, quality, salt)
- Fertilization (deficiencies, nutrients, trace elements)
- Best management practice (mulching, covering, weed control, pruning, pollination, harvesting)

**MULTIPLE
PARAMETERS
HAVE
SIGNIFICANT
INFLUENCE ON
PRODUCTION
RESULTS**



YOUR BENEFITS



MORE YIELD

by reduction of loss and
increase of harvest quantity



BEST QUALITY

by tasty attractive fruits
and long shelf time



SAVE MONEY

on fertilizers and
pesticides



HIGHER PROFIT

by optimized processes
and costs

WHY SANBIO?

»We help you to **rescue**
your **harvest**, to make
more **profit** and
to **save** costs.«

Jörg MEYER
Founder and CEO



AWARD WINNER

AWARD WINNER



MADE IN GERMANY.



"CROP POWER 85" AWARD
GERMANY 2008



"INNOVATIVE THROUGH
RESEARCH" AWARD
GERMANY 2020-2021



PRESTIGE AWARD
"BIOTECH COMPANY OF
THE YEAR"
GERMANY & UK 2020

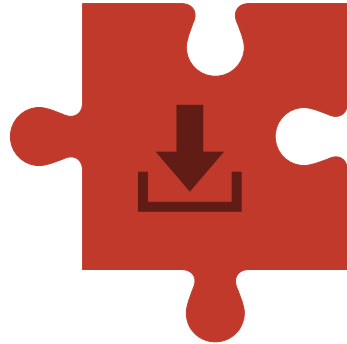
OUR SOLUTION

THE MARKET PROVIDES

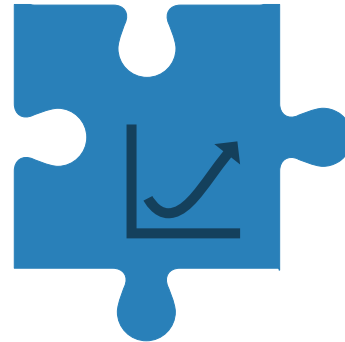
individual standard products of each category with a single purpose only.



Fertilizers



Soil improver



Stimulators



Pesticides

SANBIO COMBINES TO MULTI-FUNCTIONAL

Sanbio® combines **core functions** from each category.
It works systemically, preventively and curatively with associated natural mechanisms.

Pesticide

Stimulator

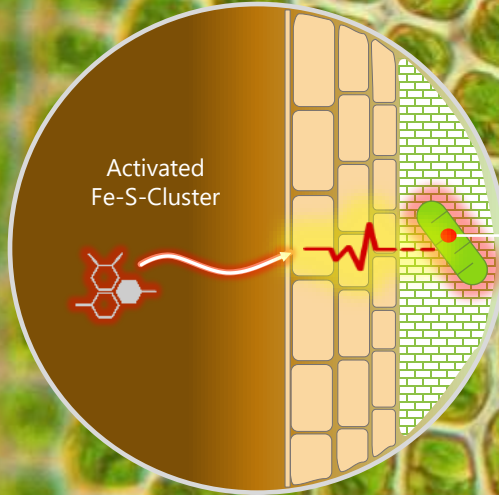
Fertilizer

Soil improver



UTILIZE YOUR **FULL POTENTIAL**

The raw material is activated in a special process: bio-catalytic stimulation by surface modification. The contained Magnesium-Iron-Sulphur-Clusters are encoded in an electromagnetic field. In the plant cell, the frequency-coded signals are transmitted from the clusters to the plant cell. This **electromagnetic stimulation** can affect specific phytohormones, proteins, amino acids, immune system and can **trigger specific functions**.



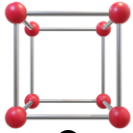
STIMULATION OF PLANT CELL

Interaction of bio-electrical signals



BIO-ELECTRICAL STIMULATION

INNOVATIVE PROGRAMMING MAKES THE DIFFERENCE



Specific composition

Blend of selected components and raw materials

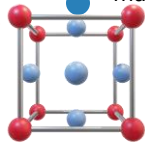
01



02

Programming

The activation process contains surface modification, polarization and supercharging in an electric-magnetic field.



Infiltration into plant cells

The Mg-Fe-S-Cluster is transported into the plant cells by applying the product.

03

04

Bio-electrical stimulation

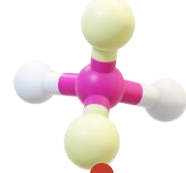
The electrical membrane potential of the cells is modified by interaction of charges.



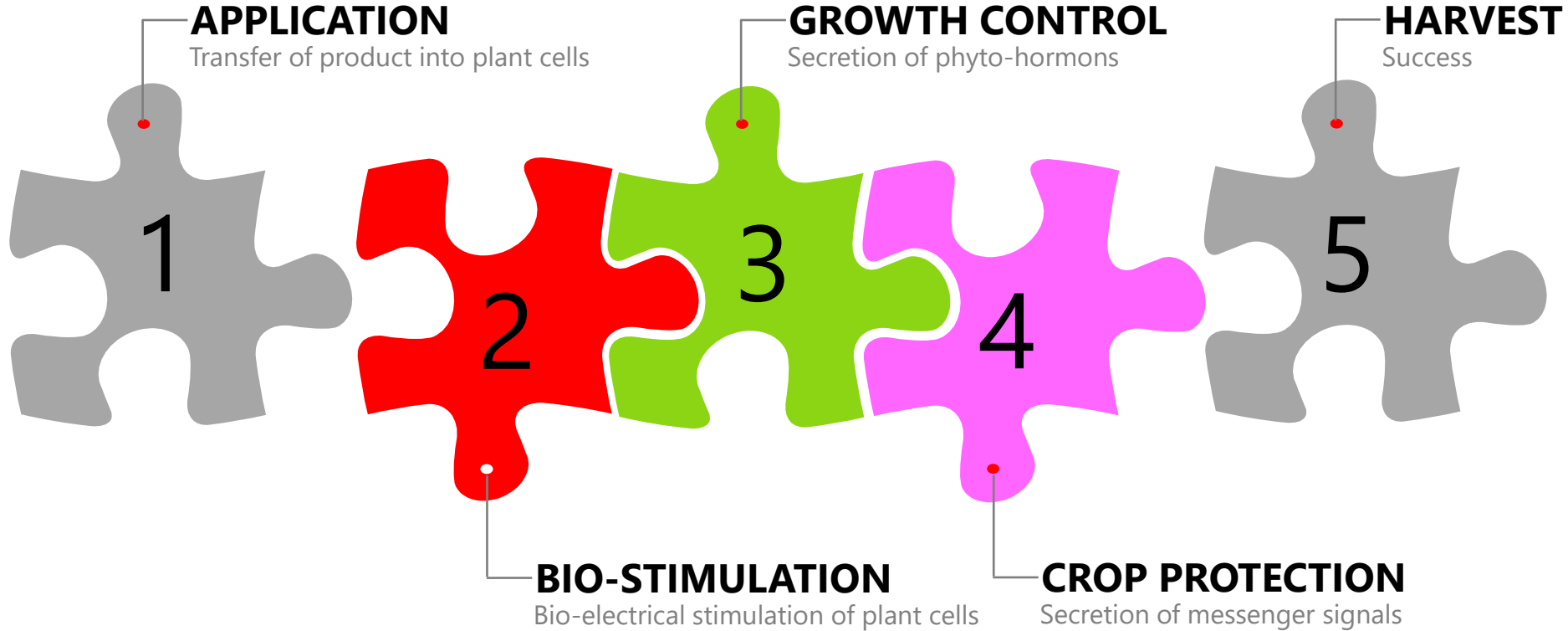
05

Triggering

The forced secretion of phytohormones, proteins, amino acids triggering growth, and immune system



SCIENCE AT WORK



MULTI-LEVEL APPROACH



8. GROWTH CONTROL

7. INTEGRATED CROP & PEST PROTECTION

6. RESPIRATION & TRANSPIRATION

5. CONTROL OF PHOTOSYNTHESIS

4. ENHANCED POLLINATION

3. ADJUSTMENT OF RHIZOPLANE MICROBIOM

2. MODELING OF ROOT ARCHITECTURE

1. NUTRITION & SOIL FERTILITY

THE **SANBIO PROGRAM** FOR DATE PALMS



MULTI-FUNCTIONAL SYSTEM

Control of	EPSOMIT	TITAN	PLANTA	VITAL
Root architecture				
Photosynthesis				
Nutrition				
Abiotic tolerance				
Biotic resistance				
Growth control				
Pollination				
Transpiration				
Adjustment of rhizoplane microbiom				
Pest bio-control				

A close-up photograph showing a person's hand holding a large quantity of small, light blue, spherical fertilizer granules. The hand is positioned above a young green plant growing in dark soil. Some of the granules have fallen onto the ground around the base of the plant. The background is softly blurred, showing more green plants in a field under bright, natural light. A semi-transparent white banner with red text is overlaid across the middle of the image.

1. NUTRITION & SOIL FERTILITY

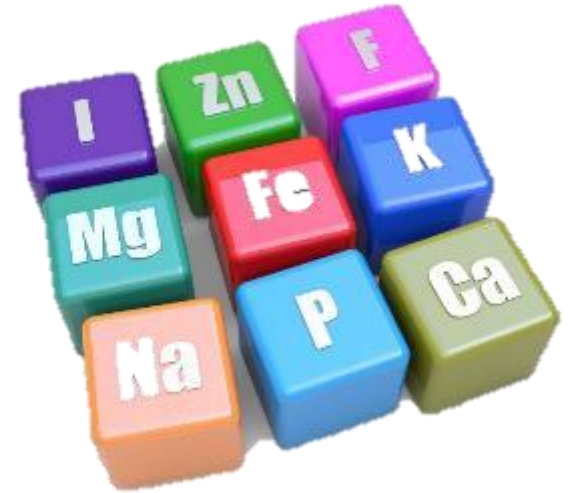
SUPPLY WITH **NUTRIENTS & ELEMENTS**

Beside the biocatalytic stimulation technology the SANBIO products have on-board following nutrients and trace elements:

Primary elements: N, P, K

Secondary elements: Mg, S, Ca

Trace elements: Fe, Ti, B, Mn, Zn, B, Na, Al, Co, Se, I, La, Ce, Si, V





2. MODELING OF ROOT ARCHITECTURE

FULL ACCESS BY LARGE ROOTS

The activation of proteins which contribute to root elongation regulates the asymmetric cell division and cell proliferation in the root meristem. The significantly enlarged root mass can absorb much more water and nutrients and anchors the plant better in the soil.



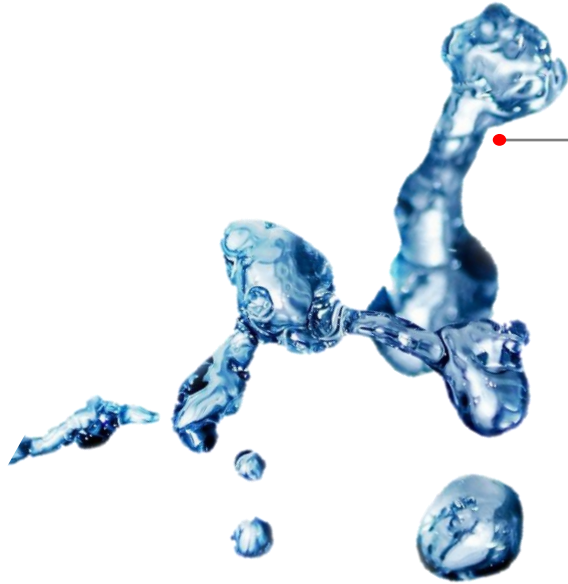
ROOT SYSTEM

Development of root mass and root hairs to improve the supply



DON'T MISS THE **ESSENSTIALS**

Optimized utilization of water and nutrients helps you to save valuable irrigation and expensive fertilizer.

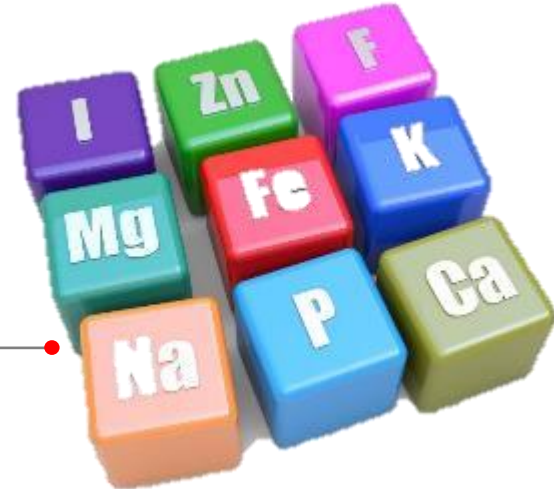


WATER

The most crucial and precious asset

NUTRIENTS

balance deficiencies

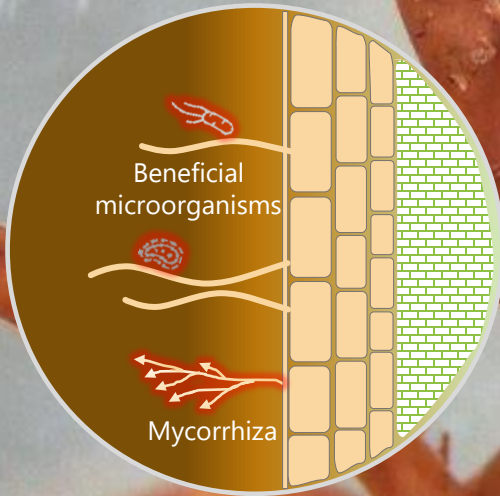


A scanning electron micrograph (SEM) showing a complex network of yellowish, fibrous structures, likely plant roots or rhizosphere soil. Several large, reddish, rod-shaped bacteria are visible, some with long, thin, hair-like appendages extending from them. The background is a dark, textured surface.

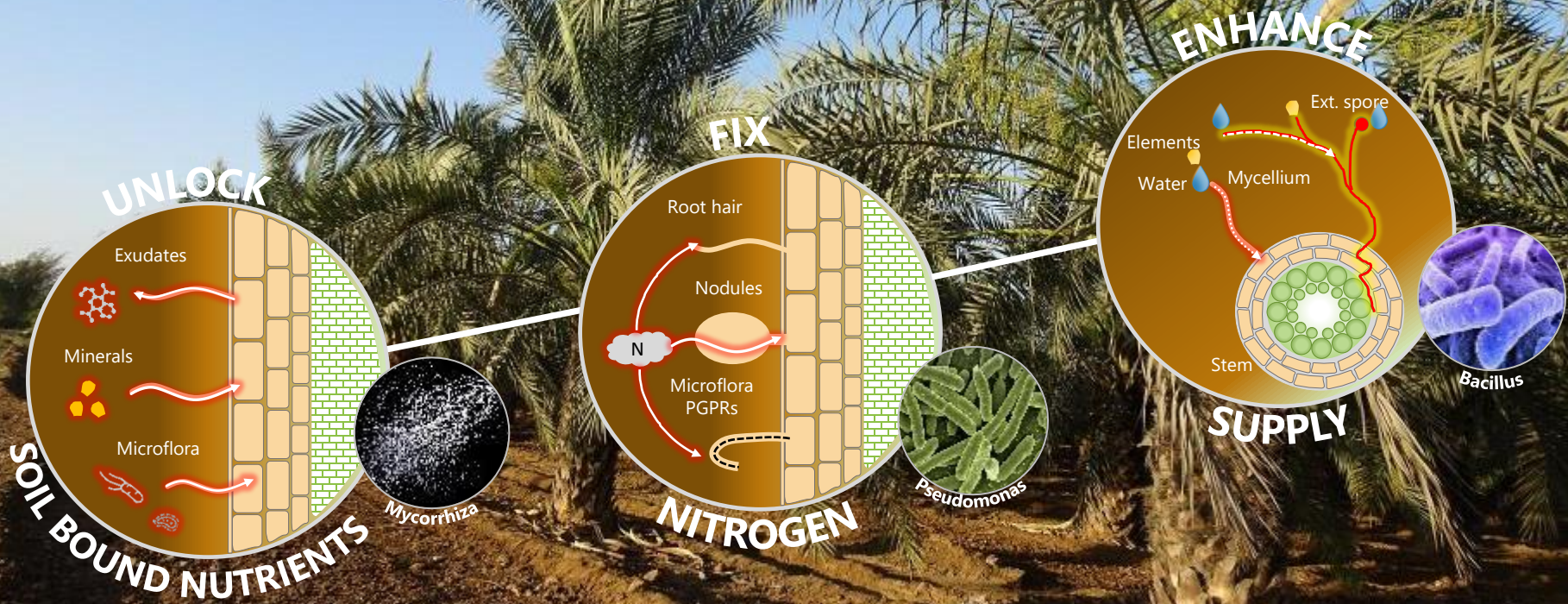
3. ADJUSTMENT OF RHIZOPLANE MICROBIOM

SUPPORT BY **ENHANCED MICROBIOM**

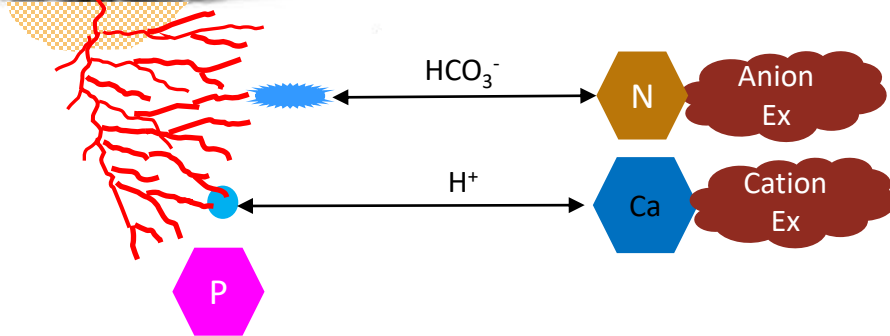
The product contains a blend of selected natural microorganisms and mycorrhiza fungi. Shortly after inoculation they colonize the enlarged root mass for symbiotic interactions. This augmentation results in improved access to essential nutrients and support of biocontrol ability.



THE PERFECT NUTRITION



CONTROL OF NUTRITION



Colonisation

with **beneficial microorganisms**

- N fixing bacteria
- PGPR Rhizobacteria
- Mycorrhize

Enhanced nutrition

- intensified **respiration**
- increased **ion exchange**
- improved **assimilation** of plant available nutrients

Displacement

of **antagonists and pathogens**



4. ENHANCED POLLINATION

MORE FRUITS BY ENHANCED POLLINATION



IMPROVED POLLINATION

- Increased number of seeds
- Improved adhesion to stigma
- Better pollen germination on stigma
- Higher number of pollen tubes growing through pistil style and reaching the ovary
- More effective fertilization and seed formation

+20%
seeds



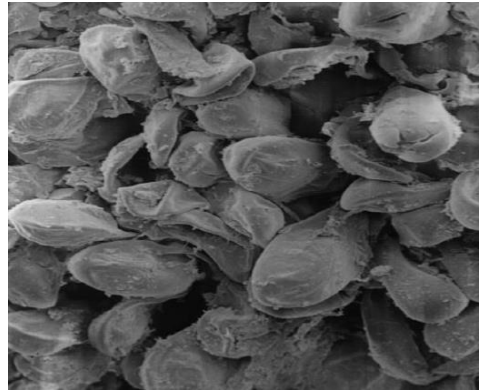
ENHANCED POLLINATION



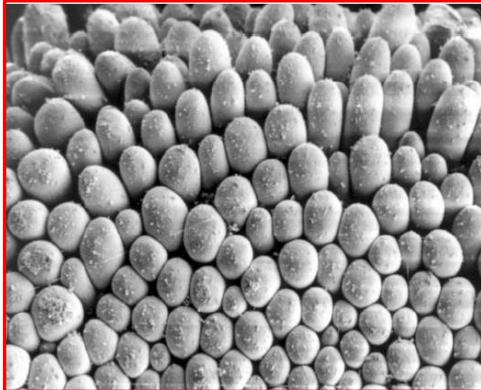
Sanbio TITAN improves receptivity of stigma, what positively affects pollination process through increased number of germinating pollen grains on stigma.



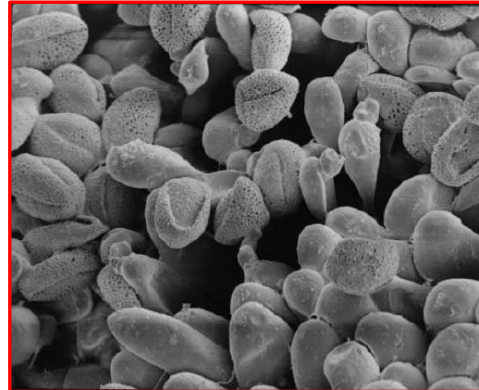
1: untreated



2: untreated



3: treated



4: treated

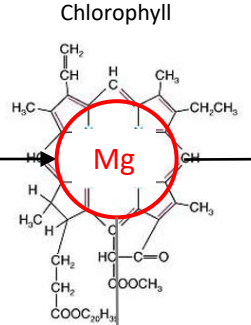
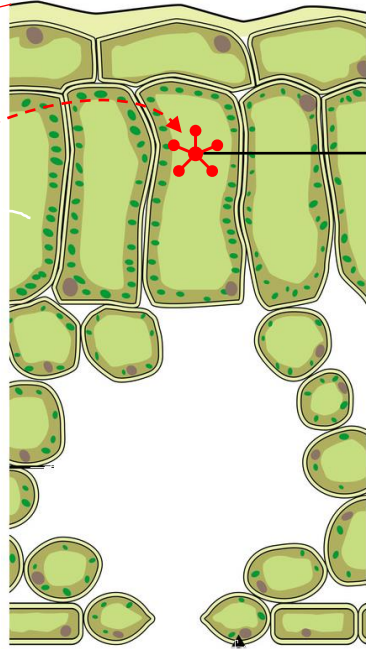
1: Weak receptivity of stigma and
2: low number of germinating pollen grains on untreated blossom.

3: huge receptivity of stigma and
4: high number of germinating pollen grains on treated blossom with Sanbio TITAN.

A close-up photograph of several green leaves, likely from a plant like a banana or similar, showing prominent veins. The leaves are arranged in a fan-like pattern, creating a sense of depth and texture. A white horizontal banner is overlaid across the middle of the image, containing the text '5. CONTROL OF PHOTOSYNTHESIS'. The word 'PHOTOSYNTHESIS' is highlighted in red, while the rest of the text is in black.

5. CONTROL OF **PHOTOSYNTHESIS**

CONTROL OF PHOTOSYNTHESIS



Light Harvesting Complex



Energy



ENHANCED GENERATION
of energy use for growth processes

PROMOTION
of the development of chlorophyll

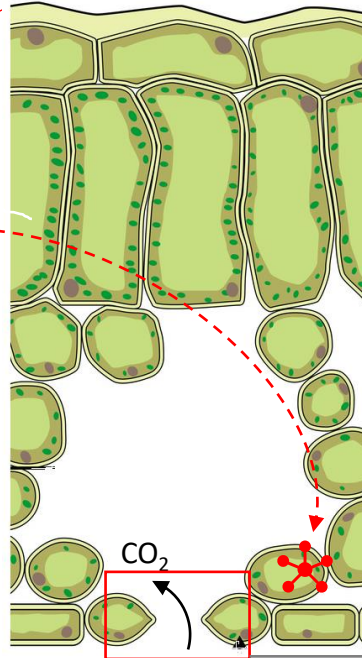
INFILTRATION
of activated supercharged Mg-Fe-S-Cluster into plant cell



6. RESPIRATION & TRANSPIRATION

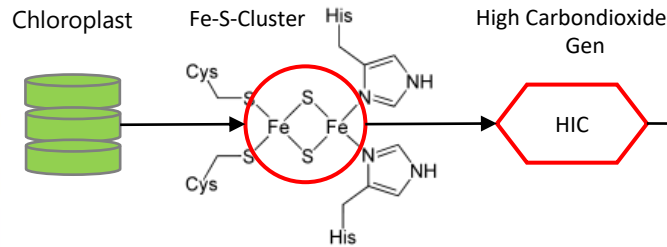


CONTROL OF INTRA-CELLULAR RESPIRATION



INFILTRATION

of activated supercharged **Mg-Fe-S-Cluster** into plant cell

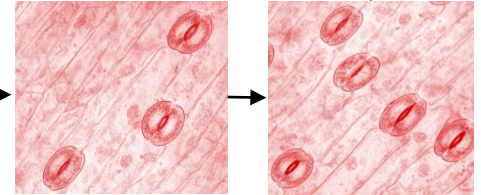


ENHANCEMENT

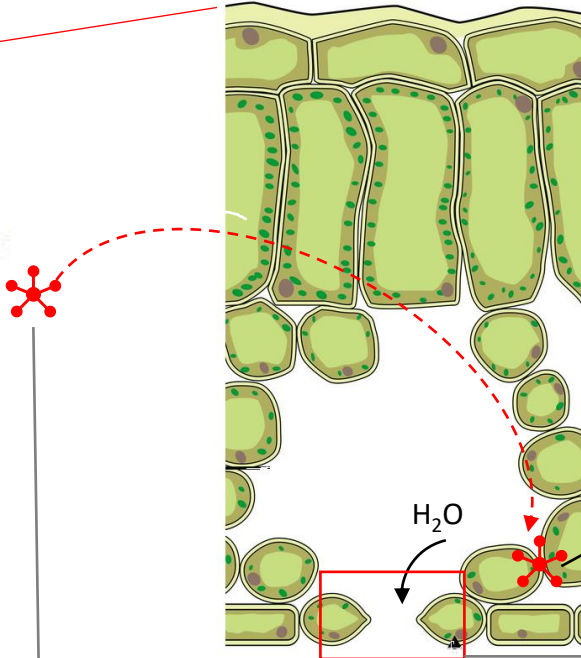
of intra-cellular **respiration**

GENERATION

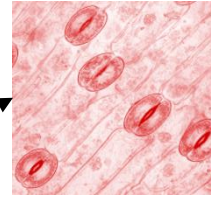
of the **new stomata**



CONTROL OF WATER TRANSPIRATION



CONTROL
of the **stomata** opening



REDUCTION
of water transpiration

INFILTRATION
of activated supercharged **Titanium** into plant cell



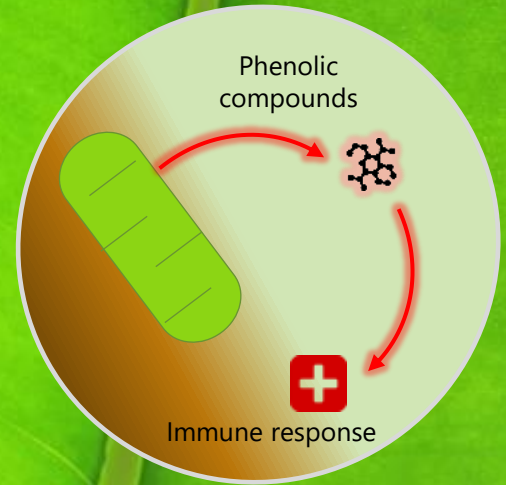
WATER SAVE



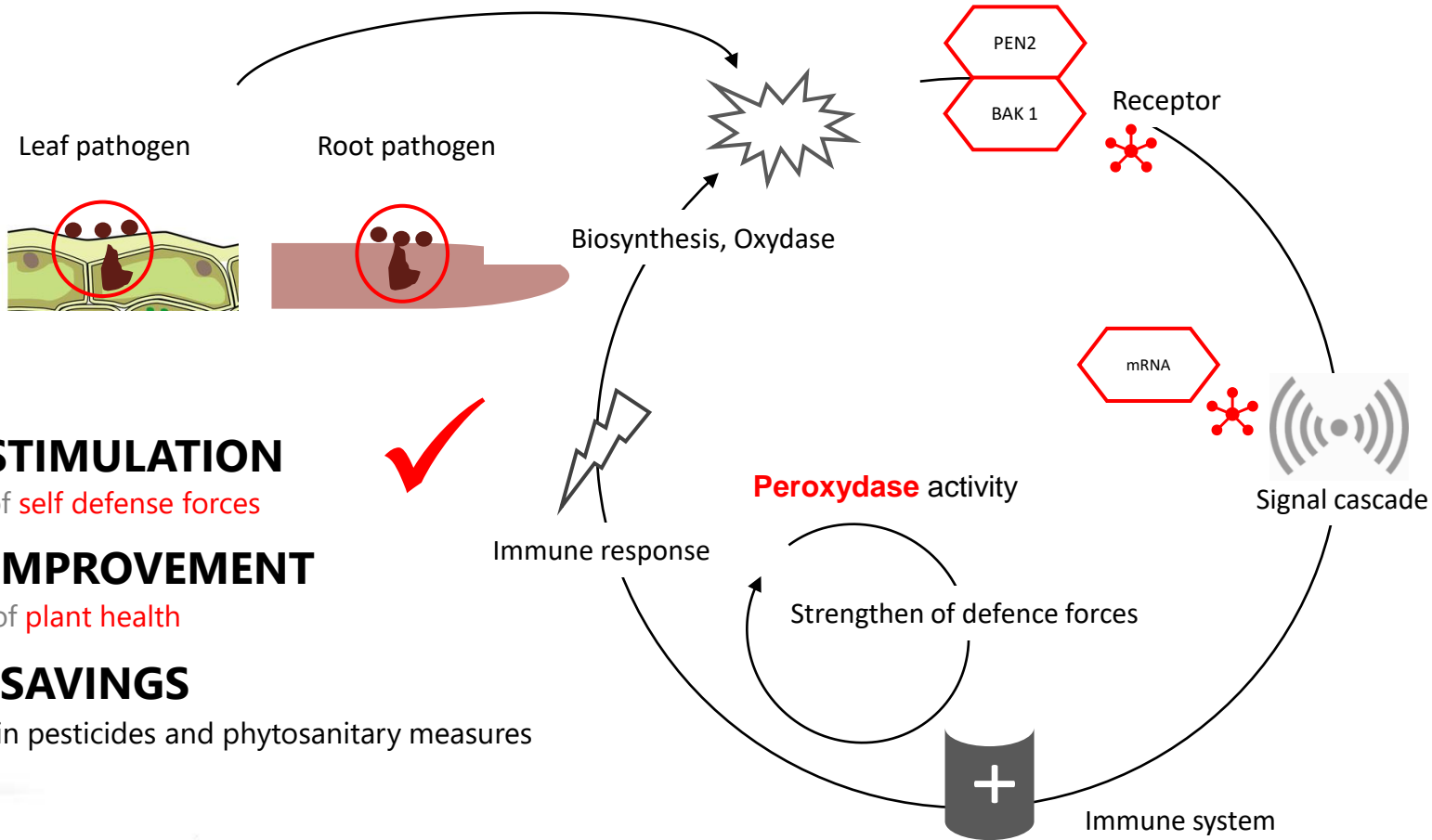
7. INTEGRATED CROP PROTECTION

INTEGRATED **DISEASE** CONTROL

Selective secretion of phenolic compounds and control of peroxidase activity speed up the local response to pathogen attack. This activates the systemic immune system become activated and supports the plant to survive, recover and developing on fast way.



ACCELERATION OF IMMUNE RESPONSE



STIMULATION

of self defense forces

IMPROVEMENT

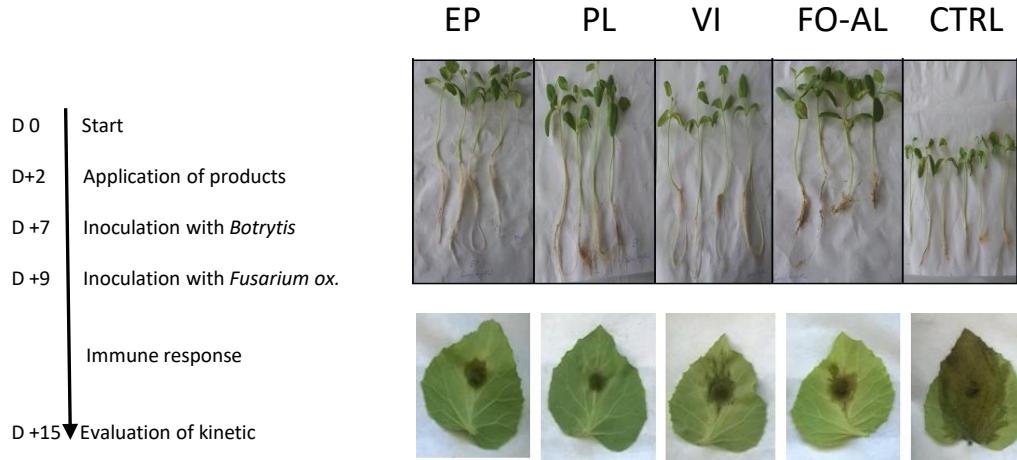
of plant health

SAVINGS

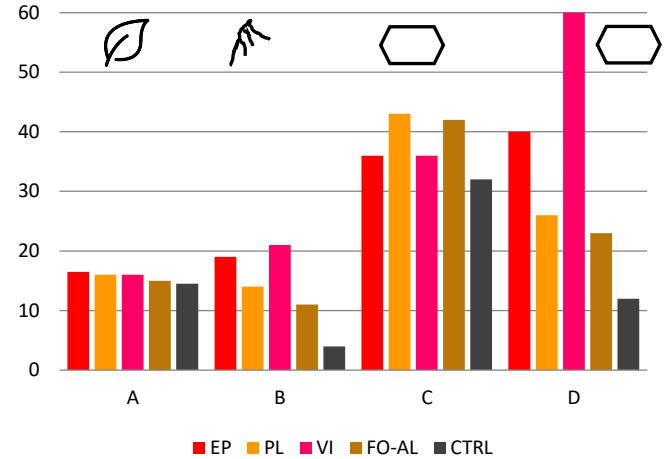
in pesticides and phytosanitary measures



ACCELERATION OF IMMUNE RESPONSE



et al. Prof. W. Hamada, Laboratory of Genetics and Plant Breeding, INAT, Molecular Plant Microbe Interactions Institut, Tunis, 2015



- | | | | |
|---|----------------------------|-------|--------------------------------|
| A | Growth of leaves | EP | Sanbio EPSOMIT |
| B | Growth of roots | PL | Sanbio PLANTA |
| C | Peroxydase activity | VI | Sanbio VITAL |
| D | Phenolic compounds release | FO-AL | Fosetyl-Al, Bayer Crop Science |
| | | CTRL | Control |

INTRODUCTION OF RESISTANCE

against main fungal diseases by strengthens the plant self defense force



Bayoud wilt disease
(*Fusarium oxy.*)



Spot leaf diseases (*Graphiola
phoenicis*)



Sudden decline diseases
(*Fusarium solani*)



Root rot disease (*Phytophthora arecae*)



Dry roots (*Fusarium spp.*)

INTRODUCTION OF RESISTANCE

against main fungal diseases by strengthens the plant self defense force



Palm infested by sudden decline disease (*Fusarium solani*) without treatment



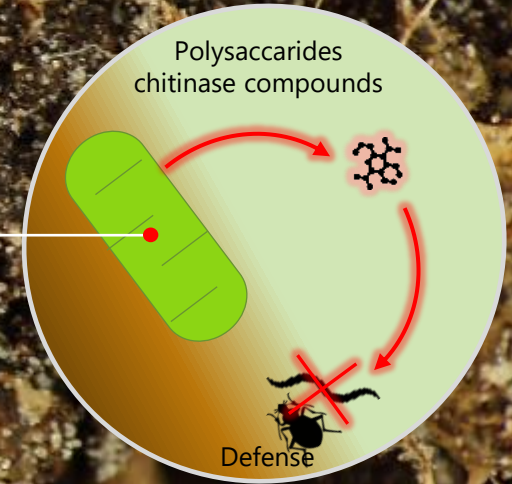
Same palm tree next year after fungicide treatment

The selective secretion of polysaccharides - chitinase compounds leads to degrading of skin matrix of nematodes and insects in egg, larval and adult stage. As a result, the permeability of worm and hopper skin is increased. Consequently, pathogens can penetrate the skin, weaken and kill the host.

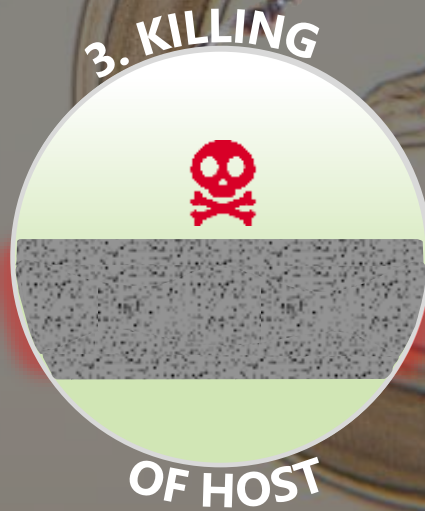
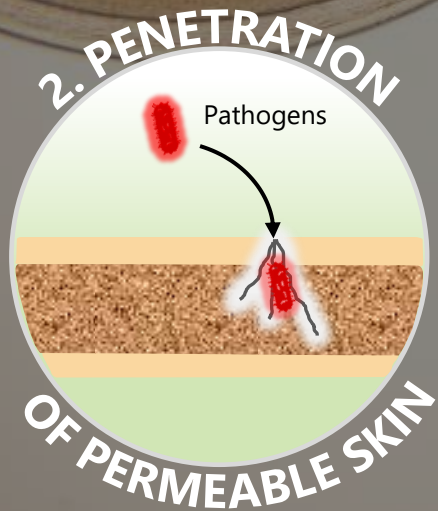
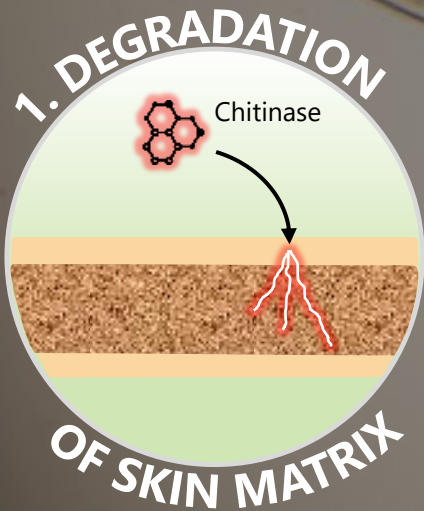
INTEGRATED PEST CONTROL

SELECTIVE SECRETION

Release of targeted compounds

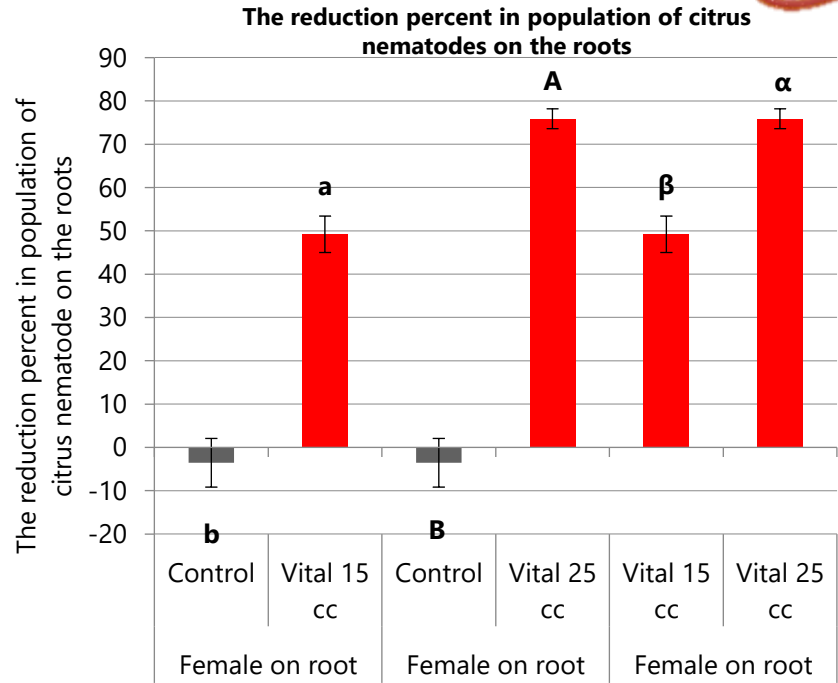
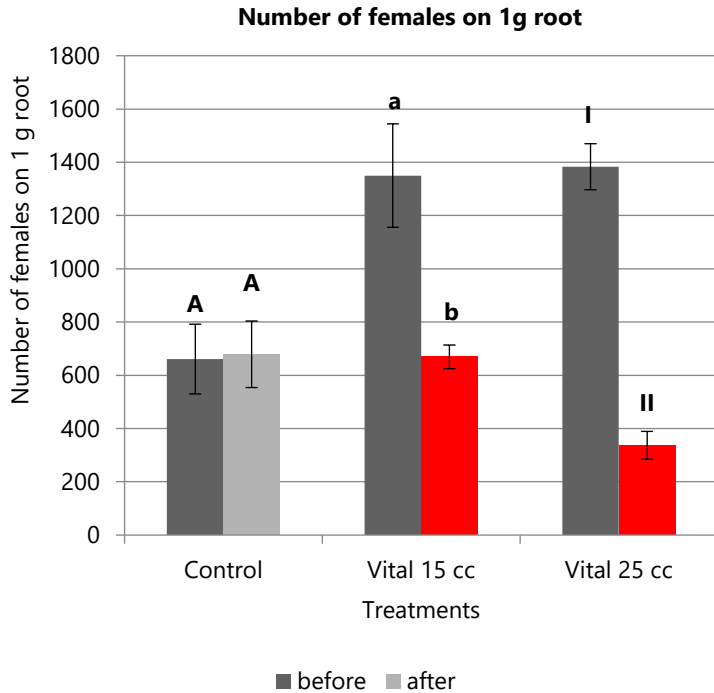


THE NATURAL WAY



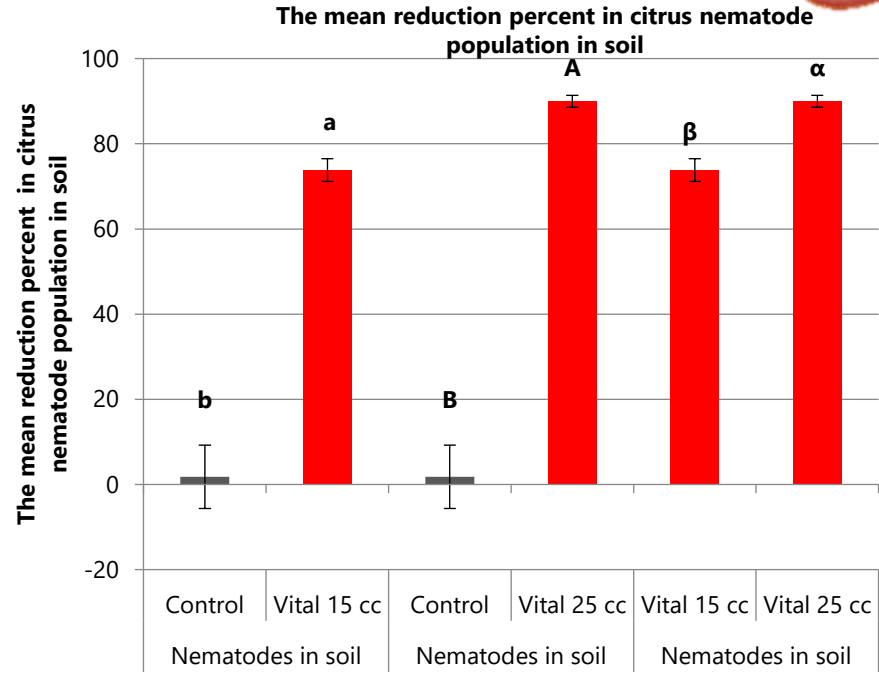
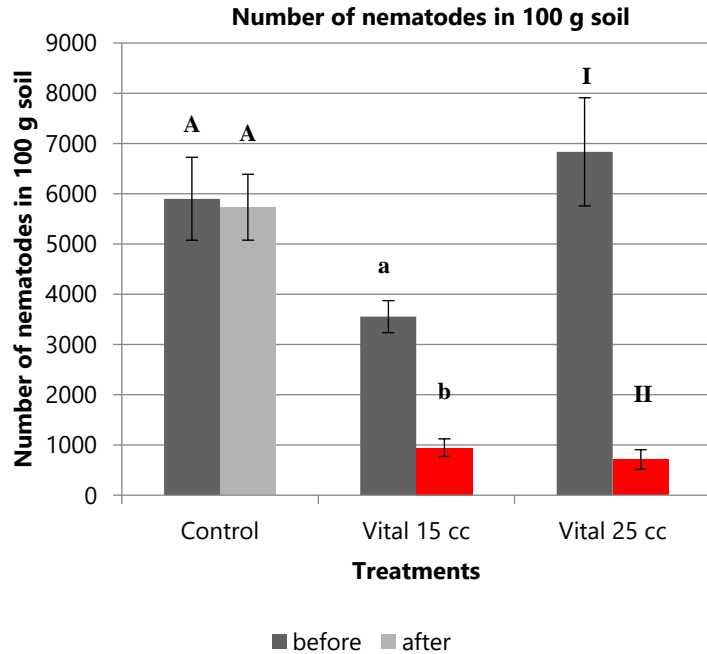
EFFECTS OF VITAL ON ROOT-KNOT-NEMATODE

Tylenchulus semipenetrans



EFFECTS OF VITAL ON ROOT-KNOT-NEMATODE

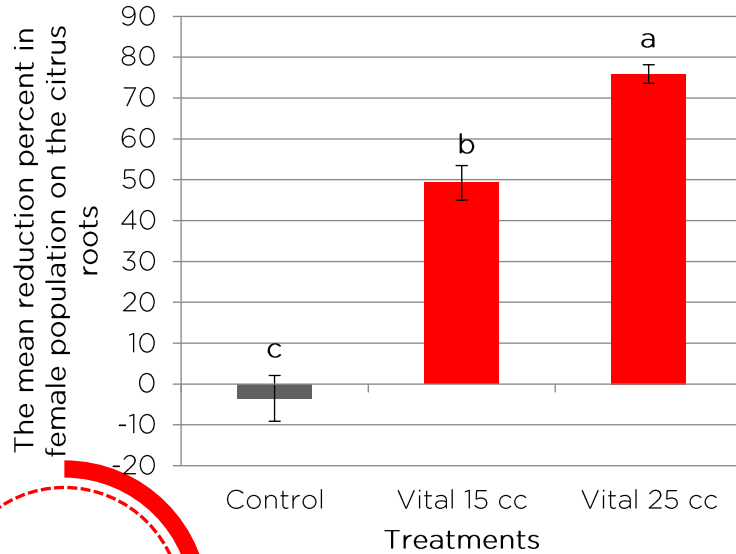
Tylenchulus semipenetrans



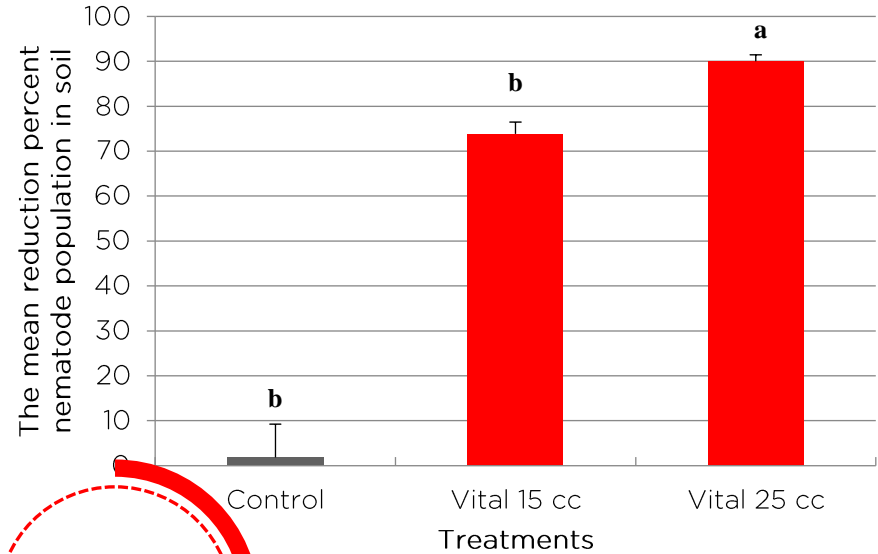
EFFECTS OF VITAL ON ROOT-KNOT-NEMATODE *Tylenchulus semipenetrans*



The mean reduction percent in female population on the citrus roots



The mean reduction percent in female population in soil



80%

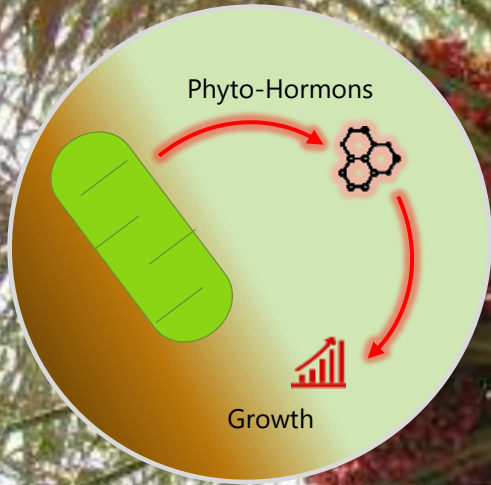
Reduction
on roots

88%

Reduction
in soil



8. GROWTH CONTROL



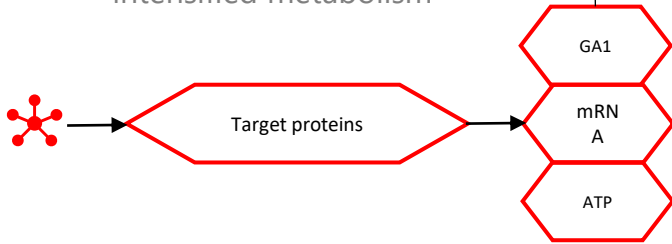
GROWTH CONTROL

The forced secretion of phyto-hormons such as Gibberellin, Cytokinin, Auxin, Ethylene, etc. can control the vegetative growth of roots and leaves, plant vigor, ripening and development of fruits.

GROWTH CONTROL

FORCED SECRETION

of target proteins leads to intensified metabolism



PROMOTING

of growth-related factors:

- Roots
- Shoots
- Leaves
- Fruits
- Ripening
- Vigor
- Yield
- Size
- Weight
- Taste
- Quality
- ...



APPLICATION




EPSOMIT FACTSHEET

DESCRIPTION

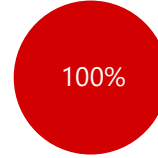
EPSOMIT is a premium advanced immunity activator and growth stimulant for stress control and increase of productivity on all crops.

Topseller.
Best price-performance-ratio.

FEATURES

-  Growth enhancement
-  Abiotic stress tolerance
-  Biotic stress resistance
-  Organic farming

COMPOSITION






- Magnesium sulphate hepta hydrate $MgSO_4 \cdot 7H_2O$

ELEMENTS

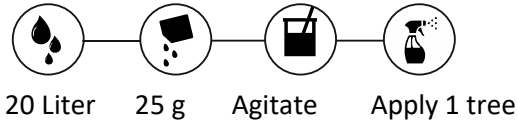


Magnesium oxide (MgO)...18.2 % w/w
Sulphur trioxide (SO₃).....35.0 % w/w

USE

-  Palm trees
-  Foliar spray (recommended), fertigation, root soak, soil drench
-  Standard dosage for palm trees:
25 g/tree
2-4 applications per period

APPLICATION



Mixing with most fertilizers and plant protection chemicals is possible.

PACKING



1 / 5 / 25 / 500 kg

TITAN FACTSHEET

DESCRIPTION

TITAN is a premium advanced immunity activator and growth stimulant for stress control and increase of productivity additionally water transpiration control on all crops.

Special product.

USE



Palm trees



Foliar spray



Standard dosage for palm trees:
25 mL per tree
2-4 applications per pollination period

FEATURES



Growth enhancement



Abiotic stress tolerance



Biotic stress resistance



Water transpiration control

COMPOSITION

Magnesium sulphate heptahydrate
water of crystallisation
Titanium
Water
Citric acid

ELEMENTS



MgO, SO₃, Ti

APPLICATION



20 Liter
Water

2 L
Titan

Agitate

Spray
1 ha

PACKING



1/10/200/1000 L

PLANTA FACTSHEET

DESCRIPTION

PLANTA is a premium advanced immunity activator and growth stimulant for stress control, increase of soil fertility and productivity on all crops.

Premium product.

USE



Palm trees



Fertigation, root soak, soil drench



Standard dosage for palm trees:
50 g per tree
2 applications per period

FEATURES



Growth enhancement



Abiotic stress tolerance



Biotic stress resistance

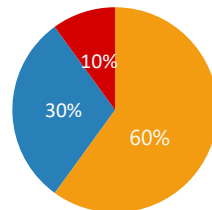


Soil fertility



Organic farming

COMPOSITION



■ Magnesium sulphate hepta hydrate $MgSO_4 \cdot 7H_2O$

■ Algae extract

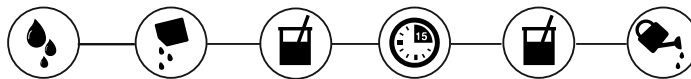
■ Blend of microorganisms

ELEMENTS



MgO , SO_3 , K_2O , Fe, B, Mn, P_2O_5

APPLICATION



20 Liter
lukewarm
water

50 g
PLANTA

Agitate

Maturing
15 min

Agitate

Apply
1 tree

Mixing with most fertilizers is possible. Do NOT apply SANBIO® PLANTA with plant protection agents at the same time. Wait 14 days to use SANBIO® PLANTA in that case.

PACKING



1 kg

VITAL FACTSHEET

DESCRIPTION

VITAL is a advanced immunity activator and growth stimulant for root recovery used in fertigation of all crops.

Special product.

FEATURES



Growth enhancement



Abiotic stress tolerance

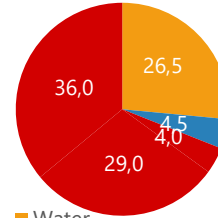


Biotic stress resistance



Root recovery

COMPOSITION



Water

Nitrogen

Magnesium Sulphate Heptahydrate

Algae extract

ELEMENTS



CaO, Fe, K₂O, MgO, Mn, SO₃, P₂O₅

USE



Palm trees



Spray



Standard dosage for palm trees:

100 mL per tree

2-4 applications spray onto trunk and soil

APPLICATION



20 Liter
Water

100 mL
Vital

Agitate

Spray
1 tree

PACKING



1/10 L

THE SANBIO PROGRAM FOR PALM TREES

density 130 trees per hectare

25 g per palm tree
2-4 foliar applications
per period



25 mL per palm tree
2-4 foliar applications during
pollination period



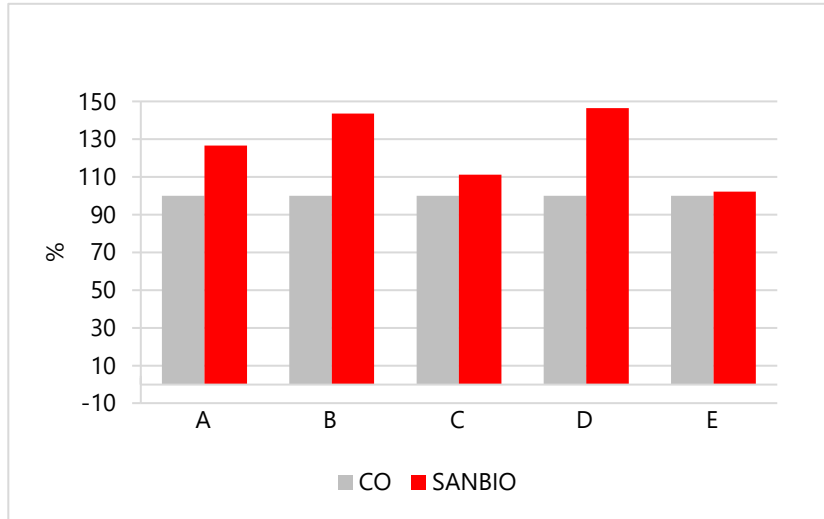
50 g per palm tree
2 soil applications
per period



100 mL per palm tree
2-4 spray applications onto the
trunk and soil against insects



CASESTUDY: EFFETCS ON PERFORMANCE AND QUALITY



CO=Control, untreated palm trees
SANBIO=treated palm trees
A= Yield per tree (53,4/67,7 kg)
B= Fruit length (10,8/15,5 cm)
C= Fruit firmness (5,0/5,6 kg/cm²)
D= Pulp weight (10,1/14,8 g)
E= Total soluble solids (73,4/75 %)





**JUST DO IT.
APPLY NOW!**



GET IN TOUCH WITH US

SANBOS GmbH



Geraer Strasse 14
D-06712 Gutenborn-Drossdorf
Germany



+49 3441 53987-3



+49 3441 53987-4



info@sanbio.eu

youtube: sanbio sanbos



www.sanbio.eu



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A brand of SANBOS.



Jörg MEYER
Founder and CEO