microbiome
PROLONGING LIFE
Watson & Fine
Official distributor

About us

M icrobiome is an Israeli start-up that aims to revolutionize the use of probiotics to enhance health and well-being across various aspects of life.

Our initial focus is on reducing waste and extending shelf life throughout the post-harvest supply chain.

Tech Empowers Industry

Our technology has proven to be a valuable tool for producers, distributors, and retailers, helping to preserve food quality, optimize supply chain processes, and boost financial performance.

Unleash Microbiome Tech benefits:

Reduction in fruit waste

1

Extended storability

2

Enhanced shelf life

3

A universal holistic solution

4

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Reduction in fruit waste

1

Decrease in customer claims

+

cost savings

+

prevention of financial loss

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Extended storability

2

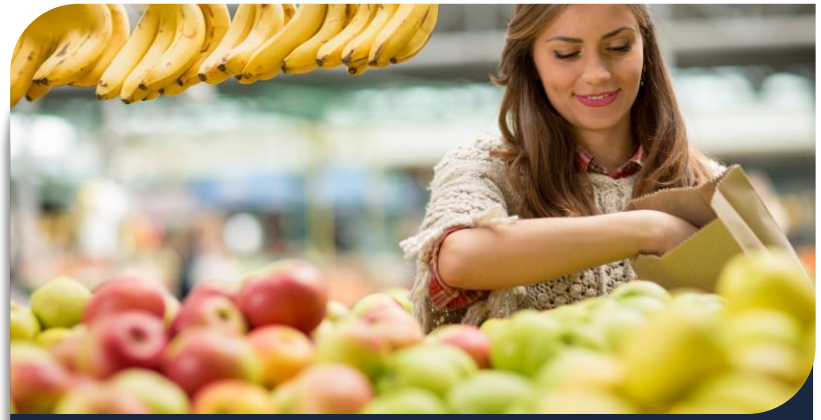
longer marketing window

+

Increased sales potential

Enhanced shelf life

3



Ensuring fruits remain fresh and appealing to consumers

+

fostering customer satisfaction and brand loyalty

A universal holistic solution

4

100% natural and green

+

suitable for all post - harvest stages

+

Applicable throughout the supply chain

+

suitable for all types of Fruit & Vegs

How it Works

A new era in post-harvest treatment: using probiotic bacteria to control mould, fungi and pathogenic bacteria.

PROBIOTIC MODE OF ACTION

Modification of microbial population

The proliferation of probiotic bacteria actively changes and modifies the microbial population and the environmental conditions on the applied surface. This makes it difficult for the pathogenic microorganism to grow and dominate the environment.

Competition on nutrients

Rapid multiplication and reproduction of probiotic bacteria on surfaces creates a competition of nutrients and space that prevent fungi, mould and undesirable bacteria to grow.

Competitive adhesion to surfaces

Probiotic bacteria can create aggregates with pathogenic agents and prevent their ability to attach to surfaces and thus reduce and eliminate their damaging activity.

Production of anti fungal + anti bacteria active molecules

Probiotic bacteria actively release anti fungal and anti bacteria molecules that prevent growth of these pathogens, thus protecting the post harvest fruits and vegetables.

Holistic and Eco Friendly

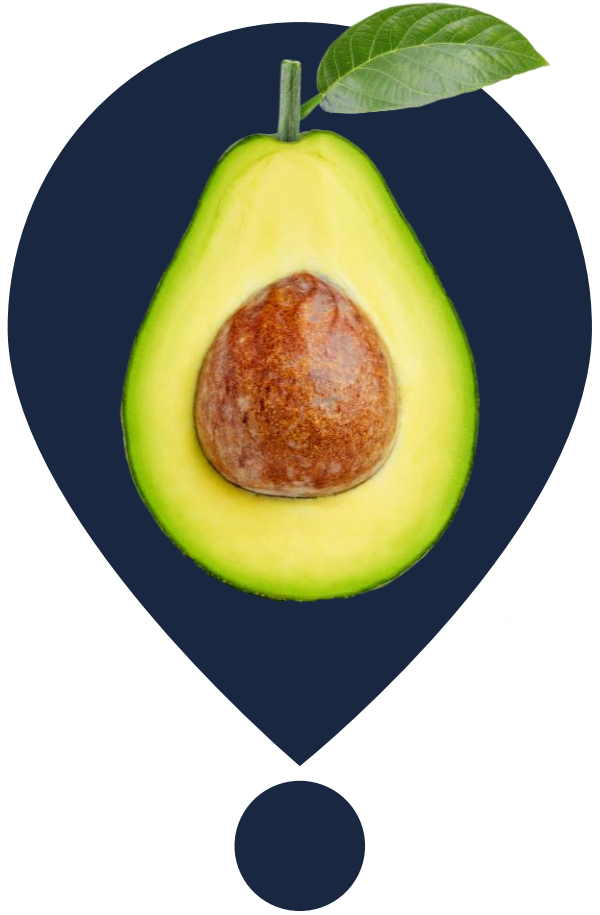
100% organic. Effective against a wide variety of common pathogens. Suitable for a wide variety of fruits and vegetables and for all post-harvest fruit handling processes.

OUR CHEMICAL – FREE SOLUTION

A stable probiotic formulation serves as nourishment for beneficial bacteria to thrive and reproduce, effectively outcompeting mould, fungi, and other pathogenic bacteria that contribute to spoilage of fresh produce.

Our solution consists of a beneficial bacterial consortium combined with natural stabilizers and nourishing 100% organic substances.

The outcome is a significant increase in the shelf life of fresh produce.



PROVEN TO OUTPERFORM CHEMICAL- BASED SOLUTIONS

commercially used by leading agricultural organizations

Found to be effective by inhibiting growth and propagation of typical pathogens:

more

avocado cherry pear persimmon apple nectarine grapes orang

And more…

Pathogens tested:

Colletotrichum, Penicillium Yeast, E. coli, Rhizopus, Lasiodiplodia, Alternaria, Listeria, Botrytis, Botryosphaeria, Cladosporium, Salmonella, aspergillus, Fusarium, Macrophomina, Sour rot, Brown-rot

PROLONGED PROTECTION ACROSS THE SUPPLY CHAIN

From storage to supermarket

MAKING THE DIFFERENCE

Selected projects that are in commercial use or have been proven feasible

Apples
Pears
Nectarines

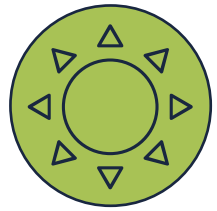
Grapes
Cherries
Berries

Avocado
Citrus
Persimmon
Pomegranate
Kiwi

Vegetables

Flowers

In-Vitro
tests



All

MAKING THE DIFFERENCE

Apples, Pears, Nectarines

PEARS AFTER **9 MONTHS** OF STORAGE:

No mould or rot, nor is there any internal discoloration. The fruit appears fresh

Skin damaged but NO mould or rot after 9 month!!!

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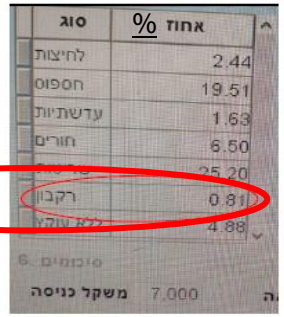
SPADONA PEARS - after **10 months** storage:

Spadona pears picked and stored on 22/7/2022 with daily fogging of Microbiome FOG, through a storage period of **10 months**.

Fruit was packed in May 2023 with pack-out of only **0.81%** decay signs. Pears look amazingly fresh.

Sorting results

- Pressures
- Roughness
- Lenses
- Holes
- Scratches
- Decay
- No Stem



BACK

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NECTARINE - 3 weeks storage in coold room

Proven effect in preventing stem rot and prolonged shelf life

No molud nor rot signs. Thus, minor defects can fall under 1st grade category, I.e, **less waste and higher income.**

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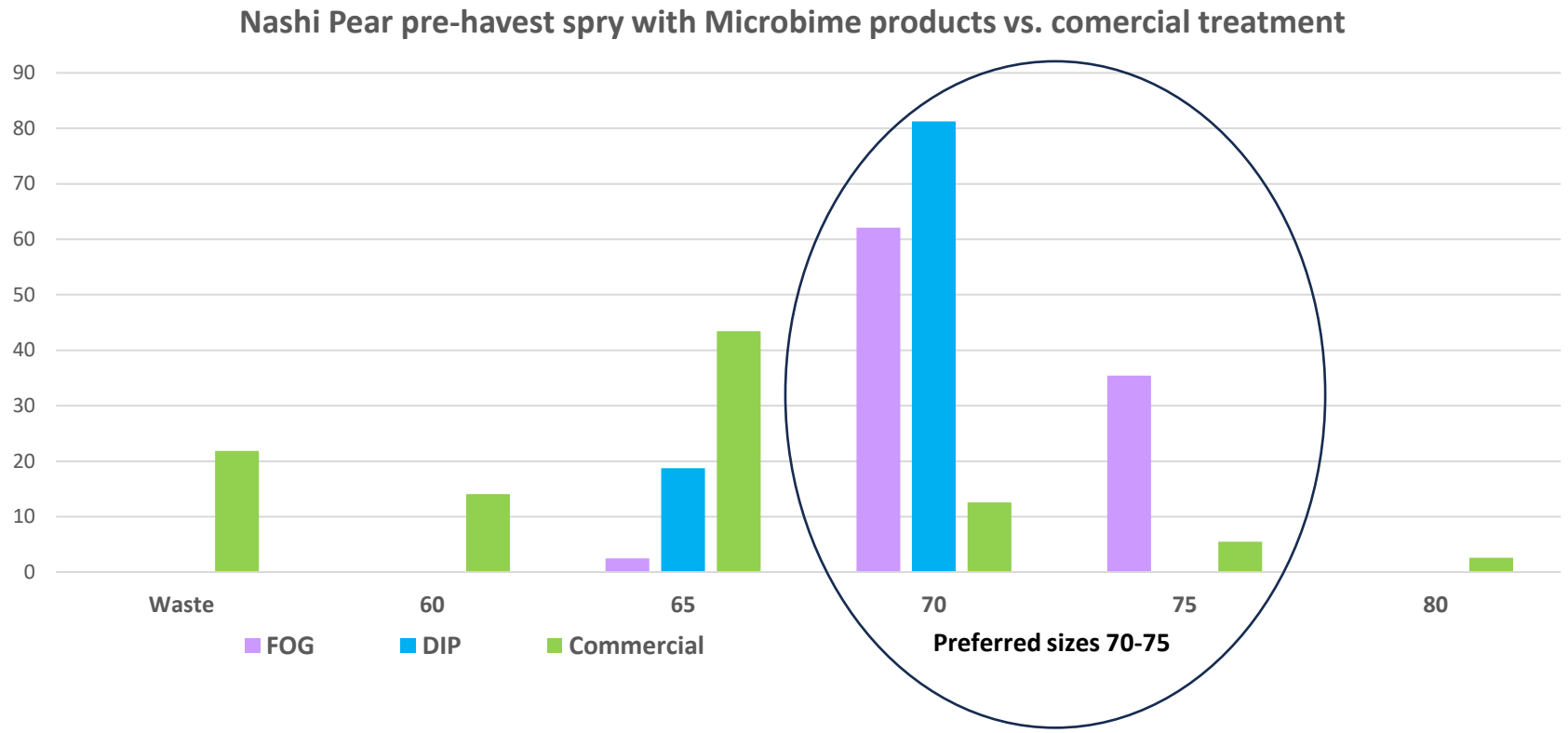
NASHI pear – pre-harvest spray on trees

Both Microbiome products <u>improved fruit size and reduced waste</u> compared to the commercial protocol (green).



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4/1/2024

MAKING THE DIFFERENCE

Grapes, Cherries, Berries

Table Grapes

Conclusion:
As was proven before with so many other products, Microbiome FOG can keep a space, and its content (in this case–Table grapes), free of pathogens for a long time.
Thus, a commercial scale trial of export table grapes is recommended (in-0.5°C and high humidity)

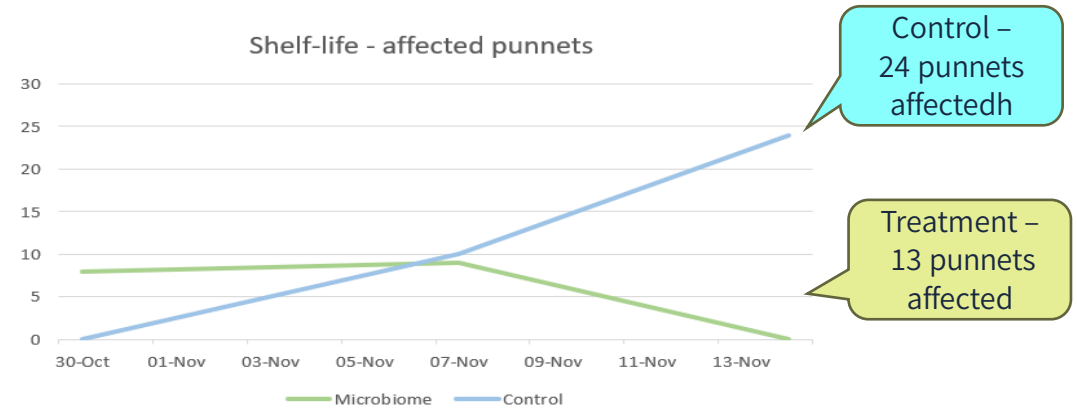
- POC observation to demonstrate that using Microbiome FOG may replace and **eliminate the use of So2 pads.** **45 days** at 1.5°C and 75-80 RH with **no signs of any mould or decay**.
- Additional **7 days** at room temp of 22-24°C, **no signs of mould nor decay appear,** with good flavor.

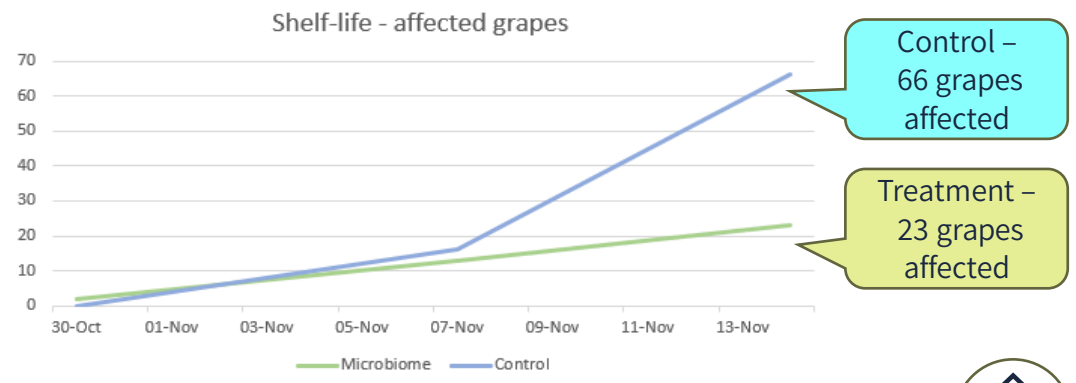
Grape storage trial with Microbiome FOG

Weekly assessment in the Gaskains Farm – pallets without SO2 pads

Date	Sample	Box #	# of punnets affected	# of grapes affected	Sample	Box #	# of punnets affected	# of grapes affected
30-Oct	Treatment	1	0	0	Control	1	0	0
		2	1	1		2	0	0
		3	0	0		3	0	0
		4	1	1		4	0	0
		5	0	0		5	0	0
07-Nov	Treatment	1	0	0	Control	1	3	5
		2	1	1		2	0	0
		3	1	10		3	2	3
		4	2	2		4	1	2
		5	0	0		5	4	6
14-Nov	Treatment	1	4	7	Control	1	5	11
		2	2	7		2	4	8
		3	3	4		3	6	13
		4	3	4		4	4	10
		5	1	1		5	5	24

Date	Sample	# of punnets	# of grapes	Sample	# of punnets	# of grapes
30-Oct	Treatment - Totals	2	2	Control - Totals	0	0
07-Nov		4	13		10	16
14-Nov		13	23		24	66





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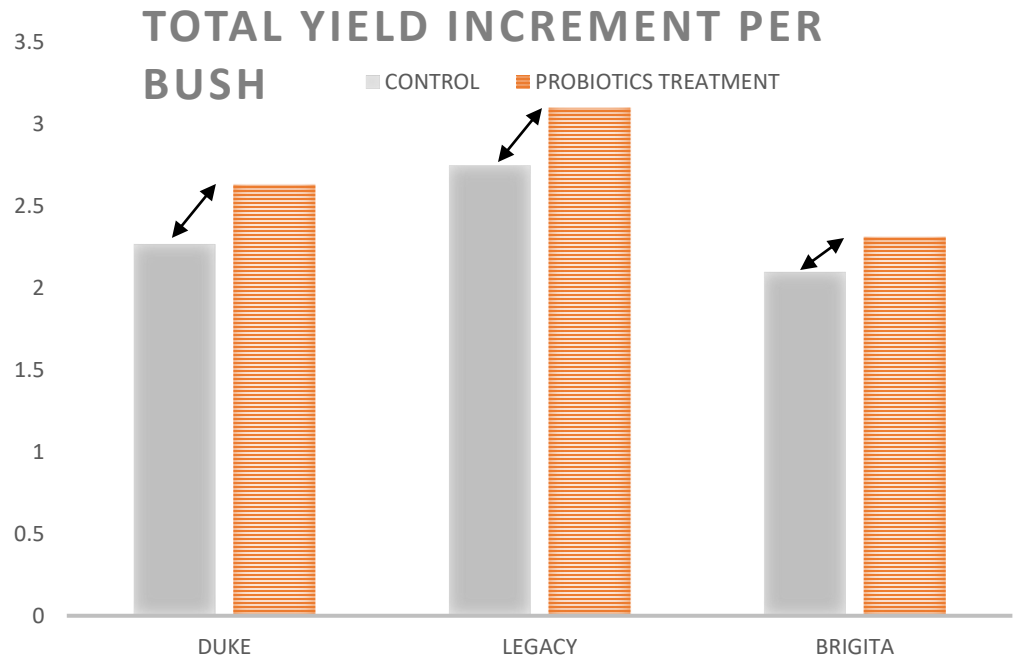
Blueberries

Pre-harvest spray and long-term storage with Microbiome DIP and FOG treatment

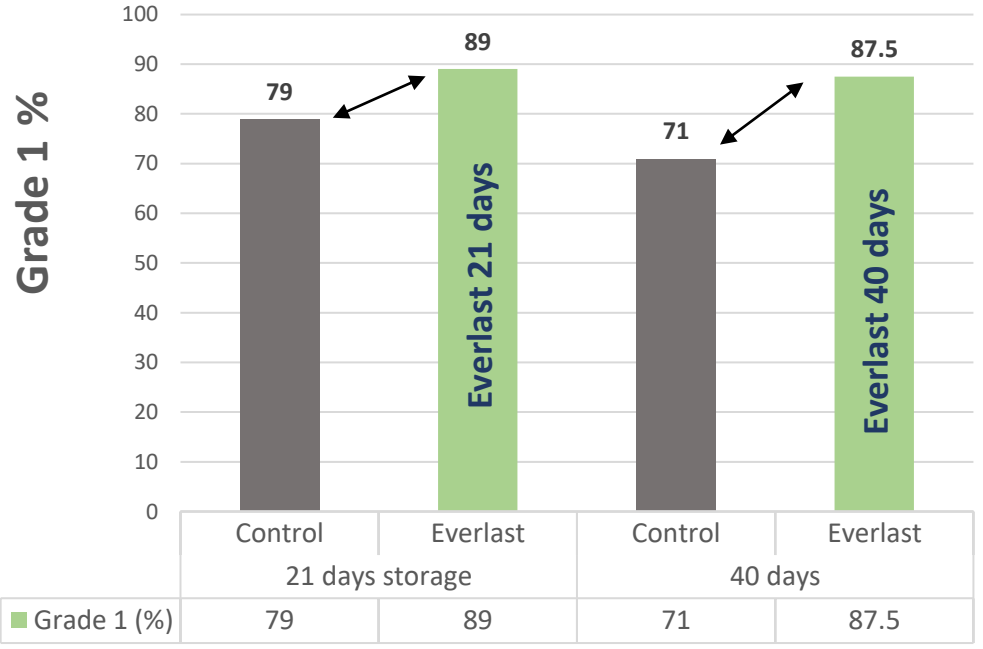
Average Yield (Kg per bush)

An increase of total yield by 16%, and 15% increase in fruit size



Fruit quality @ 21-40 days storage (1c°)

Quality improvement of 10% after 21 days, and 16% after 40 days Vs.



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CHERRY - IMMERSION TREATMENT WITH MICROBIOME DIP

Cherry sorted in "Bereshit" packhouse, treated by Microbiome DIP in the tipping bath.
Cherry fruit was harvested from plots that had suffered skin cracks and hail damage.
Treated and untreated fruit samples were kept for 7 days at room temperature (22-24 degrees).

Control – mould and rot around stings and in cracks and wounds

Treatment –
fruit with severe skin damage yet remained free of any mould and rot

BACK

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MAKING THE DIFFERENCE

Avocado, Citrus, Persimmon

ON SEP' 22

THE DIFFERENCE IS CLEAR

AVOCADO: 7 Weeks at 6°c cold room plus 11 days at room temp

PROBIOTICS

CONTROL

- Over 5 seasons of commercial probiotic treatment with solid indications of less mold and fungus problems than other avocado suppliers. As reported by UK and Dutch importers,
- Stored in cold room for 12 weeks without mold, rot or fungus and has longer shelf life when dispatched to market..
- Minor skin defects will remain free of mould or decay. Therefore, more fruits will be sold as 1st grade quality yielding higher income.

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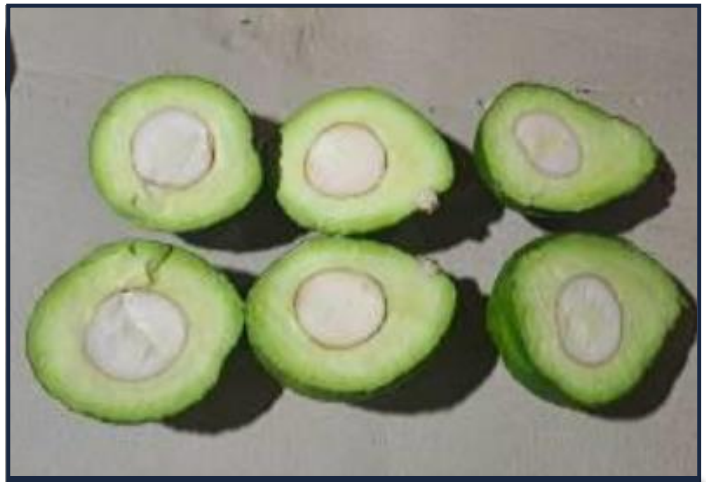
AVOCADO TREATED WITH MICROBIOME FOG AT **53** DAYS TRANSIT TIME

No mould or rot, nor is there any internal discoloration. The fruit looks **fresh**

Due to congestion at the transshipment ports, the transit time took 53 days from Mombasa to Mersin (16/4 – 8/6/23)

General condition of the cargo

General condition of the cargo



Condition of the inner parts of avucados

Here are a few quotes and photos copied from of the surveyor's report:

"The Surveyor did not detect any symptoms of moulding or color change on the inner parts of the avocados, around the seeds. The inner parts and seeds of the avocados were found to be sound in general. The hardness degree of the avocados was found to be 6.8 - 5 and no softening was detected on same".

"The Surveyor understood that around 1.64 % of the total cargo quantity might be non-standard, 1.85 % of the same might fall within Class 2 and remaining 5,327 boxes in 22,375.38 kg out of totally 5,520 boxes in 23,184 kg should be sound and falling within Class 1". (Comment = **96.5% class 1**)

Westfalia Fruit trials technology targeting food safety and sustainability

Fresh Plaza.com March 27, 2024

Westfalia Fruit has conducted the first successful trials of an innovative and natural method of ensuring food safety within the supply chain.

Current industry practice is to manually deep clean avocado ripening rooms to maintain high levels of food safety and eliminate residue from naturally occurring fruit mould. **Westfalia's new method uses a probiotic** uniquely distributed within a water mist circulated throughout ripening room, delivering several clear benefits.

Andrew Mitchell, Head of Innovation at Westfalia Fruit, explains, "**Our innovative probiotic liquid** is similar to that found in yoghurts which can help with the natural balance of our digestive system. This type of probiotic is also very good at attacking yeasts and moulds. We have developed the application of this natural probiotic further as a liquid, Westfalia Fruit is the only avocado supplier able to do this."

In an initial study, there was a 65 percent reduction in micro levels in the trial room compared to the control room. The study also found that mould on the individual fruit was significantly reduced. Avocados that had been treated with the probiotic remained mould free for up to fifteen days, which resulted in a reduction of internal rot of around 20 percent. Using this method also has several other clear benefits – it eliminates the need for chemical cleaning materials, avoids the need to shut down ripening rooms for cleaning, and can also be applied to hard-to-reach areas such as ventilation ducts and fans.

Westfalia is conducting a second trial, applying the probiotic liquid from the roof of the ripening room, and expects this to achieve a 90 percent reduction in micro levels compared to the control room. Fruit quality will be continuously monitored over a four-week trial in preparation for initial rollout across Westfalia's UK facilities.

SHARON FRUIT- EVERLAST VS CHLORIN 4 MONTH TRIAL

Chlorine + MCP1
1st Graide = 51%
Soft = 28%

MCP1 + Chlorine + Microbiome FOG
1st Graide = 72%
Soft = 2.7%

Control – pay attention to dry and leaning calyx leaves and advanced peel color = **advanced aging process**.

51% 1st grage. 28% soft

VS.

72% 1st grade. 2.7% soft

Treated with Microbiome FOG - green and upright calyx leaves and less advanced peel color, when = **slower aging process => longer shelf life**

ON SEP' 22

ORANGES Kept for **54** DAYS SHELF LIFE TRIAL AT ROOM TEMPERATURE

Proven effective in preventing the spread of infection from one fruit to the next.

Based on these results, we've treated Orri in a **chemical-free protocol** using Microbiome products only. Demonstrating significantly fewer mould, fungi, and decay than with the commercial treatment.

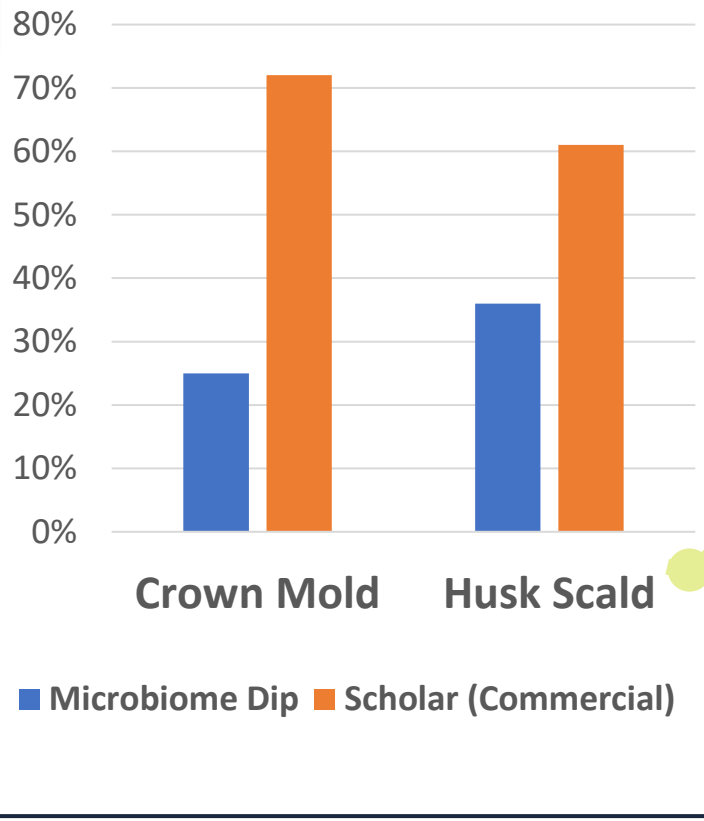
On March 23

Pomegranate – Scolar Vs. Microbiome Dip

Stored for 70 days with MA bags at 7°c (9.3.2023)

No rot. A reduction by 66% on crown rot and 50% on husk scald = Fresh peal look

Microbiome Dip



Scolar (commercial protocol)

BACK

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Kiwi - treated with Microbiome FOG

IN-VIVO demonstration of the protective ability and extended shelf life of Kiwi treated with Microbiome probiotics FOG product Vs, control group.

Kiwi Probiotic FOG **treatment**

Kiwi after 15 days of FOG probiotic

Kiwi Probiotic FOG treatment

no mould or decay, with anti-aging like effect, and prolong shelf-life.

Fresh Kiwi with no treatment (control)

FRESH KIWI WITH NO TREATMENT (CONTROL)

Control with mould and and signs of shrinkage

BACK

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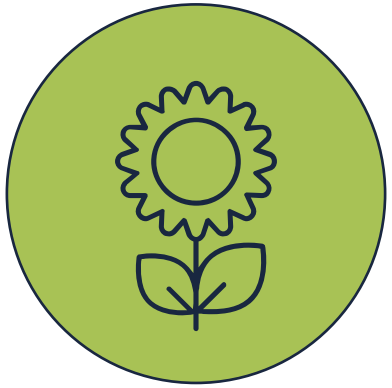
MAKING THE DIFFERENCE



Flowers

ON JAN 19

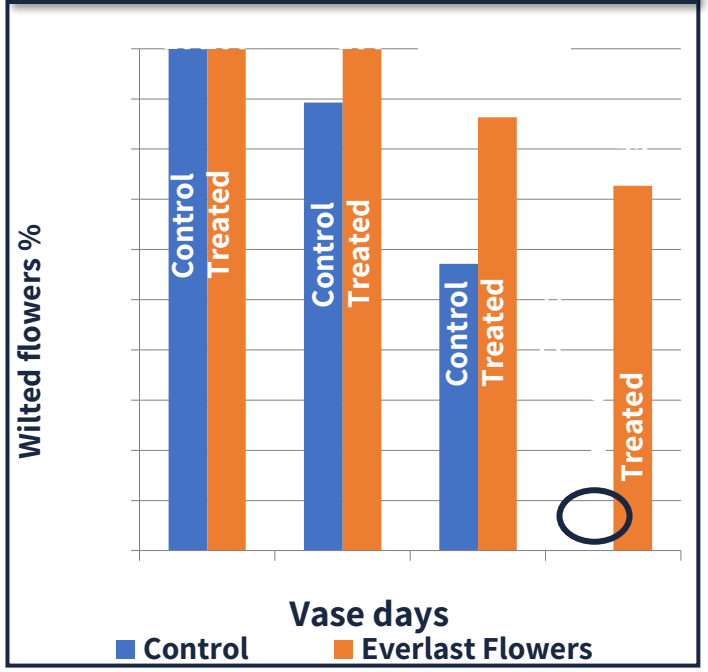
FLOWERS – PEONY FLOWER

Influence of EVERLAST Flower added to vase water at **15 days** (Vs. 5-7 days only for Not treated)
Abramov farm Jun-2019

FLOWERS - ACHILLEA

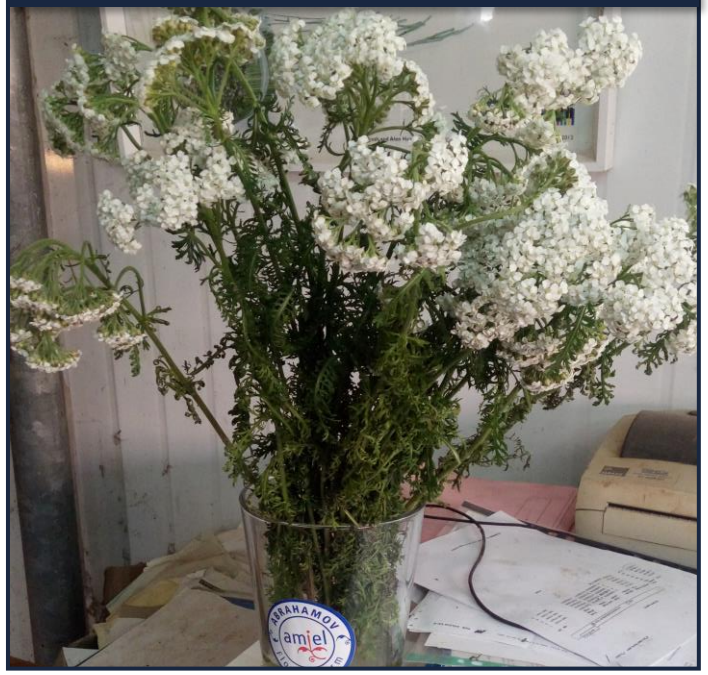
Influence of EVERLAST Flower added to vase water Vs. control for 18 days
Abramov farm Jun-2019

Sellable flowers rate over time (days)



Achillea in 18 days - Control

Achillea in 18 days –
treated with Everlast Flower



BACK

MAKING THE DIFFERENCE

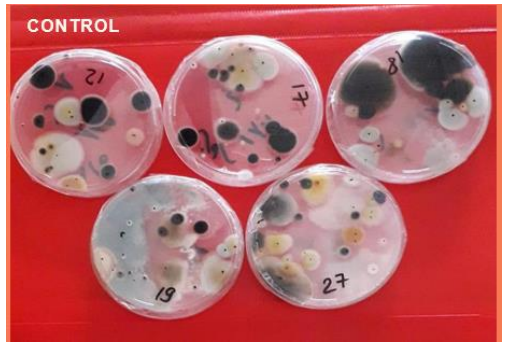
In-Vitro tests

FIELD CASE STUDIES

Enriching the space with Microbiome formulation reduces pathogen presence

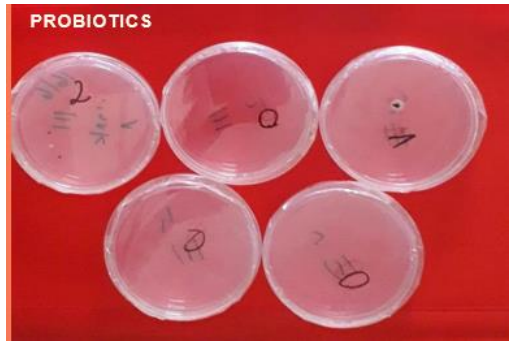
Reduces potential spoilage and loss, and saves the need for constant and periodic cleaning procedures

CONTROL



PDA's taken from cold room before treated with Microbiome FOG. identification of pathogenic fungi conducted by 'Meigal' Laboratories.

PROBIOTICS



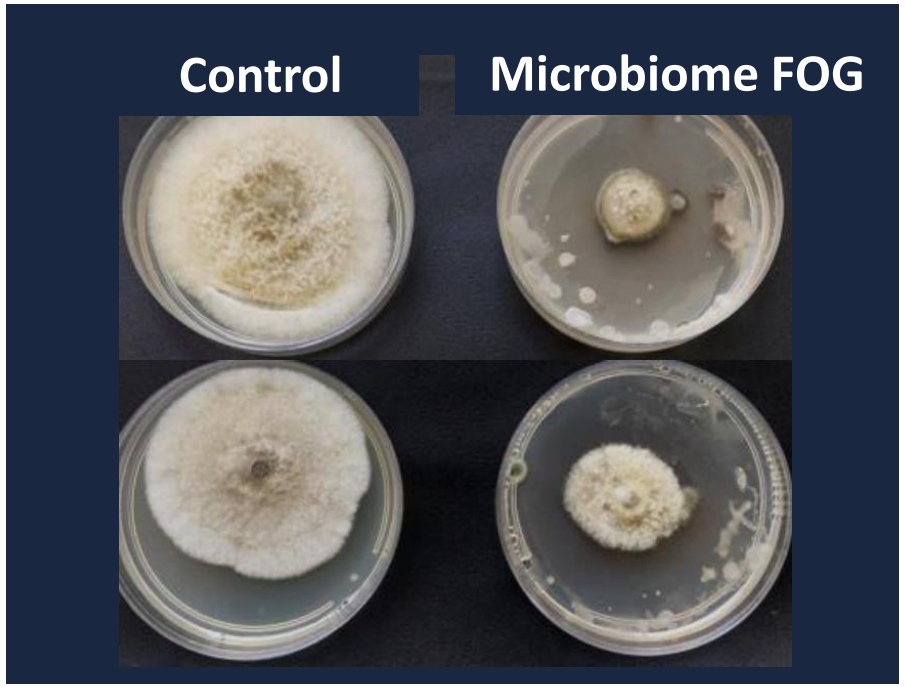
PDA's placed at the exact location of the previous PDA's while the room was treated with Microbiome FOG. The penicillium colonies were suppressed almost completely.

INFO

	BEFORE	AFTER PROBIOTIC
Penicillium Yeast Other (No. of colonies)	27	0
Penicillium Yeast Other (No. of colonies)	19	0
Penicillium	18	0
Penicillium Yeast Other (No. of colonies)	17	0
Penicillium	12	1

FIELD CASE STUDIES

Microbiome solution in-vitro test on inhibiting the development of the fungi Alternaria Alternata



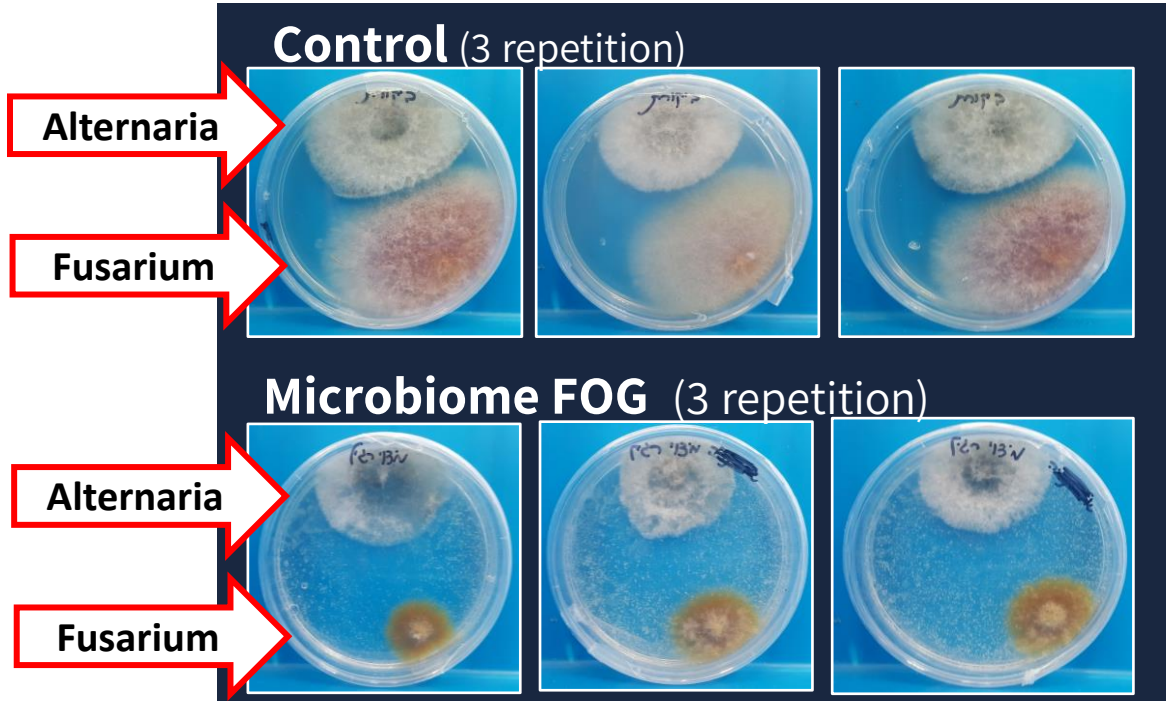
Material and methods:
An amount of 200 uL of Microbiome FOG was transferred to PDA plates and aseptically spread until the solution covered the entire plate. After this, *A. Alternata* mycelial plugs were transferred to these plates. Plates were incubated at 23°C and viewed after two, five and seven days. On the seventh day of incubation, the growth diameter of each plate was measured (width and breadth).

Conclusion: It is demonstrated that the Microbiome probiotic product was successful in inhibiting the growth and propagation of the Alternaria Alternata fungi.

BACK

FIELD CASE STUDIES

Microbiome solution in-vitro test on inhibiting the development of the fungi Alternaria and Fusarium



Material and methods:

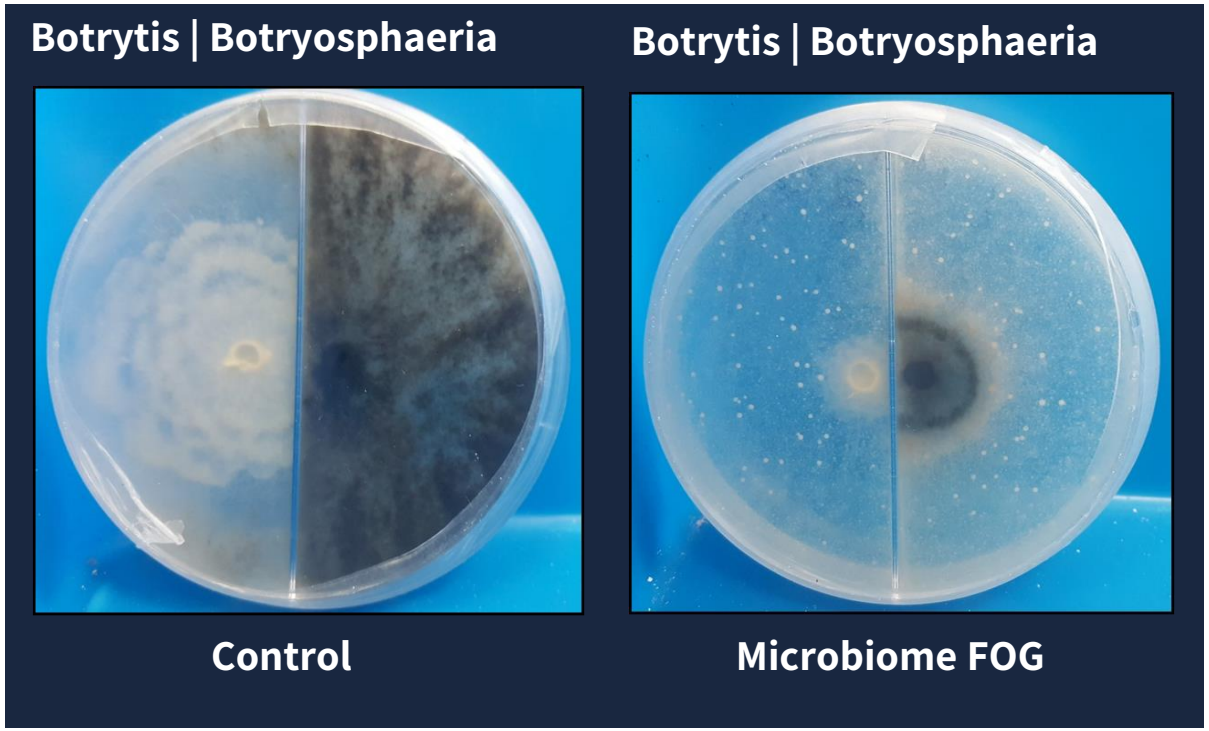
An amount of 200 uL of Microbiome FOG solution for that treatment was transferred to each treatment plate containing a PDA substrate, into which sterile beads were inserted and mixed until the solution was uniformly distributed on the substrate.
After this, plugs were taken from the tested Fungi and placed on the substrate according to the order described in the figure above.
Plates were transferred to a 25°C incubator and viewed after 2,5 and 7 days.

Conclusion: It is demonstrated that the Microbiome probiotic product was successful in inhibiting the growth and propagation of the Alternaria and Fusarium fungi.

BACK

FIELD CASE STUDIES

Microbiome solution in-vitro test on inhibiting the development of the fungi Botrytis and Botryosphaeria



Material and methods:

An amount of 200 uL of Microbiome FOG solution for that treatment was transferred to each treatment plate containing a PDA substrate, into which sterile beads were inserted and mixed until the solution was uniformly distributed on the substrate.
After this, plugs were taken from the tested Fungi and placed on the substrate according to the order described in the figure above.
Plates were transferred to a 25°C incubator and viewed after 2,5 and 7 days.

Conclusion: It is demonstrated that the Microbiome probiotic product was successful in inhibiting the growth and propagation of the Botrytis and Botryosphaeria.

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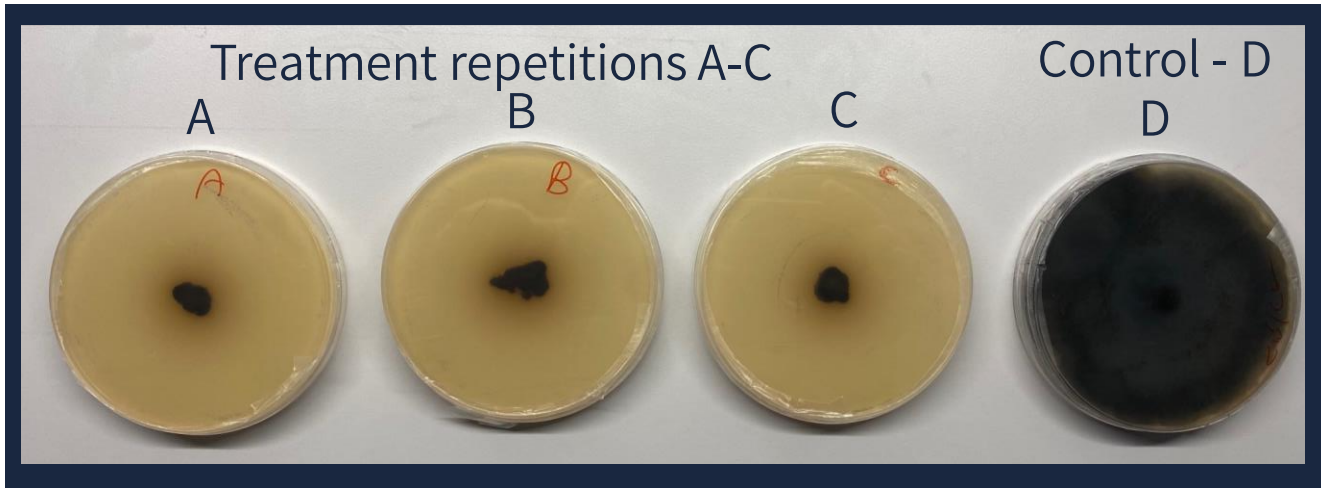
FIELD CASE STUDIES

Microbiome solution in-vitro test on inhibiting the development of the fungi Cladosporium



Material and methods:
An amount of 200 uL of the Microbiome FOG was transferred to each treatment plate containing a PDA substrate, into which sterile beads were inserted and mixed until the solution was uniformly distributed on the substrate.
After this, plugs were taken from the tested *Cladosporium* Fungi and placed on the substrate Plates were transferred to a 25°C incubator and viewed after 7 days.

Conclusions: It is demonstrated that the Microbiome probiotic product was successful in inhibiting the growth and propagation of the *Cladosporium* fungi.

BACK

ON JUNE 22 A COSTOMER'S AGRICULTURE DEPARTMENT

Evaluated microbial activity in a few operating rooms

End of the season population

After commercial treatment

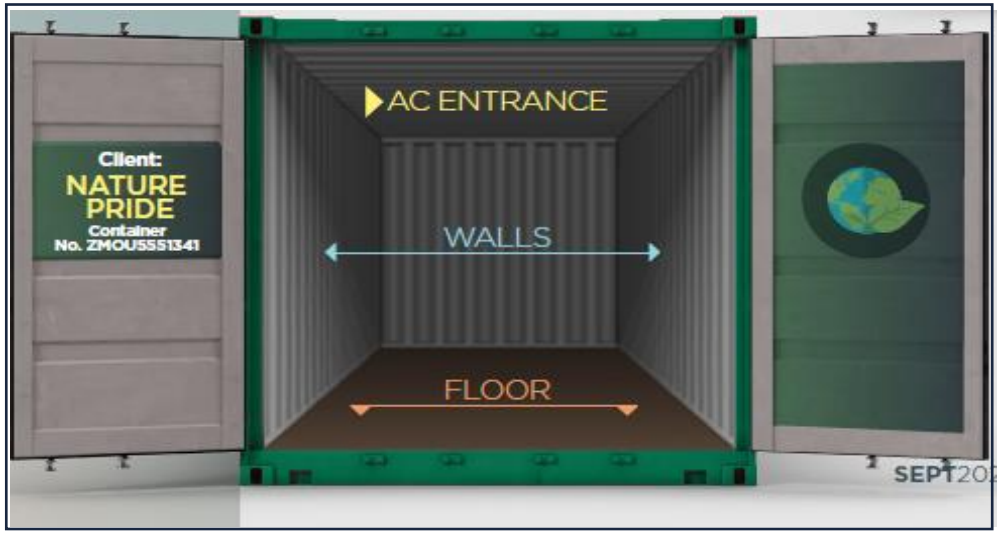
Cold room treated with Microbiome FOG

BACK

Fogging "Microbiome" product in reefer containers using automatic slow-release device, for continuance protection to prevent pathogens development

The probiotic bacteria protection effect will last extra 5-7 days after fruit will be off loaded and sent to market

Mould count	In Israel	In the Netherlands
Entrance	900	40
Walls	110	9
Floor	1,800	9
	Before treatment	When arrived at customer Wearhouse



Conclusion: highly contaminated containers can affect your product!

APPLICATION METHODS - continuous protection throughout supply chain processes

Cold rooms

Raw material, packed pallets & long-term storage (RA & CA)

RA cold rooms - fogging system - Nozzles could be fitted anywhere in the room.
The best way to place it would be close to the air-cooling system.

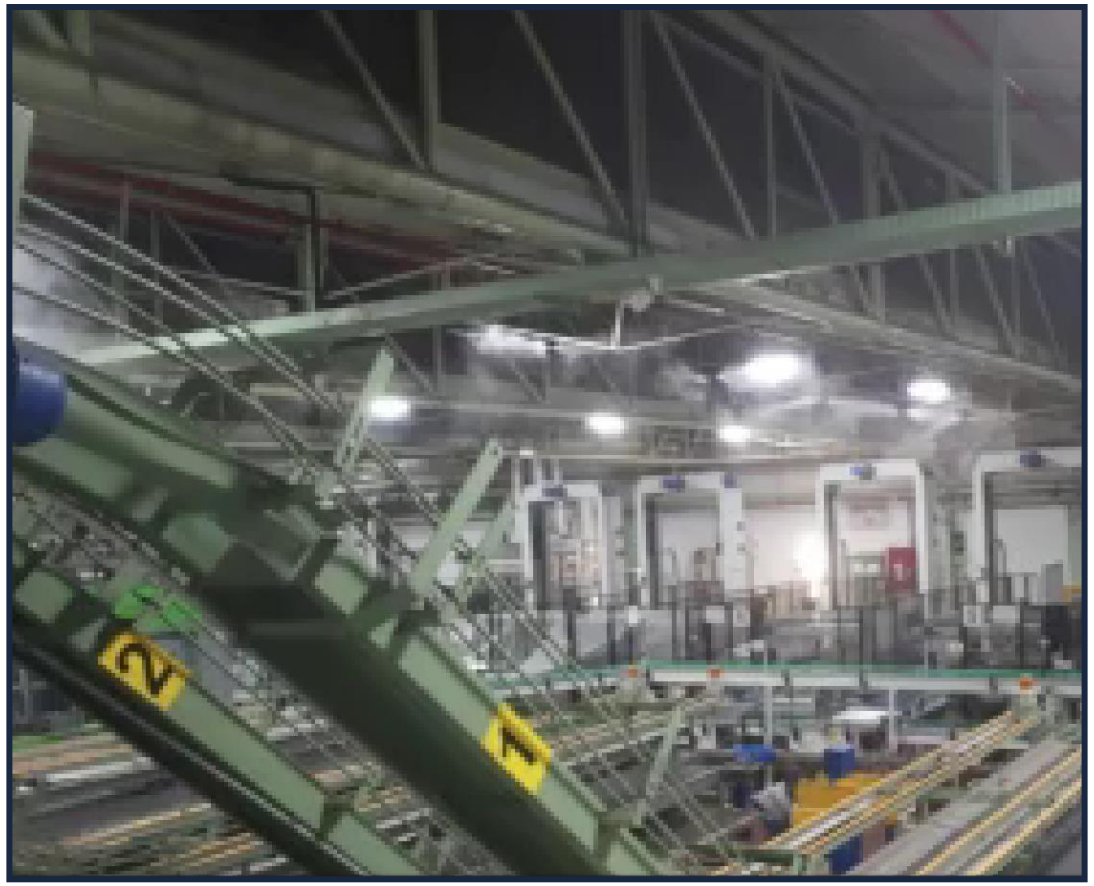
APPLICATION METHODS - continuous protection throughout supply chain processes

Fogging on Avocado and Citrus chemical-free packing lines

Fogging chamber on Pears packing line (Mist)

Installed on apples grading water tunnels, berries and cherry tipping bath etc.

Fogging with probiotic in packing hall.
Few minutes only, every 3rd night, will keep space free of pathogens.



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MICROBIOME FUTURE VERTICALS

Fresh produce is just the beginning!

INDOORS

1. HOME
2. TRANSPORT
3. HOSPITAL
4. BUILDING & PUBLIC PLACES

WATER

1. MINERAL
2. PONDS
3. INDUSTRIAL WASTE

ANIMALS

1. INDUSTRIAL GROWTH & CARE
2. PETS
3. ANIMAL PRODUCTION

AGRICULTURE

1. GROWTH
2. POST HARVEST
3. SEEDS & CUTTING
4. SUPER MARKETS
5. STORAGE
6. PROCESSING PLANTS

LIFE CARE

1. SPORTS
2. BODY CARE
3. PROBIOTICS CARE COSMETICS

FOOD PROCESSINGh

1. FRUIT & VGETABLES
2. FISH, BEEF & CHICKEN
3. FOOD PRESERVATION

microbiome PROLONGING LIFE