MICROBIAL ENHANCER FOR PLANTS

100% SATISFACTION GUARANTEED

MIICROBIAL MASS

PRODUCT GUIDE

Intrant approuvé pour l'agriculture biologique

Input approved for organic agriculture

AT MIIM HORTICULTURE WE TAKE OUR INSPIRATION FROM THE GROWERS WHO BUILT THIS INDUSTRY ON THE SIDES OF MOUNTAINS AND IN THE MIDDLE OF CORN FIELDS, IN BASEMENTS AND GARAGES, IN BARNS AND WAREHOUSES AND SHIPPING CONTAINERS.

WE ARE ENERGIZED BY GROWERS WHO PUSH THEMSELVES TO RAISE THE BAR ON EVERY CROP; WHO TREASURE THE GRIND AND REAP THE REWARDS; WHO LOVE THE PLANT AND LIVE THE CULTURE.

BY THOSE WHO WERE NOT AFRAID TO BREAK DOWN BARRIERS, THOSE WHO VIEWED PROHIBITION AS OPPORTUNITY AND BUILT EMPIRES FROM NOTHING. THOSE WHO CHOSE THEIR PATH AND HAD THE COURAGE TO FOLLOW IT….

….AND THOSE WHO WILL STILL BE HERE WHEN THE DUST SETTLES.

HERE'S TO YOU.

MiiM

HORTICULTURE

HARNESS THE POWER OF NATURE

MIIM Horticulture is proud to continue to support serious growers around the world with MIICROBIAL MASS and MIICROBIAL MASS PRO. Years ago, we set out to create a plant biostimulant product that would help cultivators take their crops to the next level. We understood from the beginning that a targeted approach using applied microbiology was the key to boosting plant performance, enabling commercial cultivators to achieve the results necessary to thrive in a competitive marketplace. Ultimately, our work has led us to create a novel approach to the development of bacterial consortia, and has allowed us to provide exciting new tools for growers everywhere.

JOIN THE MASS MOVEMENT

Our goal is to create products that help growers achieve the healthiest, most productive crops possible in a way that has no negative effects on the environment. After years of research we have harnessed a consortium of beneficial bacteria that is 100% natural and provides a much larger root mass, faster plant growth and better overall plant health.

"OUR GOAL IS TO CREATE PRODUCTS THAT HELP GROWERS ACHIEVE THE HEALTHIEST, MOST PRODUCTIVE CROPS POSSIBLE IN A WAY THAT HAS NO NEGATIVE EFFECTS ON THE ENVIRONMENT."

Every day more growers become aware of the consequences that their growing practices have on the natural world and begin to look for ways to reduce the negative environmental impacts of their crop production. By utilizing naturally occurring soil bacteria, MIICROBIAL MASS and MIICROBIAL MASS PRO offer solutions to cultivators seeking to maximize plant yield while minimizing environmental harm. Through the application of biology, our customers are able to produce bumper crops in the safest, cleanest ways possible without sacrificing their financial wellbeing.

MIIM HORTICULTURE

SPECIFIC FOR HEMP AND CANNABIS PRODUCTION

Specific for hemp and cannabis production, MIICROBIAL MASS and MIICROBIAL MASS PRO have been specially developed to maximize plant yield using five targeted bacterial strains that have been shown to promote plant growth and enhance microbial life in and around the root zone. These strains work to increase the bioavailability of phosphate and calcium to the plant through the use of phosphate and calcium solubilizing bacteria. They also increase the bioavailability of iron through the use of siderophore producing bacteria and promote good soil health with enzymes that hydrolyze substrate into useful by-products for the rhizospheric microbial communities.

- Five unique strains of bacillus bacteria work as a team to unlock phosphorus, calcium, and iron for uptake into plant tissues
- Extracellular enzyme production helps to break down other fertilization compounds thus promoting a rich, diverse, and healthy root zone
- Accelerated root initiation during propagation (cloning)
- Faster root development and increased root biomass
- Improved vegetative growth
- Increased plant health and vitality
- Thicker stalks and stronger branches
- Increased yield
- Effective as an additive for all nutrient programs – growing practices do not need to change in order to achieve the benefits of MIICROBIAL MASS.
- Compatible with any organic or salt based feed programs
- Effective for use with any substrate or growing media – proven benefits with use in rockwool, coco coir, potting soils, expanded clay pellets, water tables, and mineral soils
- Excellent for use in field agriculture and commercial hemp production
- Certified organic by ECOCERT Canada
- CFIA approved for production in any licensed facility in Canada

PHOTO BY **HAPPY MIICROBIAL MASS USER**

MIICROBIAL MASS IS A BIOSTIMULANT PRODUCT SPECIALLY DEVELOPED TO MAXIMIZE PLANT YIELD USING FIVE DIFFERENT BACTERIAL STRAINS

MIICROBIAL MASS utilizes the latest scientific understanding of rhizospheric microbiology and has been carefully developed to harness the power of beneficial bacteria in the root zone. Part of our research and development process involved extensive field testing in partner gardens across North America utilizing a wide variety of nutrient programs, substrates, and growing practices in both indoor and outdoor settings. This research has allowed us to identify with great precision the application rates necessary to achieve spectacular results in the majority of gardens and growing conditions.

Our proprietary blend of bacteria promotes a healthy root zone by solubilizing phosphorus and calcium, and assisting with the bioavailability of iron and other fertilization compounds from both organic and inorganic sources. Therefore, our customers are able to unleash the full potential of their crops without major changes to their growing practices.


PHOTO BY @DANKY_MCDANKERSON

MICROBIOLOGY IN YOUR GARDEN

Over the past few decades, the hydroponics industry has continued to reinvent itself and raise the bar in terms of the results that can be possible in indoor and outdoor gardening. Technological improvements in lighting, environmental controls, grow system design, and nutrient programs have revolutionized the way we think about caring for our plants. However, it seems the area in which progress has been slowest is in the biological component to plant care. Plants have evolved over millions of years as part of complex ecosystems comprised of diverse communities of organisms. Many of the most important components of these natural ecosystems are the microorganisms which form the foundation of the soil food web. These microbial communities work in mutualistic relationships with plants and are fundamentally important for nutrient cycling, plant immunity and disease suppression, drought tolerance, and overall plant health and productivity in natural ecosystems. Microbiologists and soil ecologists understand that optimal performance cannot be achieved when plants are removed from the microbial life that has supported and protected them for millennia. For this reason, some of the most exciting progress currently underway in the hydroponics industry involves the introduction of beneficial microbes to high-performance cultivation programs.

"PLANTS HAVE EVOLVED OVER MILLIONS OF YEARS AS PART OF COMPLEX ECOSYSTEMS COMPRISED OF DIVERSE COMMUNITIES OF ORGANISMS."

HOW DOES MIICROBIAL MASS WORK?

PHOTO BY **@CRAFTGROWNBC**

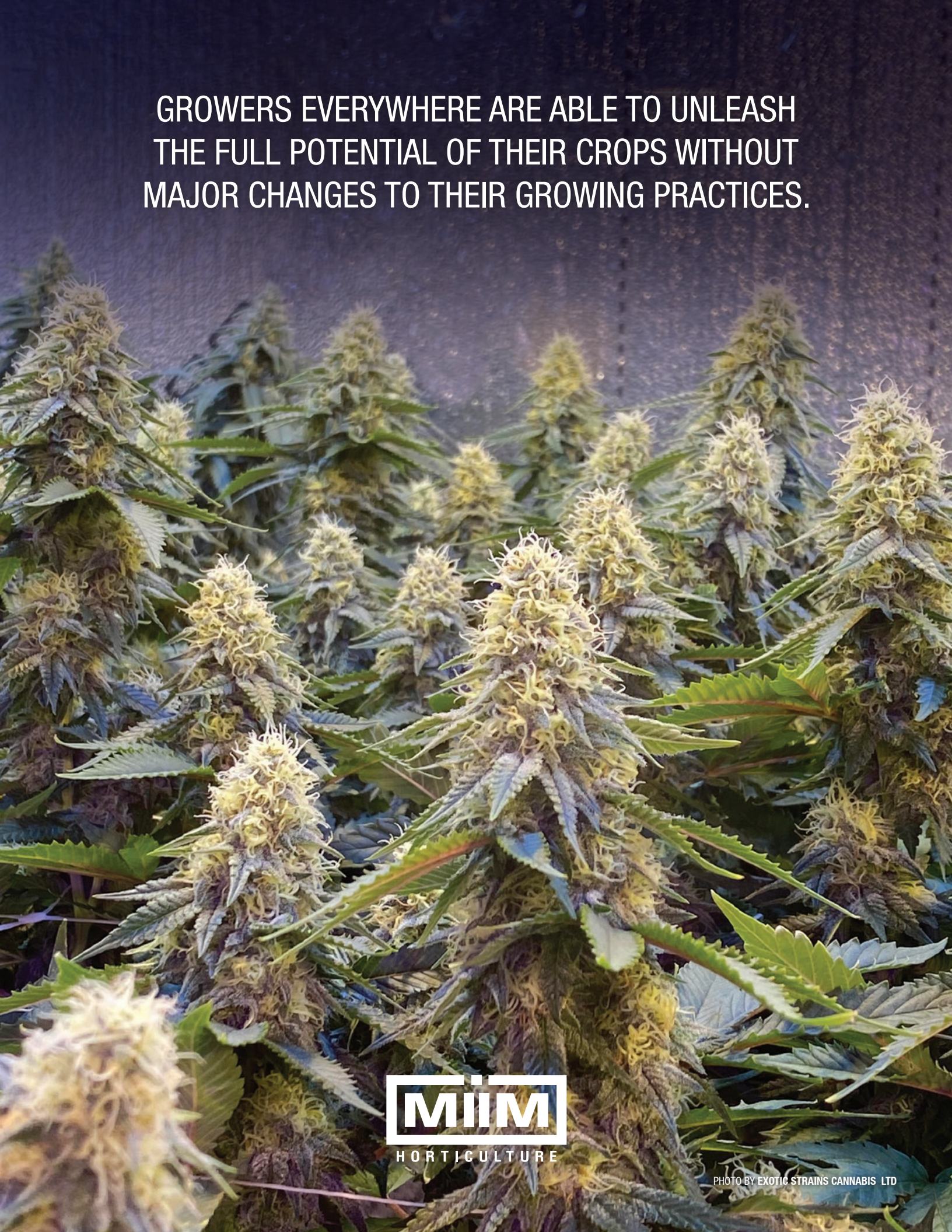
Unlike many of the first generation of beneficial microbe products introduced into the market, MIICROBIAL MASS uses a highly targeted approach to inoculate the rhizosphere with a microbial consortium optimized to cycle nutrients in very specific ways. Utilizing the very latest scientific understanding of rhizospheric microbiology, our product development process involved the careful identification of five unique strains of bacteria that work in perfect harmony to perform some of the highly specific nutrient cycling functions required for optimal plant growth and development. The functional roles of each member of this bacterial consortium can be described as their modes of action.

PHOTO BY **LEVI SWANSON**

MIICROBIAL MASS IS COMPATIBLE WITH ALL GROWING MEDIA AND ALL BASE NUTRIENTS.

MIICROBIAL MASS is effective in any growing media and in any conventional or organic nutrient program. It is compatible with soil, supersoil, rock wool, coco coir, expanded clay pellets, deep water culture, and other hydroponic systems.

GROWERS EVERYWHERE ARE ABLE TO UNLEASH THE FULL POTENTIAL OF THEIR CROPS WITHOUT MAJOR CHANGES TO THEIR GROWING PRACTICES.

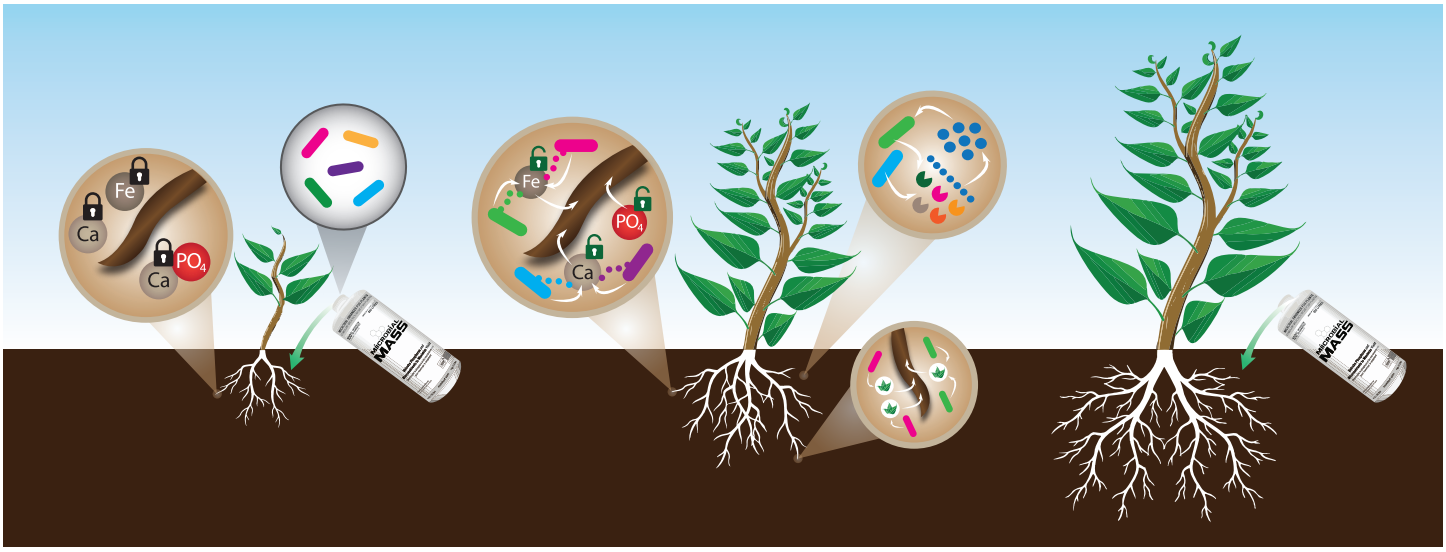


MiiM
HORTICULTURE

PHOTO BY **EXOTIC STRAINS CANNABIS LTD**

WHAT IS A MODE OF ACTION?

Mode of action is a term used to describe change at a cellular or molecular level. This transition can be anatomical or functional and always results from exposure to another living organism or any chemical or biological change in the cellular or molecular environment of a living organism. When we introduce something new to our garden and observe a change in our plants, we can be confident that a mode of action is at work. This is a valuable concept for growers to consider as we compare the effectiveness of different inputs we may wish to incorporate into our cultivation programs. MIICROBIAL MASS features several important modes of action that help to maximize results in any type of garden.



MODE OF ACTION:

PHOSPHORUS SOLUBILIZATION

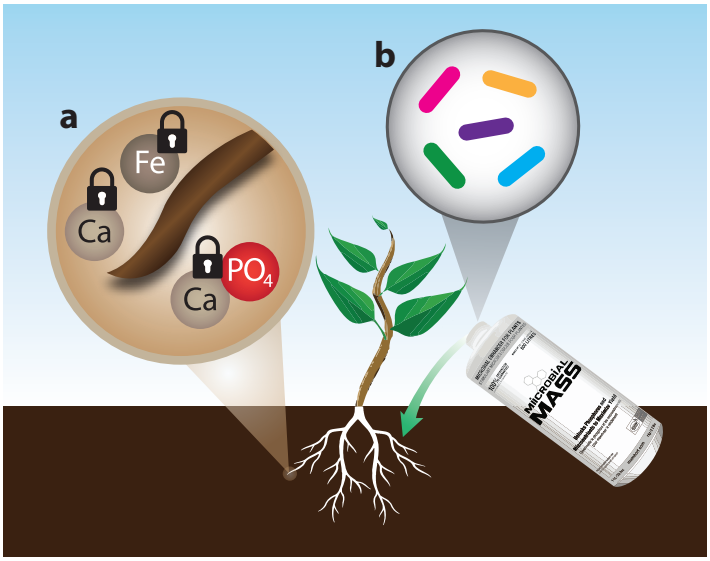
MIICROBIAL MASS features multiple strains of bacteria that are highly effective at solubilizing phosphorus. In other words, they are able to convert insoluble forms of phosphorus into forms that can be dissolved into the soil solution or hydroponic solution. This conversion of phosphorus allows this important macronutrient to be absorbed by plants' roots.

WHY PHOSPHORUS SOLUBILIZATION IS NECESSARY

Phosphorus is one of the most important nutrients required for plant growth, alongside calcium, nitrogen, and potassium. Phosphorus is vital for a range of plant stages and features, including early stages of development, tissue stiffness, root growth, fruit formation, inflorescence (flowering), and resistance to cold and disease. Unfortunately, the bioavailability of phosphorus tends to be reduced over time as it interacts with the complex chemistry of the root zone.

PHOSPHORUS SOLUBILIZATION FOR ORGANIC GROWERS

For growers running organic nutrients and living soil systems, phosphorus is largely immobilized (essentially made non-bioavailable) in organic matter in the form of inositols and phytate. This means that all organic growers must rely on the biological activity in their soils to solubilize phosphorus for plant uptake. Some bacterial strains have the power to produce phytase enzymes, which convert phosphorus into bioavailable forms ready for plant absorption.



a) Many essential nutrients for plant growth such as phosphorus, calcium and iron exist in a forms that are unavailable for plant absorption.

b) MIICROBIAL MASS contains a synergy of 5 bacteria that is applied during watering of germinating or growing plants. These strains have a high growth rate in all substrates commonly used in agriculture including hydroponic and aquaponic systems.

MIICROBIAL MASS features two bacterial strains that have a strong capacity to produce phytase enzymes to ensure solubilization of organic phosphorus.

PHOSPHORUS SOLUBILIZATION FOR HYDROPONIC GROWERS

Hydroponic and aeroponic growers running synthetic nutrients face a similar challenge. Typically, these systems make use of salt-based nutrients which are bottled in fully plant-available forms. Unfortunately, once these plant-available nutrients are introduced into the root zone, a series of chemical interactions begin to occur, leading to important nutrients becoming complexed (bonded) with other minerals in forms that cannot be taken up by plants. In this environment, phosphorus becomes complexed with calcium, aluminum, magnesium, and iron. The formation of these complexes can greatly reduce the bioavailability of phosphorus, taking food away from our plants. Therefore, MIICROBIAL MASS provides a major benefit for hydroponic and aeroponic growers by continually cycling phosphorus back to soluble, plant-available forms optimized for plant uptake.

MODE OF ACTION:

CALCIUM SOLUBILIZATION

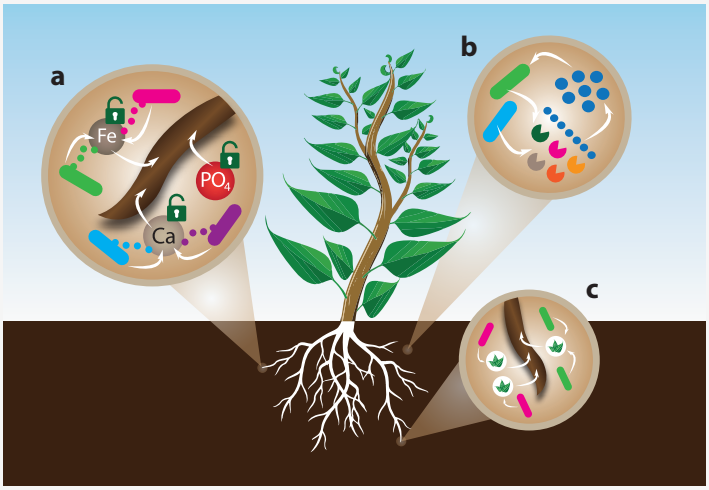
Another important mode of action used by MIICROBIAL MASS is that of calcium solubilization. Like phosphorus, calcium is considered to be an essential element for plant health and growth. MIICROBIAL MASS features multiple strains of bacteria capable of solubilizing calcium. In other words, they are able to convert calcium from insoluble forms, to forms that can be dissolved in water for uptake by plants.

WHY IS CALCIUM SOLUBILIZATION NECESSARY?

Calcium joins phosphorus, nitrogen, and potassium as one of the four most important macronutrients necessary for strong plant health and growth.
Calcium promotes an efficient root system, ensures the development of rigid stems, and is essential for a plant's immune system to function properly. It is also involved in the construction of cell walls, and helps to ensure that crucial enzymes within the plant work the way they should.

CALCIUM SOLUBILIZATION FOR ORGANIC GROWERS

By far the most common form of calcium used in organic cultivation is calcium carbonate. This is also the form in which calcium is commonly found in natural soils. Unfortunately, the calcium in this compound is bound up so that it is not bioavailable for plants. In order to be absorbed by plants, calcium must be reduced to its ionic form. Organic growers rely on soil microbiology to perform this task, and MIICROBIAL MASS features two strains of bacteria which are highly effective at converting calcium into a soluble form that can enter the soil solution and be absorbed by plants. They do this by producing organic acids that decrease pH locally, thereby reducing calcium carbonate down to Ca2+ ions which are readily available to be absorbed.



a) Bacteria present in MIICROBIAL MASS have the ability to transform phosphorus, calcium, iron and many other soil micronutrients into bioavailable forms.

b) MIICROBIAL MASS bacteria also produce large amounts of extracellular enzymes that digest complex organic molecules present in the soil into simpler forms. Those smaller molecules can then become food for the different microorganisms present in the soil, thus promoting a healthy microbial life around the plant root system.

CALCIUM SOLUBILIZATION FOR HYDROPONIC GROWERS

Although hydroponic and aeroponic growers typically utilize nutrient systems containing plant-available, ionic calcium, these ions tend to become complexed with other minerals such as phosphorus and sulfur once introduced to the complicated chemistry of the root zone environment. This means that over time the bioavailability of calcium is reduced and plants are no longer able to access the food they need for optimal growth. MIICROBIAL MASS features two strains of bacteria which are highly effective at reducing these complexes back to plant-available forms by continually solubilizing it into the hydroponic solution. This calcium solubilization facilitates increased uptake, allowing plants in hydroponic and aeroponic systems to more fully utilize the calcium provided by any nutrient program.

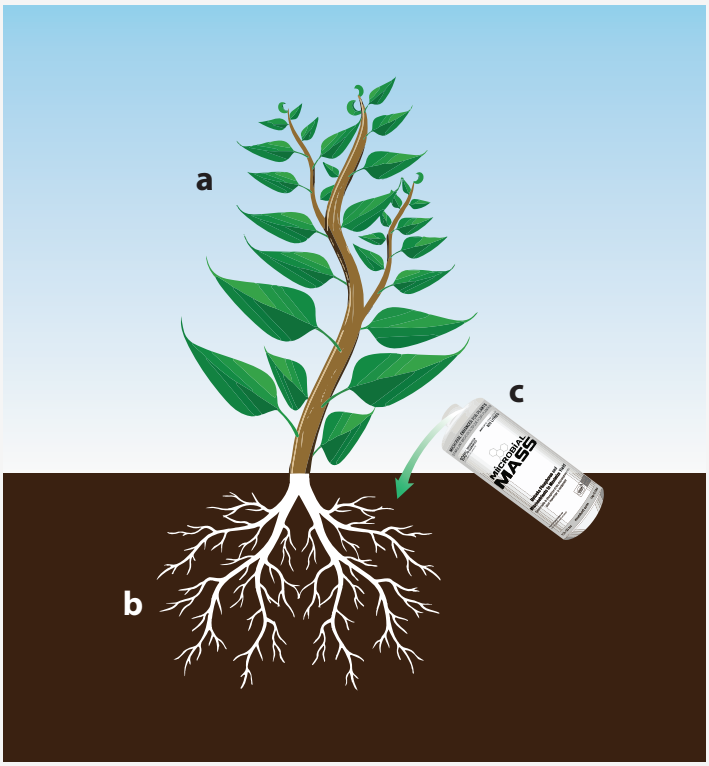
MODE OF ACTION:

SIDEROPHORE PRODUCTION

Macronutrients are not the only essential plant nutrients vital for healthy growth. Although plants require micronutrients in smaller quantities, deficiencies in these essential plant nutrients can limit growth as severely as any macronutrient deficiency.
Iron is an essential plant micronutrient, vital for plant health and growth. It is largely responsible for the production of chlorophyll, and is also heavily involved in oxygen transport throughout the plant, DNA stability and repair, certain intermediate metabolisms, and cellular respiration.

SIDERAPHORE PRODUCTION FOR ORGANIC AND HYDROPONIC GROWERS

Although iron is extremely common (it is the fourth most abundant element on Earth), plants can struggle to absorb this nutrient as it occurs in organic cultivation systems and natural soils. Usually, iron occurs as a form of ferric ion (Fe3+), which is difficult for plants to assimilate. Luckily, certain bacteria have been found to be hugely beneficial in resolving this iron absorption issue for plants. These bacteria have developed the ability to create molecules called siderophores, which are capable of binding to Fe3+ ions to facilitate transport across cell membranes. MIICROBIAL MASS features a bacterial strain that excels at producing siderophore molecules, optimizing iron uptake by plants. This allows organically grown plants to uptake all the iron they need, helping to maximize results.



The use of MIICROBIAL MASS increases **(a)** foliar and **(b)** root system growth and development, therefore enhancing yield, resilience and speed by which plants mature. **(c)** Optimal results are obtained through multiple applications of MIICROBIAL MASS throughout plant development.

MODE OF ACTION:

EXTRACELLULAR ENZYME PRODUCTION

Finally, MIICROBIAL MASS uses one more mode of action to promote plant health; extracellular enzyme production. Simply put, the bacteria in MIICROBIAL MASS are able to produce and secrete specific enzymes into the environment around them. The term “extracellular” simply means that the enzymes exit the bacterial cell and enter the rhizosphere. This is a very useful mode of action because the enzymes help to break down compounds in the soil so that plants can metabolize them. The byproducts of enzymatic degradation can also induce the growth of the five strains of bacteria present in MIICROBIAL MASS, as well as other beneficial microorganisms which may be present. The enzymes also encourage a healthy root zone by breaking down dead root matter and other plant byproducts, as well as other organic compounds in the growing media. Although this enzyme production is not necessarily meant to replace the use of enzyme-specific products, the continual enzyme production offered by MIICROBIAL MASS provides a major benefit to the root zone in any cultivation system.

MIICROBIAL MASS can be incorporated into any commercial fertigation system and is perfectly compatible with any irrigation equipment including pumps, filters, water lines, drip emitters, high pressure aeroponics, or any other water delivery method. Because it features dormant bacterial spores which have been washed and pasteurized, MIICROBIAL MASS runs clean through irrigation lines and will not contribute to an increase in biofilm buildup. In some cases, custom application strategies may be required. Please contact our technical support team for more information.

MIICROBIAL MASS
MIICROBIAL MASS PRO

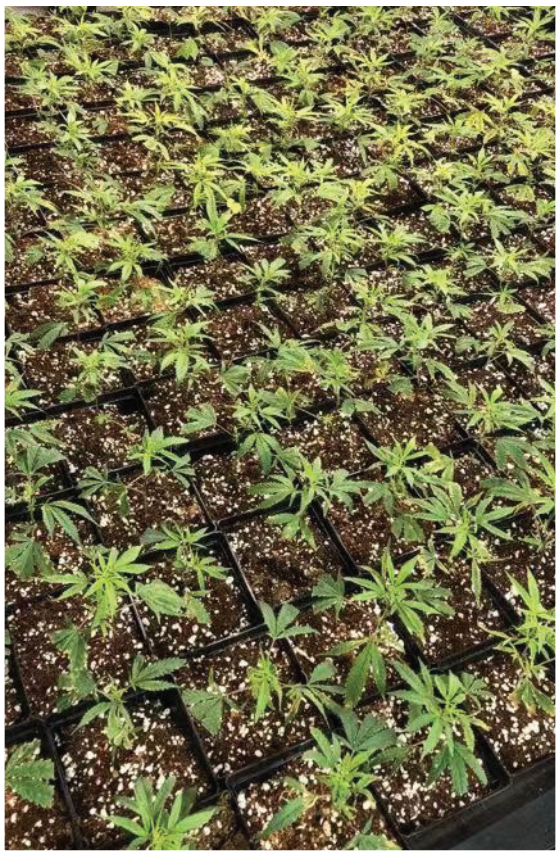
Chemical Products

		Soil, Coco Coir, Peat-Based Media		Rock Wool, Clay Pellets, DWC, Dutch Buckets	
Product	**Active Ingredients**	**Compatible**	**Threshold**	**Compatible**	**Threshold**
29% H2O2	Hydrogen Peroxide	Yes	Up to 1.5ml/L Up to 6ml/gal	Yes	Up to 0.6ml/L Up to 2.4ml/gal
35% H2O2	Hydrogen Peroxide	Yes	Up to 1.25ml/L Up to 5ml/gal	Yes	Up to 0.5ml/L Up to 2ml/gal
BioSafe Systems Zerotol	Hydrogen Peroxide & Peroxyacetic Acid	Yes*	Up to 0.1ml/L Up to 0.4ml/gal	Yes*	Up to 0.1ml/L Up to 0.4ml/gal
Athena Cleanse	Hypochlorous Acid	Yes	Up to 10ml/L Up to 40ml/gal	Yes	Up to 10ml/L Up to 40ml/gal
Cultured Solutions UC Roots	Hypochlorous Acid	Yes	Up to 10ml/L Up to 40ml/gal	Yes	Up to 10ml/L Up to 40ml/gal
Cyco Kleanse	Citric Acid	Yes	Any Concentration	Yes	Any Concentration
Botanicare Clearex	Citric Acid	Yes	Any Concentration	Yes	Any Concentration
SIPCO HyClean	Citric Acid	Yes	Any Concentration	Yes	Any Concentration
House & Garden Drip Clean	Phosphoric Acid & Potassium Oxide	Yes	Any Concentration	Yes	Any Concentration
pH Down	Phosphoric Acid	Yes	N/A	Yes	N/A
pH Up	Potassium Hydroxide (typically)	Yes	N/A	Yes	N/A

*For best results, reapply MIICROBIAL MASS 24 hours after treatment with Zerotol.

Biocontrol Products

Product	Active Ingredients	Compatible	Threshold
Botanicare HydroGuard	Bacillus Amyloliquefaciens	Yes	Any Concentration
BioBest Asperello T34	Trichoderma asperellum T34	Yes	Any Concentration
BioWorks Root Shield	Trichoderma harzianum T22	Yes	Any Concentration



UNTREATED

TREATED

The above photos show the results from a side-by-side test that was performed by commercial cannabis growers. Their trial groups consisted of clones from the same strain grown in the same environment with the same soil and nutrients. The control group on the left did not receive an application of MIICROBIAL MASS. The treatment group on the right received one application of MIICROBIAL MASS at transplant. Both photos were taken three days after transplant and the results are clear!

Images on the right show root development from the treatment group 7 days after application.

MIICROBIAL MASS and MIICROBIAL MASS PRO are easy to incorporate into any indoor, outdoor, or greenhouse cultivation system.

PROPAGATION:

MIICROBIAL MASS helps to initiate much faster root development and increases the percentage of viable, good-quality clones and seedlings worthy of carrying forward into the vegetative stage.

STARTING FROM SEED

- Incorporate into preferred germination method at 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO
- Once the primary root has emerged, transplant the seed into desired growing media and water in at the lower application rate; 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO
- Watering in at transplant would be the first biweekly application

STARTING FROM CLONE

- Soak peat pucks, rock wool cubes, coco cubes, or any other propagation media at the lower application rate; 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO; or
- Add to aeroponic cloning device at the lower application rate; 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO
- Once clones have developed roots, transplant into desired growing media and water in at the lower application rate; 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO
- Watering in at transplant would be the first biweekly application

VEGETATIVE STAGE

When applied once every two weeks throughout the vegetative stage, MIICROBIAL MASS accelerates root development and increases root biomass, accelerates vegetative growth and increases overall plant biomass, and increases the overall health and hardiness of the plant.

- After the first application at transplant, continue to apply once every two weeks throughout the vegetative stage at the higher application rate; 4ml/L for MIICROBIAL MASS or 0.5ml/L for MIICROBIAL MASS PRO
- Can be mixed with any nutrient products or additives or applied alone with water

FLOWERING STAGE

When applied once every two weeks throughout the flowering stage, MIICROBIAL MASS optimizes bud development and increases dry weight yields at harvest.

- Continue to apply once every two weeks throughout the flowering stage at the higher application rate; 4ml/L for MIICROBIAL MASS or 0.5ml/L for MIICROBIAL MASS PRO
- Last application is two weeks before harvest at the lower application rate; 2ml/L for MIICROBIAL MASS or 0.25ml/L for MIICROBIAL MASS PRO
- Can be mixed with any nutrient products or additives or applied alone with water
- Does not contain any nutrients so does not need to be “flushed”

MIICROBIAL MASS PRO Directions for Use

MIICROBIAL MASS PRO: At first transplant, apply at a dilution of 0.25 ml per liter of water (1 ml per Gallon). After the first application, apply once every two weeks throughout the vegetative and flowering stages at a dilution rate of 0.5 ml per liter of water (2 ml per Gallon). Two weeks before harvest, apply the final application at a dilution rate of 0.25 ml per liter of water (1 ml per Gallon). **SHAKE WELL BEFORE USE.**

GROWTH	
Week 1	**0.25 ml/Litre** (1 ml/Gallon)
Week 3	**0.50 ml/Litre** (2 ml/Gallon)
Week 5	**0.50 ml/Litre** (2 ml/Gallon)
FLOWER	
Week 1	**0.50 ml/Litre** (2 ml/Gallon)
Week 3	**0.50 ml/Litre** (2 ml/Gallon)
Week 5	**0.50 ml/Litre** (2 ml/Gallon)
Week 7	**0.25 ml/Litre** (1 ml/Gallon)

GUARANTEED MINIMUM ANALYSIS MIICROBIAL MASS PRO

Bacillus velezensis U47	80,000,000 viable spores/g
Bacillus velezensis U50	80,000,000 viable spores/g
Bacillus licheniformis U35	80,000,000 viable spores/g
Bacillus megaterium U48	80,000,000 viable spores/g
Bacillus megaterium U49	80,000,000 viable spores/g
Total	400,000,000 viable spores/g

MIICROBIAL MASS PRO 1L Label Sample (Canadian Label shown)

Miicrobial Mass is a biostimulant product specially developed to maximize plant yield using five different bacterial strains that are shown to promote plant growth and enhance microbial life in and around plant roots.

Principal benefits

- Increase the bioavailability of **phosphate** and **calcium** to the plant through the use of phosphate and calcium-solubilizing bacteria.
- Increase the bioavailability of **iron** through the use of siderophore-producing bacteria.
- Promote good soil health with **enzymes** that hydrolyze substrate into useful byproducts for the rhizospheric microbial communities.

Inert ingredients: Water, salts, surfactant, preservative agent, organic acid.

Usage: For soil or hydroponic gardening, commercial agriculture, field crops and greenhouses. Safe for use with edible crops.

FOR PROFESSIONAL USE ONLY

Application: SHAKE WELL BEFORE USE.
ONE APPLICATION TO THE GROW MEDIA EVERY TWO WEEKS.
Best used within 24 hours of mixing.

EXAMPLE OF APPLICATION RATE

Seedlings or Cuttings	Vegetative Growth	Flowering	Two weeks to harvest
0.25 mL/Litre	**0.5 mL/Litre**	**0.5 mL/Litre**	**0.25 mL/Litre**

Storage: Store away from direct sunlight at room temperature (maximum 50°C). Avoid temperature fluctuations. Always store in the original container.

Warning: Do not get in the eyes, on skin, or on clothing. Wash hands thoroughly after handling. Contains live bacteria and may cause adverse effects to individuals with a compromised immune system. **KEEP OUT OF REACH OF CHILDREN.**

Information regarding the contents and levels of metals in Miicrobial Mass is available at: http://www.aapfco.org/metals.html

CAUTION: Wear protective gloves. Avoid splashes.

Approved for Organic Agriculture by ECOCERT CANADA

GUARANTEED MINIMUM ANALYSIS

Bacillus velezensis U47	80 000 000 viable spores/g
Bacillus velezensis U50	80 000 000 viable spores/g
Bacillus licheniformis U35	80 000 000 viable spores/g
Bacillus megaterium U48	80 000 000 viable spores/g
Bacillus megaterium U49	80 000 000 viable spores/g
TOTAL	400 000 000 viable spores/g

Registration Number 2019168A Fertilizers Act

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Manufactured by / Fabriqué par
MIIM Horticulture Limited
Unit 201 – 7575 North Fraser Way,
Burnaby, British Columbia, V5J 4Z3, Canada

MIIM HORTICULTURE LIMITED

Made in Canada
Fabriqué au Canada

MICROBIAL ENHANCER FOR PLANTS
STIMULANT MICROBIOLOGIQUE POUR PLANTES

100% SATISFACTION GUARANTEED
SATISFACTION GARANTIE

MAKES UP TO / DONNE JUSQU'À
4000 LITRES

MIICROBIAL MASS PRO

Unlocks Phosphorus and Micronutrients to Maximize Yield

Déverrouille le phosphore et les micronutriments pour maximiser le rendement

Read the label before use
Lire l'étiquette avant utilisation

ECOCERT INTRANTS / INPUTS — Intrant approuvé pour l'agriculture biologique / Input approved for organic agriculture

1.0L / 33.8oz. miimhort.com 1kg / 2.2lbs

Miicrobial Mass est un produit microbien spécialement conçu pour maximiser le rendement des plantes à l'aide de cinq souches bactériennes bénéfiques. Ces dernières favorisent la croissance en améliorant la vie microbienne à l'intérieur et autour des racines.

Principaux avantages

- Augmente la biodisponibilité du **phosphate** et du **calcium** grâce à l'utilisation de bactéries aptes à solubiliser le phosphate et le calcium.
- Augmente la biodisponibilité du **fer** via l'utilisation de bactéries productrices de sidérophores.
- Favorise la bonne santé du sol via la sécrétion d'**enzymes** qui dégradent la matière organique en sous-produits bénéfiques pour la vie microbienne rhizosphérique.

Ingrédients inertes: Eau, sels, surfactant, agent de conservation, acide organique.

Utilisation: Pour le jardinage du sol ou la culture hydroponique, agriculture commerciale, les grandes cultures, les serres et le gazon. Sans danger pour une utilisation sur les cultures à vocation agro-alimentaire.

POUR USAGE PROFESSIONNEL SEULEMENT

Application: BIEN AGITER AVANT UTILISATION.
APPLIQUER SUR LE SOL UNE FOIS TOUTES LES DEUX SEMAINES.
Ne pas conserver le produit dilué plus de 24 heures.

EXEMPLE DE TAUX D'APPLICATION

Jeune pousse ou transplant	Croissance végétative	Floraison	Deux semaines précédant la récolte
0.25 mL/Litre	**0.5 mL/Litre**	**0.5 mL/Litre**	**0.25 mL/Litre**

Entreposage: Conserver à l'abri de la lumière directe du soleil à température ambiante (maximum 50°C). Éviter les fluctuations de température. Toujours conserver dans le contenant d'origine.

Avertissement: Éviter tout contact avec les yeux, la peau ou les vêtements. Se laver les mains soigneusement après manipulation. Contient des bactéries vivantes qui peuvent provoquer des effets néfastes sur les personnes ayant un système immunitaire affaibli.

GARDER HORS DE LA PORTÉE DES ENFANTS.

L'information concernant le contenu et le niveau de métaux dans Miicrobial Mass est disponible sur: http://www.aapfco.org/metals.html

MISE EN GARDE: Porter des gants de protection. Éviter les éclaboussures.

Approuvé pour l'agriculture biologique par ECOCERT CANADA

ANALYSE MINIMALE GARANTIE

Bacillus velezensis U47	80 000 000 spores viables/g
Bacillus velezensis U50	80 000 000 spores viables/g
Bacillus licheniformis U35	80 000 000 spores viables/g
Bacillus megaterium U48	80 000 000 spores viables/g
Bacillus megaterium U49	80 000 000 spores viables/g
TOTAL	400 000 000 spores viables/g

Numéro d'enregistrement 2019168A Loi sur les engrais

MIICROBIAL MASS Directions for Use

MIICROBIAL MASS: At first transplant, apply at a dilution of 2 ml per liter of water (8 ml per Gallon). After the first application, apply once every two weeks throughout the vegetative and flowering stages at a dilution rate of 4 ml per liter of water (16 ml per Gallon). Two weeks before harvest, apply the final application at a dilution rate of 2 ml per liter of water (8 ml per Gallon). **SHAKE WELL BEFORE USE.**

GROWTH	
Week 1	**2 ml/Litre** (8 ml/Gallon)
Week 3	**4 ml/Litre** (16 ml/Gallon)
Week 5	4 **ml/Litre** (16 ml/Gallon)
FLOWER	
Week 1	**4 ml/Litre** (16 ml/Gallon)
Week 3	**4 ml/Litre** (16 ml/Gallon)
Week 5	**4 ml/Litre** (16 ml/Gallon)
Week 7	**2 ml/Litre** (8 ml/Gallon)

GUARANTEED MINIMUM ANALYSIS MIICROBIAL MASS

Bacillus velezensis U47	10,000,000 viable spores/g
Bacillus velezensis U50	10,000,000 viable spores/g
Bacillus licheniformis U35	10,000,000 viable spores/g
Bacillus megaterium U48	10,000,000 viable spores/g
Bacillus megaterium U49	10,000,000 viable spores/g
Total	50,000,000 viable spores/g

MIICROBIAL MASS 1L Label Sample (Canadian Label shown)

Miicrobial Mass is a biostimulant product specially developed to maximize plant yield using five different bacterial strains that are shown to promote plant growth and enhance microbial life in and around plant roots.

Principal benefits

- Increase the bioavailability of **phosphate** and **calcium** to the plant through the use of phosphate and calcium-solubilizing bacteria.
- Increase the bioavailability of **iron** through the use of siderophore-producing bacteria.
- Promote good soil health with **enzymes** that hydrolyze substrate into useful byproducts for the rhizospheric microbial communities.

Inert ingredients: Water, salts, surfactant, preservative agent, organic acid.

Usage: For soil or hydroponic gardening, commercial agriculture, field crops and greenhouses. Safe for use with edible crops.

FOR PROFESSIONAL USE ONLY

Application: SHAKE WELL BEFORE USE.
ONE APPLICATION TO THE GROW MEDIA EVERY TWO WEEKS.
Best used within 24 hours of mixing.

EXAMPLE OF APPLICATION RATE

Seedlings or Cuttings	Vegetative Growth	Flowering	Two weeks to harvest
2 mL/Litre	**4 mL/Litre**	**4 mL/Litre**	**2 mL/Litre**

Storage: Store away from direct sunlight at room temperature (maximum 50°C). Avoid temperature fluctuations. Always store in the original container.

Warning: Do not get in the eyes, on skin, or on clothing. Wash hands thoroughly after handling. Contains live bacteria and may cause adverse effects to individuals with a compromised immune system. **KEEP OUT OF REACH OF CHILDREN.**

Information regarding the contents and levels of metals in Miicrobial Mass is available at: http://www.aapfco.org/metals.html

CAUTION: Wear protective gloves. Avoid splashes.

Approved for Organic Agriculture by ECOCERT CANADA

GUARANTEED MINIMUM ANALYSIS

Bacillus velezensis U47	10 000 000 viable spores/g
Bacillus velezensis U50	10 000 000 viable spores/g
Bacillus licheniformis U35	10 000 000 viable spores/g
Bacillus megaterium U48	10 000 000 viable spores/g
Bacillus megaterium U49	10 000 000 viable spores/g
TOTAL	50 000 000 viable spores/g

Registration Number 2019167A Fertilizers Act

6 28000 90023 8

Manufactured by / Fabriqué par
MIIM Horticulture Limited
Unit 201 – 7575 North Fraser Way,
Burnaby, British Columbia, V5J 4Z3, Canada

MIIM HORTICULTURE LIMITED

Made in Canada
Fabriqué au Canada

MICROBIAL ENHANCER FOR PLANTS
STIMULANT MICROBIOLOGIQUE POUR PLANTES

100% SATISFACTION GUARANTEED
SATISFACTION GARANTIE

MAKES UP TO / DONNE JUSQU'À
500 LITRES

MIICROBIAL MASS

Unlocks Phosphorus and Micronutrients to Maximize Yield

Déverrouille le phosphore et les micronutriments pour maximiser le rendement

Read the label before use
Lire l'étiquette avant utilisation

ECOCERT INTRANTS/INPUTS — Intrant approuvé pour l'agriculture biologique — Input approved for organic agriculture

1.0L / 33.8oz. miimhort.com 1kg / 2.2lbs

Miicrobial Mass est un produit microbien spécialement conçu pour maximiser le rendement des plantes à l'aide de cinq souches bactériennes bénéfiques. Ces dernières favorisent la croissance en améliorant la vie microbienne à l'intérieur et autour des racines.

Principaux avantages

- Augmente la biodisponibilité du **phosphate** et du **calcium** grâce à l'utilisation de bactéries aptes à solubiliser le phosphate et le calcium.
- Augmente la biodisponibilité du **fer** via l'utilisation de bactéries productrices de sidérophores.
- Favorise la bonne santé du sol via la sécrétion d'**enzymes** qui dégradent la matière organique en sous-produits bénéfiques pour la vie microbienne rhizosphérique.

Ingrédients inertes: Eau, sels, surfactant, agent de conservation, acide organique.

Utilisation: Pour le jardinage du sol ou la culture hydroponique, agriculture commerciale, les grandes cultures, les serres et le gazon. Sans danger pour une utilisation sur les cultures à vocation agro-alimentaire.

POUR USAGE PROFESSIONNEL SEULEMENT

Application: BIEN AGITER AVANT UTILISATION.
APPLIQUER SUR LE SOL UNE FOIS TOUTES LES DEUX SEMAINES.
Ne pas conserver le produit dilué plus de 24 heures.

EXEMPLE DE TAUX D'APPLICATION

Jeune pousse ou transplant	Croissance végétative	Floraison	Deux semaines précédant la récolte
2 mL/Litre	**4 mL/Litre**	**4 mL/Litre**	**2 mL/Litre**

Entreposage: Conserver à l'abri de la lumière directe du soleil à température ambiante (maximum 50°C). Éviter les fluctuations de température. Toujours conserver dans le contenant d'origine.

Avertissement: Éviter tout contact avec les yeux, la peau ou les vêtements. Se laver les mains soigneusement après manipulation. Contient des bactéries vivantes qui peuvent provoquer des effets néfastes sur les personnes ayant un système immunitaire affaibli.

GARDER HORS DE LA PORTÉE DES ENFANTS.

L'information concernant le contenu et le niveau de métaux dans Miicrobial Mass est disponible sur: http://www.aapfco.org/metals.html

MISE EN GARDE: Porter des gants de protection. Éviter les éclaboussures.

Approuvé pour l'agriculture biologique par ECOCERT CANADA

ANALYSE MINIMALE GARANTIE

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TOTAL	50 000 000 spores viables/g

Numéro d'enregistrement 2019167A Loi sur les engrais

AVAILABLE SIZES

125ML

250ML

500ML

1L

4L

10L

20L

ITEM NO.	DESCRIPTION	SIZE	CASE QTY
1010-105-00-CAN	MIICROBIAL MASS PRO	125ML / 4.2 OZ	12
1010-110-00-CAN	MIICROBIAL MASS PRO	250ML / 8.5 OZ	12
1010-115-00-CAN	MIICROBIAL MASS PRO	500ML / 1 PT	12
1010-120-00-CAN	MIICROBIAL MASS PRO	1L / 1 QT	12
1010-125-00-CAN	MIICROBIAL MASS PRO	4L / 1 GAL	4
1010-130-00-CAN	MIICROBIAL MASS PRO	10L / 2.5 GAL	2
1010-135-00-CAN	MIICROBIAL MASS PRO	20L / 5 GAL	1

125ML

250ML

500ML

1L

ITEM NO.	DESCRIPTION	SIZE	CASE QTY
1020-105-00-CAN	MIICROBIAL MASS	125ML / 4.2 OZ	12
1020-110-00-CAN	MIICROBIAL MASS	250ML / 8.5 OZ	12
1020-115-00-CAN	MIICROBIAL MASS	500ML / 1 PT	12
1020-120-00-CAN	MIICROBIAL MASS	1L / 1 QT	12

OUR GUARANTEE

The application of high standards of analysis, traceability and transparency is an essential element of our business model. This is why all MIICROBIAL MASS products have a clearly visible lot number on each bottle, referring to the production date and the Certificate of Analysis (CoA). The analyses are performed by professionals in a certified laboratory following standardized protocols and approved by regulatory agencies. We guarantee that our products contain no traces of contamination, pathogenic organism or heavy metals. In addition, we ensure the uniformity and quality of our products by respecting the minimum viable spore per gram for each bacteria. All information relating to CoA is available on our website. We thank you for your confidence.

FREQUENTLY ASKED QUESTIONS

Q: Is this product suitable for organic cultivation?
A: Yes. MIICROBIAL MASS is approved for certified organic production and is attested by Ecocert Canada.

Q: Is this product Health Canada Approved?
A: Yes. MIICROBIAL MASS is registered with the Canadian Food Inspection Agency for use in cannabis cultivation and is fully approved for producers licensed under Health Canada.

Q: How often do I need to apply MIICROBIAL MASS?
A: MIICROBIAL MASS only needs to be applied once every two weeks in order to maintain healthy bacterial populations in the root zone. More frequent applications are safe but may not provide any further benefits to the plant.

Q: Can I mix MIICROBIAL MASS with my nutrient reservoir or should it be mixed with only water?
A: MIICROBIAL MASS is safe and effective to be mixed into any nutrient solution or applied with water.

Q: What is the optimal pH for applying MIICROBIAL MASS?
A: MIICROBIAL MASS functions properly when applied in solutions with a pH range of 5.5 to 7.

Q: Is MIICROBIAL MASS compatible for use with oxidizing agents like hydrogen peroxide and hypochlorous acid?
A: Yes. MIICROBIAL MASS can be safely and effectively used with oxidizing agents. See our Compatibility Chart on page 9 for more details.

Q: Does MIICROBIAL MASS need to be shaken?
A: It is very important to shake MIICROBIAL MASS well before use. The bacterial spores in each bottle will settle over time, so thoroughly shaking before use is necessary in order to ensure optimal inoculation from each bacterial strain.

Q: Can I use mycorrhizae and/or enzyme products with MIICROBIAL MASS?
A: Yes. Mycorrhizal fungi, enzymes, and beneficial bacteria complement each other in healthy natural soils and may be used together as part of any cultivation program.

Q: What happens if I use too much and apply MIICROBIAL MASS in a more concentrated solution?
A: Although a more concentrated dose will be safe for plants, it is not likely to increase the benefits of using the product at the recommended application rate.

Q: Can I add MIICROBIAL MASS to my compost tea recipes and brew it with other microbially active ingredients?
A: Although MIICROBIAL MASS can be incorporated into a compost tea brew, for best results we recommend applying it in unadulterated form. Some of the strains grow far more rapidly on a sugar diet than the others, which means that brewing teas will alter the careful balance of bacterial strains necessary to achieve optimal results. Furthermore, some tea recipes may inhibit the proliferation of our bacterial consortium in favour of other microorganisms. In order to achieve the best results possible, we recommend using MIICROBIAL MASS as directed.

Q: What happens if it freezes?
A: If a bottle of MIICROBIAL MASS freezes, it is still perfectly good to use. Simply let the product thaw at room temperature and give it a good shake before use.

Q: How long is the shelf life?
A: A bottle of MIICROBIAL MASS can be stored for up to two years. It Is best to store it in a cool, dark place.

Anatomical: Relating to bodily structure.

Bacterial Consortium: A group of two or more bacterial species living symbiotically.

Beneficial Bacteria: "Good" bacteria that enhance plant health.

Bioavailability: The amount of an element or compound that is accessible to a plant.

Calcium Solubilizing Bacteria: Beneficial bacteria that are capable of converting insoluble forms of calcium into soluble forms to increase bioavailability to plants.

Compound: A substance that is composed of two or more separate elements; a mixture.

Element: 118 elements are the basic building blocks of all normal matter in the universe.

Enzymes: Proteins which accelerate chemical reactions.

Extracellular Enzymes: Enzymes made inside a bacterial cell and then secreted outside the cell, where their function is to break down complex macromolecules into smaller units.

Food Web: Food webs describe the transfer of energy between species in an ecosystem.

Hydrolyze: To break apart a chemical bond with water.

Inoculate: To introduce cells or organisms into or onto a substance or organism.

Macroelements: Also referred to as macronutrients, these are elements that plants require in large quantities such as nitrogen, phosphorus, potassium, and calcium.

Microbiology: The branch of biology that deals with microorganisms.

Microelements: Also called micronutrients, these are elements that plants require only in trace amounts. They include iron, zinc, boron, manganese, and others.

Molecule: A group of two or more atoms held together by chemical bonds.

Molecular: Relating to or consisting of molecules.

Phosphate Solubilizing Bacteria: Beneficial bacteria capable of solubilizing inorganic phosphorus from insoluble compounds which helps to increase phosphate bioavailability to plants.

Phytase: Phytases are types of enzymes that breaks down nonbioavailable forms of phosphorus into a form that is usable by plants.

Proliferation: Rapid increase in numbers of bacteria through reproduction. May also be referred to as bacterial growth.

Rhizosphere: The narrow region of soil that is directly influenced by root secretions - typically only a few millimeters around the roots.

Siderophores: Compounds that are secreted by microorganisms such as bacteria and fungi and serve primarily to transport iron across cell membranes, increasing the bioavailability of iron to plants and other forms of life.

Soil Food Web: The soil food web is the community of organisms living all or part of their lives in the soil. It describes a complex living system in the soil and how it interacts with the environment, plants, and animals.

Solubilize: To make a substance soluble or more soluble so that it can be dissolved in water.

Substrate: The surface or material on or from which an organism lives, grows, or obtains its nourishment; or, a molecule upon which an enzyme acts.

Email: **info@miimhort.com** / Toll Free: **1.844.MIICROB**
(644.2762)

THE WORLD'S MOST VERSATILE AND EFFECTIVE BENEFICIAL BACTERIA

EFFECTIVE

- Better cloning and faster root initiation
- Accelerated vegetative growth and enhanced root development
- Increased overall plant biomass for bigger, heavier buds

VERSATILE

- Proven results in any organic or synthetic nutrient program
- Highly effective in any growing media or hydroponic system
- Works great for indoor, outdoor, or greenhouse cultivation

DORMANT

- Dormant bacterial spores for superior shelf-stability
- Runs clean through irrigation equipment
- No excess biofilm build-up in drip lines or emitters

RUGGED

- Highly competitive and tough bacterial consortium
- Compatible with oxidizing agents, antimicrobial products, and descaling products
- Compatible with biocontrol products and other beneficial microorganisms

VALUE

- Highly concentrated formula
- Only needs to be applied once every two weeks
- Solid return on investment proven by commercial cultivators

MIIM HORTICULTURE

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