Plant Disinfection

PRESENTATION

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Why do we need disinfectants for plants?

Disinfectants for plants serve several important purposes:

- **Disease Prevention:** Disinfectants help prevent the spread of plant diseases caused by bacteria, fungi, and viruses. Treating tools, pots, and surfaces with disinfectants can reduce the risk of transferring pathogens between plants, preventing the spread of infections.

- **Control of Pests:** Some disinfectants can also help control pests, such as insects and mites, that can damage plants. Disinfecting tools and equipment used in gardening can reduce the transmission of pests between plants and minimize infestations.

- **Healthy Growth:** Maintaining a clean environment for plants promotes healthy growth. Disinfectants can eliminate harmful microorganisms that compete with plants for nutrients, water, and sunlight, allowing plants to thrive without interference.

Problems with plants

- Prevention of Cross-Contamination: Disinfectants are crucial for preventing cross-contamination between plants, especially in settings such as nurseries, greenhouses, and botanical gardens where plants from different locations are in close proximity. This helps maintain the integrity of plant collections and prevents the spread of diseases.

- Compliance with Regulations: In commercial agriculture and horticulture, there may be regulations or guidelines governing hygiene practices to prevent the spread of plant diseases. Using disinfectants as part of regular maintenance helps growers comply with these regulations and minimize the risk of disease outbreaks.

- Overall, disinfectants for plants are essential tools for maintaining plant health, preventing the spread of diseases, and promoting optimal growing conditions. They play a vital role in both amateur gardening and commercial agriculture by ensuring the cleanliness and hygiene of plant environments.

SOURCES OF

CONTAMINATION

Part 112.11 of the FSMA Produce Safety Rule states that “you must take measures reasonably necessary to prevent the introduction of known or reasonably forseeable hazards into covered produce…”

Knowing how contamination can be spread is the first step

HUMANS

Humans can spread pathogens through fecal material, saliva, mucous, or other bodily fluids, usually with improper handwashing & hygiene practices, illness, or injury.

SOIL

Raw manure used as a soil amendment can pose a risk to fresh produce if not properly handled or applied, such as applying too close to harvest.

ANIMALS

Both wild and domesticated animals can spread contamination Through their feees.

WATER

Water can carry and spread pathogens, contaminating large amounts of produce through their feces. through irrigation, crop sprays, washing & cleaning, flooding, etc.

EQUIPMENT

Equipment, tools, and other food contact surfaces that aren't regularly cleaned and sanitized can harbor pathogens and pose a huge risk to fresh produce.

MoldEx Plant

- **Organic Plant Disinfectant:**
  Introducing MoldEx Plant, an organic plant disinfectant formulated to boost garden health naturally.
- **Eco-Friendly Formula:**
  MoldEx Plant is an eco-friendly disinfectant designed specifically for gardens, offering a sustainable solution for plant care.
- **Natural and Bio-Based:**
  This natural and bio-based antifungal disinfectant combats harmful microorganisms without the use of harsh chemicals, promoting a healthier garden environment.
- **Revitalizes Garden Health:**
  MoldEx Plant revitalizes your garden by eliminating pathogens and revitalizing plant health, ensuring vibrant and thriving plants.
- **Vibrant and Healthy Plants:**
  With MoldEx Plant, your plants remain vibrant and healthy, free from the detrimental effects of harmful microorganisms.

- **Targeted Protection Against Harmful Microorganisms:**
  By targeting bacteria and fungi that can harm trees, flowers, and various plant species, MoldEx Plant effectively eliminates these threats and promotes healthier, faster growth with stronger roots.

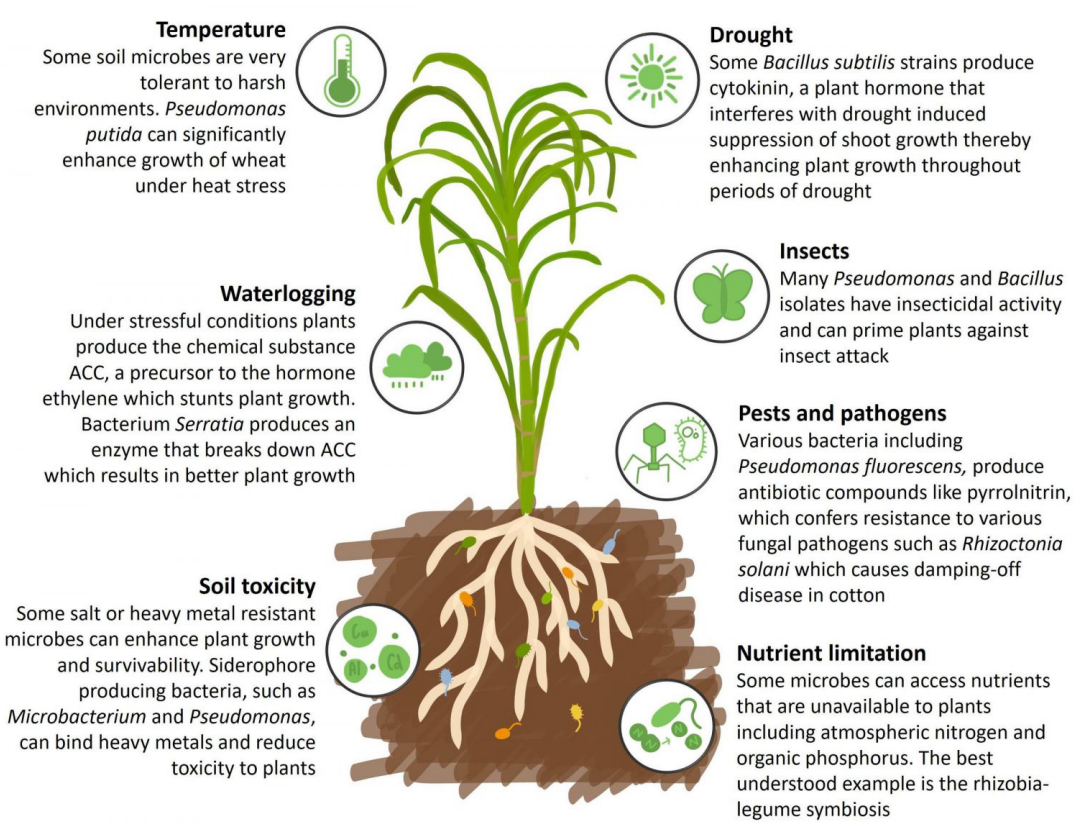
- **Safe for All Plants:**
  MoldEx Plant's formula is safe for all types of plants, ensuring compatibility with diverse plant species. It seamlessly integrates into your regular watering routine, providing long-lasting protection against mold and bacteria without causing harm.

- **Promotes Lush, Vibrant Garden Environment:**
  With MoldEx Plant, gardeners can achieve a lush, vibrant garden environment free from worries of plant tissue damage, leaf discoloration, and root drying.

- **Natural and Bio-Based Solution:**
  Opting for MoldEx Plant means choosing a natural, bio-based solution to keep your garden thriving in an eco-conscious way.

Why MoldEx Plant?

- A lot of factors play a role in growing healthy plants.
- If one of the factors are not stable the plant gets weak and can get contaminated.
- After contamination viruses and bacteria have the change to grow. If no action is taken the virus/bacteria will spread to other plants or the environment. This can also cause mold.



What Real Solution Means: MoldEx Plant

What MoldEx Plant is:	Why MoldEx Plant is like this:
Plant Compatible: Safe and biobased	– Benzalkonium chloride which is similar to soap. – Works also bactericidal and virucidal.
Wholesome Protection:	– Benzalkonium chloride has the effect that gram-positive as well as gram-negative pathogens are quickly killed. – Good bacteria are not attacked. – The protective layer of the plant is protected and nurtured. – Does not cause harm
Long-lasting: Works for longterm	– Common disinfectants are based on (low) percentage alcohol. – The alcohol loses its effect within a few minutes and kills the – plants if used in high amounts

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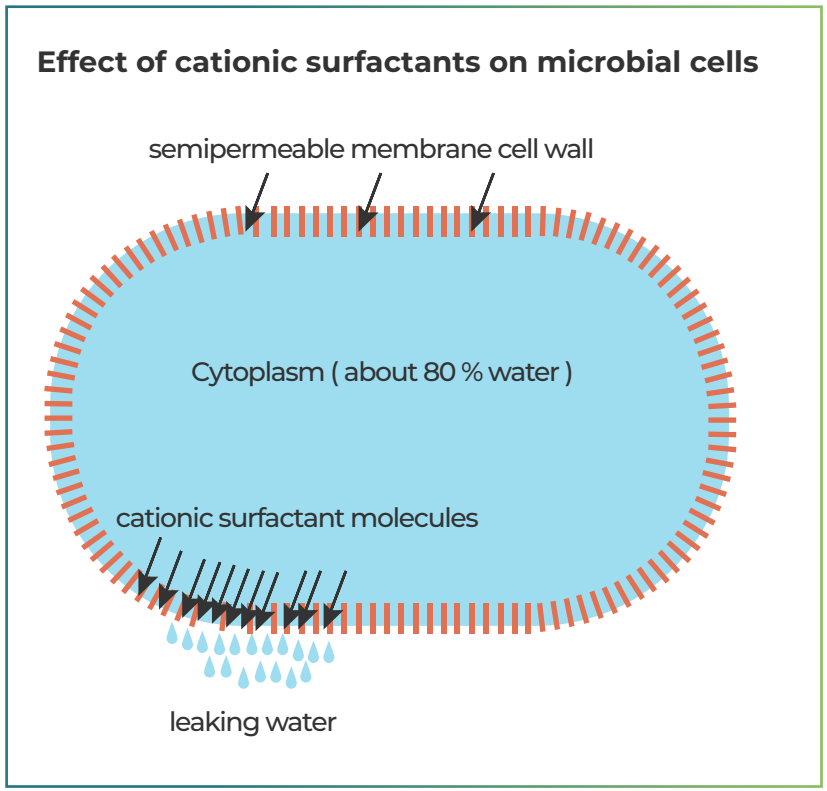
So how does it work?

- **Cationic Surfactant Properties:**
  - Benzalkonium chloride is classified as a cationic surfactant, characterized by a positive electrical charge and a large molecular structure.
  - Its large molecule size prevents penetration into the skin, while the positive charge facilitates attachment to negatively charged germs.

- **Soap-Like Behavior:**
  - Due to its surfactant properties, benzalkonium chloride behaves similarly to soap by significantly lowering the surface tension of water, allowing it to infiltrate even thick films.

- **Dehydration Mechanism:**
  - Enveloped germs regulate their cell water content via pores in the cell wall.
  - Benzalkonium chloride, being water-soluble, enters the cell and reduces the surface tension of cell water, causing it to become more liquid.
  - The increased liquidity of cell water leads to its outflow through the cell wall pores, resulting in dehydration of the cell.

- **Physical Action, Not Poisonous:**
  - Benzalkonium chloride does not function as a poison that disrupts the metabolism of germs.
  - Instead, it acts physically by dehydrating germs, making it an effective disinfectant without chemical interference.



How MoldEx Plant work?

- Enveloped microbes or hard viruses have a semipermeable membrane as a shell that regulates the water balance. Normally, the water content of the cell fluid has a high surface tension at which the membrane is waterproof.
- The cationic surfactant molecule attached to the cell decreases the surface tension of the water in the membrane envelope and becomes membrane permeable. The cell runs out, dries out and loses its viability.
- The effect last for up to 3 hours or until the skin gets in contact with water. The cationic surfactants leaves a protected layer on the skin.

(Low) alcohol based disinfectants

- Ethanol hardens the protein in virusses which causes the molecules to fall apart.
- This effect is only for a few minutes and does not protect for a long amount of time.
- Ethanol also hardens other protective bacteria and oils on the plant, this causes the plant to dry out and die without the good bacteria to eat from

After

Before