



Working hard to make  
growing easier

# Disinfecting and Cleaning Greenhouses



**PROTECT YOUR  
GREENHOUSE FROM  
TOMATO BROWN  
RUGOSE FRUIT VIRUS  
CLEAN AND  
DISINFECT!**

# A STEP-BY-STEP GUIDE

After crop removal, clean-up and sanitation are a crucial component to a good integrated pest management (IPM) program. This will help minimize spread and carry over of pests, diseases and viruses.

## Step 1 Removal of organic material

The removal of all organic matter is essential because refuse contains high levels of contamination and is a major source of infection. High levels of soiling will also reduce the efficacy of the cleaning and disinfections process.

- Remove all crop debris, clips, “nutrient base or culture media”, strings, etc.
- Caked soiling should be brushed, scraped, or power-washed if necessary to aid removal.
- Remove trays, pots, containers, and equipment from the area to be cleaned and disinfected, and put to one side during cleaning and disinfecting.
- Make all necessary repairs and upkeep.

## Step 2 Washing with detergent

Detergent application is often overlooked but is critical to the disinfection and cleaning process of greenhouses. Following any dry cleaning or gross organic removal process, high levels of contaminated material will still remain. Cleaning using an appropriate detergent will help remove soil and biofilms (organic and minerals) from the surfaces. You also want to remove proteins as well as fatty acids and ensure that no greasy deposits (biofilms) remain on porous surfaces. Detergents help reduce the contaminant load on a surface and will also reduce the required time for the cleaning process, and minimize spread of disease in washing water.

- Use a high volume of water at low pressure to apply detergents.
- The dilution and application rates should be in accordance with the detergent’s label in order to apply enough detergent solution per square meter of surface area. If you are using an injection system, ensure to prepare stock according to ratio of injection.
- Start at the apex of the roof and work down the walls to the floor.
- Pay particular attention to corners and other areas where algae and scale accumulates.
- Leave detergent solution soak for 10–15 minutes.
- Detergent solution should be removed by rinsing before it dries.

### Detergents: To clean and remove organics prior to sanitizing

Item Code	Product	Description	Unit Size
5000616	Professional Liquid Detergent	Effective at all water temperatures. Phosphate free, NTA free, APE free, VOC free, and contains surfactants that are over 99.99% biodegradable.	200 L and 1000 L

## Step 3 Rinsing

- Before detergent solution dries, thoroughly rinse with water to remove detergent and any remaining organic or mineral deposits using a pressure washer or by scrubbing and rinsing.
- Let dry (eliminate excess water on walls, floor or equipment) before moving on to disinfection.

## Step 4 Sanitize

Although cleaning will eliminate over 90 percent of contaminants, what is left will be more than enough to be dangerously harmful to your next crop. Using a proven disinfectant effective against your challenges is essential.

- Ensure there is no excess water on the floors, walls and equipment before moving on
- Choose an appropriate product according to ambient temperature, presence of specific pathogens, and contamination levels.
- Using a portable sprayer or a pressure washer or other equipment (at a low pressure setting), apply the appropriate disinfectant to all surfaces.
- The dilution and application rates should be in accordance to the disinfectant's label in order to apply enough disinfectant solution per square meter of surface area.
- Pay particular attention to corners, cracks, seams and porous surfaces.
- As with the detergent application, start from the apex of the roof and work down the walls to the floors.
- Make sure all equipment is disinfected before returning it to the greenhouse.
- When finished leave the area and allow to dry.

### Disinfectants: Used to sanitize post cleaning to remove pathogens

Item Code	Product	Description	Unit Size
5000603	Aquarian M390	7.5% Didecylidimethyl ammonium chloride – a fourth-generation quaternary ammonium chloride with a broad spectrum of fungicidal and bactericidal properties providing rapid germicidal control of key pathogens. For control of mold and mildew on tile, wood, concrete and painted surfaces.	20 L
5000602			204 L
5000478			1250 kg
5000045	Hydrogen Peroxide 35%	General disinfectant.	227 kg
5000369			1000 kg
5000360	Sodium Hypochlorite – (Bleach) 12 %	General disinfectant.	205 L
5000362			1000 L
5000050	Virkon	A broad spectrum germicide for cleaning and disinfection.	5 kg
5000324			10 kg

## Cleaning irrigation system

All water systems contain some contaminants, especially the header tanks where dust and dirt can accumulate. This may allow micro-organisms such as Pythium, Fusarium and Phytophthora to pass on from one crop to the next. Cleaning with an appropriate cleaner targeting the challenges present in the closed or open water system followed by an appropriate disinfectant will ensure that the water system carries only what you want to the plants.

- Ensure that treated waterline is not supplying water to plants in another room or building during the cleaning process.
- Choose an appropriate detergent (depending on waterline issues; organic matter or mineral deposits).
- Prepare stock solution to ensure proper dilution rate and quantity to be used.
- Inject solution into waterline or fill header tank.
- Circulate to ensure product is present everywhere in the waterline.
- Let stand (soaking time depends on condition of the waterline).
- Flush waterline thoroughly.

### Antimicrobial and anti-biofilm: For facility and irrigation systems

Item Code	Product	Description	Unit Size
5000601 5000476	Pro-Oxine (+ an activator)	Activate to produce Chlorine Dioxide for broad spectrum antimicrobial activity and control of biofilm	18.9 L and 205 L
5000371 5000372	Deluge Wetting Agent	Wetting agent/surfactant to help lift biofilm once killed by Oxine.	9.46 L and 208 L

## Cleaning and disinfecting of moveable equipment

Regularly clean and disinfect surfaces and items that come in contact with plants or people. This includes:

- Tools.
- Scissor carts, forklifts (especially forks), tractors, harvesters, vehicles.
- Picking crates, pallets.
- Packing lines, walkways.
- Irrigation equipment, drip lines, sprayers.
- Door handles.
- Anything that has plant sap/residue on it.

Wash using **Kam's Professional Liquid Detergent**. Organic matter *must* be removed prior to disinfecting.

Rinse and allow to dry.

Apply a disinfectant solution (see disinfectants on previous page).

Ensure proper dilution rates are used.

## Apply Insecticides Eliminate residual insect populations

Some diseases and viruses can be transmitted by insects.

Item Code	Product	Description	Unit Size
5000162	DDVP 20% EC	For control of whiteflies and aphids.	10 L
5000297	Dibrom	Fog for control of whiteflies, spider mites, aphids, leafrollers and mealybugs	3.78 L

Always read and follow the product label.

## Rodenticide baiting and traps

- Make repairs around the buildings. Plug all holes and burrows.
- Remove waste, weeds and debris that can be used for nests.
- Ensure doors have sweeps and close tightly.
- Use approved bait stations and set and bait traps.
- Check traps regularly.

### Rodenticides: Bait now to prevent pest infestation and damage over winter

Item Code	Product	Description	Unit Size
9000232	EZ Klean Rodent Bait station	Keeps bait away from non-target animals and children; for indoor or outdoor placement.	6/case
5000636	Conrac All Weather Blox	<b>Bromadiolone</b> – single feed anticoagulant. Paraffinized blocks for maximum weatherability.	8.1 kg
9000231	First Strick Soft Bait	<b>Difethialone</b> – anticoagulant for use against mice and rats.	3.5 kg
9000233		Non-wax, targeted dose pouches.	7 kg
9000235	Resolv Soft Bait	<b>Bromadiolone</b> – anticoagulant. Highly attractive.	7 kg/pail
5000222	Ground Force – paraffinized pellets	<b>Chlorophacinone</b> – multi-feed anticoagulant rodenticide that controls a broad range of rodents.	10 kg
5000223	Hombre Mini-Blocks	<b>Difethialone</b> – anticoagulant for use against mice and rats. Single feed rodenticide that prevents bait shyness.	10 kg

It is recommended to change both the chemistry (type of ingredient: bromadiolone, difethialone) and format (pellets, mini-blocks, place packs, etc.) to excite rodents' appetite. Alternating chemistry and format is the best way to prevent bait shyness and to improve bait acceptance during the rodent's life cycle.

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