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# Selection and Usage of Disinfectants for Nursery Production



College of Agriculture,  
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Natural Sciences

ANR-PATH-3-2016

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Disinfectants are substances that are applied to primarily on objects to destroy or inhibit the growth of harmful microorganisms. Preferably, a disinfectant should be broad spectrum (eliminates bacteria, viruses, viroids, oomycetes and fungi), nonirritating, nontoxic and noncorrosive. Selection decisions should include effectiveness against the potential pathogenic agents, safety to people, effect on equipment, the environment, plants and expense.

## **Factors affecting the effectiveness of a disinfectant:**

- Susceptibility of the microorganism. Disinfectants vary in their spectrum of activity, but the type of microorganisms and their metabolic activity will also affect the efficacy.
- Degree of contamination. This determines the quantity of disinfectant required and time of exposure.
- Amount of protein based materials present. High protein based materials absorb and neutralize some chemical disinfectants.
- Presence of organic matter and other composites such as soaps or detergents may neutralize some disinfectants.
- Chemistry of disinfectant. It is important to understand the mode of action in order to select the ideal disinfectant.
- Concentration and quantity of disinfectant. It is important to choose the appropriate concentration and quantity of disinfectant that is best suited to different conditions.
- Contact time (the length of time it is exposed to the area to be disinfected) and temperature. Adequate time and appropriate temperature must be allowed for action of the disinfectant and may depend on the degree of contamination and organic matter load.
- Shelf life of the disinfectant solution. Many chemicals reduce in effectiveness with the

passage of time and their exposure to air and the other chemicals in the solution.

- Residual activities and effects on metal should be considered for particular circumstances.
- Application temperature, pH, light and interactions with other compounds must be considered (for example water used to dilute a concentrated disinfectant may contain a variety of chemicals or contaminants that reduce the activity of the disinfectant).
- Application method.
- Toxicity to the environment and relative safety to people that may be exposed.
- Phytotoxicity to the greenhouse produced plant.
- Cost and availability.
- Storage and stability.

### **Purpose of disinfection in the nursery:**

- Cleaning benches, floors, irrigation systems, fan blades, cooling towers, pots, plugs, nursery production structures (plastic, wood, metal, glass and concrete) with disinfectant between crops.
- Foot baths/mats with disinfectant at each entry point.
- Washing hands with regular or antimicrobial hand soaps before work and at intervals throughout the day. But hand-sanitizing products are a reasonable substitute for hand washing as long as hands are free of soil or dirt. Convenient hand washing facilities near entrances and throughout production and propagation units needs to be provided.
- Disinfecting knives, scissors, or cutting tools after taking cuttings during production or propagation. Pruners, cutting and grafting tools that automatically dispense a disinfectant solution are available in market.
- Disinfecting the vehicles (utility carts in the facility and also transportation vehicles), tanks and equipment.
- Disinfecting irrigation water.
- Disinfecting seeds and asexually propagated planting materials.

### **Types of disinfectants:**

- Alcohols
- Phenolic compounds
- Quaternary Ammonium Compounds
- Chlorine
- Chlorine dioxide
- Hydrogen peroxide/Hydrogen dioxide
- Peroxy acid compounds
- Sodium carbonate peroxyhydrate
- Iodophors
- Acid-anionic sanitizers
- Carboxylic acid sanitizers
- Natural salts
- Natural plant extracts
- Organic acids (citric/lactic/caprylic acid)
- Microorganisms
- Ozone
- CO<sub>2</sub>
- Electrolyzed water

For additional information, contact your local nursery specialist office.

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### **Precautionary Statement**

To protect people and the environment, disinfectants should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a disinfectant. According to laws regulating disinfectants, they must be used only as directed by the label.

### **Disclaimer**

This publication contains disinfectant recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the disinfectant applicator's responsibility, by law, to read and follow all current label directions for the specific disinfectant being used. The label always takes precedence over the recommendations found in this publication. Use of trade, brand, or active ingredient names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar and suitable composition, nor does it guarantee or warrant the standard of the product. The author(s) and Tennessee State University assume no liability resulting from the use of these recommendations.

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