

Disinfection

Consult manufacturer directions to determine the efficacy of the disinfectant against the biohazards in your lab and be sure to allow for sufficient contact time. Some disinfectants appropriate for lab use include: household bleach (5-10% solution), quaternary ammonium compounds, and phenolic compounds.

When choosing a disinfectant consider the following:

- The microorganisms present
- The item to be disinfected or surface(s)
- Corrosivity or hazards associated with the chemicals in the disinfectant
- Ease of use

70% Ethanol

Aqueous alcohol solutions are not appropriate for surface decontamination because of the evaporative nature of the solution; a contact time of **ten minutes or more** is necessary and not achievable using a 70% (v/v) aqueous solution of ethanol. 70% ethanol can be used to soak small pieces of surgical instruments and for wipe downs following a disinfectant (e.g., 10% bleach) that might leave a corrosive residue.

Difficult organisms

Some agents such as Cryptosporidium, Bacillus spores and prions are very resistant to the usual disinfectants. EHS Biosafety is available to assist you in determining the appropriate disinfectant and provides guidance on use of appropriate disinfection techniques and materials for researchers.

Bacillus spores

Clostridium difficile

Cryptosporidium

Prions, CJD

Summary and Comparison of Liquid Disinfectants

Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
70% Isopropyl Alcohol solution	-Cleaning some instruments -Cleaning skin	-Changes protein structure of microorganism -Presence of water assists with killing action	-Fairly inexpensive	- < 50% Solution not very effective -Not active when organic matter present -Not active against certain types of viruses -Evaporates quickly -Contact time not sufficient for killing	-Flammable -Eye Irritant -Toxic	-
Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
Chlorine Compounds	-Spills of human body fluids Bactericidal - Good Fungicidal - Good Sporicidal - Good at > 1000ppm Sodium	-Free available chlorine combines with contents within microorganism, reaction byproducts cause its death -Need 500 to 5000 ppm -Produce	-Kills hardy viruses (e.g. hepatitis) -Kills a wide range of organisms -Inexpensive -Penetrates well -Relatively quick microbial	-Corrodes metals such as stainless, aluminum -Organics may reduce activity -Increase in alkalinity decreases bactericidal property -Unpleasant	-Follow spill procedure and dilution instructions -Make fresh solutions before use -Eye, skin and respiratory irritant	-Bleach solutions (sodium hypochlorite) -Clorox -Cyosan -Purex

	Hypochlorite	chemical combination with cell substances -Depends upon release of hypochlorous acid	kill -May be used on food prep surfaces	taste and odor -Tuberculocidal, with extended contact time	-Corrosive -Toxic	
Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
Glutaraldehyde	Bactericidal - Good Fungicidal - Good Tuberculocidal - Excellent Virucidal - Good Sporicidal - Good	-Coagulates cellular proteins	-Non-staining, relatively noncorrosive -Useable as a sterilant on plastics, rubber, lenses, stainless steel and other items that can't be autoclaved	-Not stable in solution -Has to be in alkaline solution -Inactivated by organic material	-Eye, skin and respiratory irritant -Sensitizer -Toxic	Calgocide 14 -Cidex -Vespire
Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
Iodophors (Iodine with carrier)	-Disinfecting some semicritical medical equipment Bactericidal - Very Good Fungicidal - Excellent Virucidal - Excellent	-Free iodine enters microorganism and binds with cellular components -Carrier helps penetrate soil/fat -Need 30 to 50 ppm -Probably by disorder of protein synthesis due to hindrance and/or blocking of hydrogen bonding	-Kills broad range of organisms -Highly reactive -Low tissue toxicity -Kills immediately rather than by prolonged period of stasis -Not affected by hard water -May be used on food prep surfaces	-May stain plastics or corrode metal -May stain skin/laundry -Stains most materials -Odor -Some organic and inorganic substances neutralize effect -Tuberculocidal, with extended contact time -Sporicidal, some	-Dilution critical -Follow directions! -Use only EPA registered hard surface iodophor disinfectants -Don't confuse skin antiseptic iodophors for disinfectants -Skin and eye irritant -Corrosive -Toxic	-Bactergent -Hy-Sine -Ioprep -Providone (iodine/betadine) -Wescodyne
Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
Phenolic Compounds	Bactericidal - Excellent Fungicidal - Excellent Tuberculodial - Excellent Virucidal - Excellent	-Gross protoplasmic poison -Disrupts cell walls -Precipitates cell proteins -Low concentrations inactivate essential enzyme systems	-Nonspecific concerning bactericidal and fungicidal action -When boiling water would cause rusting, the presence of phenolic substances produces an antirusting effect	-Unpleasant odor -Some areas have disposal restrictions -Effectiveness reduced by alkaline pH, natural soap or organic material -Sporicidal, no	-Skin and eye irritant -Sensitizer -Corrosive -Toxic	-Hil-Phene -Lph -Metar -Vesphene
Class	Recommended Use	How They Work	Advantages	Disadvantages	Comments & Hazards	Examples
Quaternary Ammonium compounds (QUATS)	-Ordinary housekeeping (e.g. floors, furniture, walls) Bactericidal - Excellent Fungicidal -	-Affects proteins and cell membrane of microorganism -Releases nitrogen and phosphorous from cells	-Contains a detergent to help loosen soil -Rapid action -Colorless, odorless -Non-toxic,	-Does not eliminate spores, TB bacteria, some viruses -Effectiveness influenced by hard water -Layer of soap	-Select from EPA list of hospital disinfectants -Skin and eye irritant -Toxic	-Coverage 258 -End-Bac -Hi Tor

	Good Virucidal - Good (not as effective as phenols)		less corrosive -Highly stable -May be used on food prep surfaces	interferes with action		
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