University of Nebraska Lincoln

Safe Operating Procedure

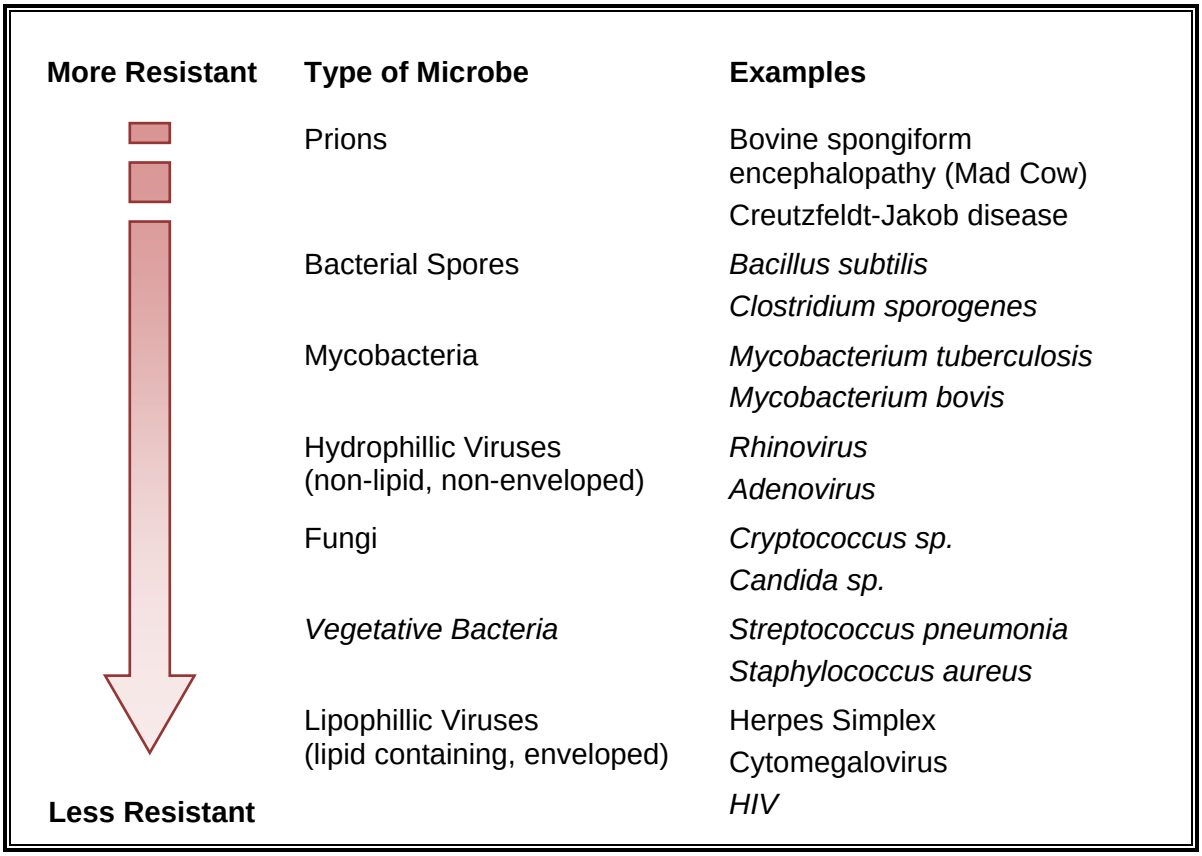
(Revised 9/09)

DISINFECTANTS FOR BIOHAZARDOUS MATERIALS

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at http://ehs.unl.edu/)

The following table provides information regarding various surface disinfectants for use in laboratories where work with biological agents is conducted. Efficacy of every disinfectant varies by a number of factors: 1) organic load, 2) microbial load, 3) type of organism, 4) condition of surfaces to be disinfected (i.e., porous or nonporous), and 5) disinfectant concentration, pH, temperature, contact time and environmental humidity. Prior to selecting a specific disinfectant, consider the relative resistance of microorganisms.

Microbial Resistance to Chemical Disinfectants:



Type of Microbe	Examples
Prions	Bovine spongiform encephalopathy (Mad Cow) Creutzfeldt-Jakob disease
Bacterial Spores	*Bacillus subtilis* *Clostridium sporogenes*
Mycobacteria	*Mycobacterium tuberculosis* *Mycobacterium bovis*
Hydrophillic Viruses (non-lipid, non-enveloped)	*Rhinovirus* *Adenovirus*
Fungi	*Cryptococcus sp.* *Candida sp.*
Vegetative Bacteria	*Streptococcus pneumonia* *Staphylococcus aureus*
Lipophillic Viruses (lipid containing, enveloped)	Herpes Simplex Cytomegalovirus *HIV*

For added assurance, perform kill determinations in your own laboratory with your own strains of microorganisms.

Disinfectant	Quaternary ammonium compounds	Phenolic compounds	Chlorine compounds	Iodophor compounds	Alcohol (ethyl or isopropyl)	Formaldehyde (liquid)	Glutaraldehyde	Hydrogen peroxide (liquid)
Concentration	0.1-2%	0.2-3%	0.01-5%	0.47%	70-85%	4-8%	2%	6%
Contact time (min)	10-30	10-30	10-30	10-30	10-30	10-30	10-600	10-600
Vegetative bacteria	Y	Y	Y	Y	Y	Y	Y	Y
Lipo viruses	Y	Y	Y	Y	Y	Y	Y	Y
Tubercle bacilli	N	Y	Y	Y	Y	Y	Y	Y
Hydrophillic viruses	N	Y/N	Y	Y/N	Y/N	Y	Y	Y
Bacterial spores	N	N	Y/N	N	N	Y/N	Y	Y
Inactivated by organic matter	Y	Y/N	Y	Y	Y	N	N	N
Residual	N	Y	Y/N	Y	N	Y	Y	Y
Corrosive	N	Y	Y	Y	N	N	N	Y
Skin-eye-respiratory irritant	Y-Y-Y	Y-Y-Y	Y-Y-Y	Y-Y-Y	N-Y-N	Y-Y-Y	Y-Y-Y	Y-Y-Y
Toxic	Y	Y	Y	Y	Y	Y	Y	N
Other considerations	Effectiveness influenced by hard water or residual detergent.	Effectiveness reduced by alkaline pH and natural soap. Corrosive. Unpleasant odor.	Must make fresh solutions before use. Increase in alkalinity decreases efficacy. Corrodes stainless steel and aluminum.	May stain plastics, laundry, and other materials.	Recommended for surfaces and equipment; e.g., biohaz spills, BSC cleaning, water baths	Carcinogen.	Usable on plastics, rubber, lenses, and other items that cannot be autoclaved.	

Biological Toxins

- 2N sodium hydroxide (NaOH) for 1 hour (This is a caustic and corrosive material and may damage surfaces and equipment. Wear appropriate PPE.). Neutralize after appropriate contact time.

Prions:

- Environ LpH from Steris (other LpH formulations are not approved for prion use) is effective and not as corrosive to surfaces as bleach or NaOH. This was formerly known as Canadian LpH. All staff using LpH must be trained in its proper use.

  Note: Thoroughly mix the treatment solution until uniform. Minimize breathing LpH fumes. Use squirt bottles and saturated lab wipes rather than spray bottles that create a mist. Containers with LpH should have tight covers. Wear eye protection. User must observe the precautions and safety requirements on the registered product label.

- 2% free chlorine by making a final concentration of 2.5% sodium hypochlorite solution (freshly made 40% household bleach, per USDA requirements) for one hour

- Freshly made 1N NaOH for one hour. Neutralize after appropriate contact time.

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