



# Disinfectants – an informed choice

Definitions					
Cleaning	Antiseptics	Bactericidal & Bacteriostatic	Disinfectants	Sanitation	Sterilisation
<p>The Physical removal of foreign material. E.g. Dust, soil, organic material.</p> <p>Means removing rather than killing micro organisms.</p>	<p>Chemicals that kill micro organisms on living skin or mucous membranes</p>	<p><b>Bactericidal</b> Chemical agents capable of killing bacteria. Similarly agents that are virucidal, fungicidal, or sporicidal are agents capable of killing these organisms.</p> <p><b>Bacteriostatic</b> Chemical agents that inhibit (not kill) the growth of bacteria.</p>	<p>Disinfectants are used on inanimate objects in contrast to antiseptics which are used on living tissue</p> <p>Disinfection usually involves; chemicals, heat or ultra violet light.</p> <p>Disinfection is the inactivation of disease-producing micro organisms.</p> <p>Disinfection does not destroy bacterial spores.</p>	<p>Process that reduces micro organisms on an inanimate object to a level below that of infectious hazard</p>	<p>Destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Items should be cleaned thoroughly before effective sterilization can take place.</p>

Low level Disinfectants	Commonly found in	Efficacy	How they work	Use	Concerns
<b>Phenolic</b>	<ul style="list-style-type: none"> <li>Mouth washes</li> <li>Scrub soaps</li> <li>Surface disinfectants</li> <li>Active ingredient in house hold disinfectants (Lysol, pine Sol)</li> </ul>	<p>Effective against</p> <ul style="list-style-type: none"> <li>Bacteria (gram positive)</li> <li>Enveloped Viruses</li> </ul> <p>Not effective against</p> <ul style="list-style-type: none"> <li>Non envelope viruses and spores</li> </ul>	<ul style="list-style-type: none"> <li>Maintain activity in presence of organic material</li> </ul>	<p>Used mainly for decontamination environments (removal of disease producing micro organisms and leave safe for further handling.</p> <ul style="list-style-type: none"> <li>Decontamination of the hospital environments.</li> <li>laboratory surfaces and non critical medical items</li> </ul>	<ul style="list-style-type: none"> <li>Do not use in nurseries</li> <li>Not recommended for use on food contact surfaces</li> <li>Prolong exposure to skin may cause irritation</li> <li>May be absorbed through skin or by rubber</li> <li>Some synthetic flooring may become sticky with repetitive use</li> </ul>
<b>Quaternary Ammonium Compounds</b>	<ul style="list-style-type: none"> <li>Very good cleaning agents (but water hardness and materials such as cotton reduce microbiocidal effectiveness, as these materials absorb the active ingredients.</li> <li>Not good as antiseptics</li> </ul>	<ul style="list-style-type: none"> <li>Not effective against non envelope viruses, fungi, bacterial spores</li> </ul>	<ul style="list-style-type: none"> <li>QA disinfectants carry a very strong positive charge that makes good contact with negatively charged surfaces</li> </ul>	<ul style="list-style-type: none"> <li>Widely used as disinfectants</li> <li>but are contraindicated as antiseptic</li> <li>Ordinary environmental sanitation of non critical surfaces such as floors, furniture and walls</li> </ul>	<ul style="list-style-type: none"> <li>Generally low in toxicity but prolonged contact time can cause irritation</li> <li>Limited use as disinfectant because of narrow microbiocidal spectrum</li> </ul>

Intermediate Level Disinfectants	Commonly found in	Efficacy	How they work	Use	Concerns
<b>Alcohols</b>	In the health care setting <ul style="list-style-type: none"> <li>Ethyl alcohol</li> <li>Isopropyl alcohol</li> </ul>	<ul style="list-style-type: none"> <li>Antiseptics</li> <li>Disinfectants</li> <li>rapidly bactericidal rather than bacteriostatic</li> </ul>	<ul style="list-style-type: none"> <li>Require time to work</li> <li>Do not penetrate organic matter</li> </ul>	<ul style="list-style-type: none"> <li>Bactericidal (against vegetative forms of bacteria, also tuberculocidal, fungicidal, and virucidal against envelope viruses).</li> <li>Not effective against bacterial spores and limited effectiveness against non envelope viruses. (effectiveness dependant on concentration)</li> </ul>	<ul style="list-style-type: none"> <li>Volatile</li> <li>Flammable (storage issues require cool well ventilated areas)</li> <li>Generally too expensive for general use as a surface disinfectant</li> </ul>
<b>Hypochlorites (most widely used of chlorine disinfectants)</b>	<ul style="list-style-type: none"> <li>Liquid Sodium hypochlorite</li> <li>Powder calcium hypochlorite</li> <li>Tablet Sodium Dichloroisocyanurates</li> </ul>	Broad spectrum of antimicrobial activity. <ul style="list-style-type: none"> <li>Not affected by water hardness</li> <li>Recommended for use in hospital and domestic environments as disinfecting solutions</li> <li>In decontamination of hepatitis and AIDS viruses</li> <li>Disinfecting surfaces in food preparation and bathroom environment</li> </ul>	<ul style="list-style-type: none"> <li>Fast acting</li> <li>The exact method by which free chlorine destroys micro-organisms has not been elucidated.</li> <li>Organic material such as faeces or blood inactivate chlorine based disinfectants. Therefore surfaces must be clean before their use. Maximum effectiveness achieved with prolong contact time.</li> </ul>	<ul style="list-style-type: none"> <li>Oxidising, Bleaching, disinfecting useful as cleaning agents.</li> <li>In correct dilutions and contact time can eliminate both enveloped and non enveloped viruses.</li> <li>Effective against fungi, bacteria and algae but no spores.</li> <li>House hold bleach diluted using 1:50 with water, good surface disinfection.</li> </ul>	<ul style="list-style-type: none"> <li>Low incidence of serious toxicity.</li> <li>Occupational dermatitis or irritation of the skin. Asthmatics or persons allergic to chlorine at high risk for adverse reactions after inhaling or ingestion</li> <li>At concentration of 4-6% skin and ocular irritation or oropharygeal, oesophageal and gastric burns</li> <li>Other disadvantages: corrosiveness to metals in high concentrations (&gt;500ppm), inactivation by organic matter, discolouring or bleaching of fabrics, release of toxic chlorine gas when mixed with ammonia or acid.</li> <li>Inactivated by organic material</li> <li>Use in well ventilated areas</li> <li>Shelf life shortens when diluted (1:9parts water)</li> </ul>

<p><b>Solid:</b></p> <p><b>Calcium Hypochlorite</b></p> <p><b>Sodium Dichloroisocyanurate</b></p>				<p>Recommended for use against AIDS (HIV), hepatitis, poliomyelitis and Cholera</p>	<p>Chlorine tablets stable for 3 years or more.</p> <p>Cf to the liquid form inherently unstable and degrades with age. Degradation accelerates in conditions of high temperature or strong sunlight</p>
<p><b>Iodine and Iodophor Disinfectants</b></p>	<ul style="list-style-type: none"> <li>• Iodine and Iodophor well established chemical disinfectants</li> </ul> <p>Normally incorporated in time release formulations and in soaps. Surgical scrubs Simple iodine tinctures (dissolved in alcohol)</p>	<ul style="list-style-type: none"> <li>• Bactericidal</li> <li>• Sporicidal</li> <li>• Virucidal</li> <li>• Fungicidal</li> </ul>	<p>require prolong contact time</p> <p>Disinfective ability neutralises by organic material. Frequent application needed for thorough disinfection</p>		<ul style="list-style-type: none"> <li>• Not suitable for use as hard surface disinfectants</li> <li>• Corrosive to metals unless combined with inhibitors</li> </ul>

High level Disinfectants	Commonly found in	Efficacy	How they work	Use	Concerns
<b>Hydrogen Peroxide</b>	<ul style="list-style-type: none"> <li>Antiseptics to clean wounds</li> </ul>	<ul style="list-style-type: none"> <li>Disinfectant</li> </ul>	<ul style="list-style-type: none"> <li>Strong oxidant</li> <li>Fast acting</li> <li>Breaks down into water and oxygen</li> </ul>	<ul style="list-style-type: none"> <li>Activity of peroxides greatest against anaerobic bacteria</li> <li>Hydrogen peroxides at high concentrations damaging to tissues</li> <li>Stabilized hydrogen peroxides can be used to disinfect environmental surfaces</li> <li>High level surface disinfectant</li> </ul>	<ul style="list-style-type: none"> <li>Can be corrosive to aluminium, copper, brass or zinc</li> <li>Surface active</li> <li>Limited ability to penetrate</li> </ul>
<b>Gluteraldehyde</b>		<p>Wide germicidal range</p> <ul style="list-style-type: none"> <li>Bactericidal</li> <li>Virucidal</li> <li>Fungicidal</li> <li>Sporicidal</li> <li>Parasitocidal</li> </ul>		<ul style="list-style-type: none"> <li>Disinfectant and Sterilant (in both liquid and gaseous form)</li> <li>Potent disinfectants</li> <li>Moderate residual activity and effective in the presence of limited amount of organic material.</li> </ul>	<ul style="list-style-type: none"> <li>Highly toxic. Used only as a last resort. Only under trained supervision in a well-ventilated setting and its appropriate personal protective equipment.</li> </ul>
<b>Formaldehyde</b>	<ul style="list-style-type: none"> <li>Formalin ( water based solution 37% formaldehyde by weight)</li> </ul>	<p>Wide germicidal range</p> <ul style="list-style-type: none"> <li>Bactericidal</li> <li>tuberculocidal</li> <li>Virucidal</li> <li>Fungicidal</li> <li>Sporicidal</li> </ul>		<p>Disinfectant and Sterilant (in both liquid and gaseous form)</p>	<ul style="list-style-type: none"> <li>Formaldehyde should be handled as a potential carcinogen. Limits its role as in sterilization and disinfection process.</li> <li>Carcinogenic, toxic, strong irritant &amp; pungent odour</li> </ul>
<b>Ortho-phthaldehyde</b>		<p>Wide germicidal range</p> <p>Bactericidal</p> <ul style="list-style-type: none"> <li>Virucidal</li> <li>Fungicidal</li> <li>Sporicidal</li> <li>Parasitocidal</li> </ul>		<p>Sterilant</p>	

<b>Peracetic Acid</b>		<ul style="list-style-type: none"><li>• Sporicidal (even at low temperatures)</li></ul>	<ul style="list-style-type: none"><li>• Characterises by rapid action against all micro organisms</li><li>• No harmful decomposition products.</li><li>• Leaves no residue</li><li>• Remains effective in the presence of organic matter</li></ul>	<ul style="list-style-type: none"><li>• Used in automated machines to chemically sterilize medical, surgical and dental instruments</li></ul>	<ul style="list-style-type: none"><li>• Peracetic acid can corrode copper, brass, bronze, plain steel and galvanized iron</li><li>• Unstable particularly when diluted</li></ul>
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