

Active ingredients, chemical formulas, pros and cons of disinfectant-impregnated wipes applications

Disinfectant Category	Example of Active Ingredients	Chemical Formula	Advantages	Shortcomings
Alcohol	Ethyl alcohol (Ethanol)	C_2H_6O	Rapid bactericidal effect. No bacteriostatic action. Relatively cheap and easy to obtain. Wet the surface easily.	Tend to swell and harden rubber and certain plastics. Not sporicidal. Inflammable. Poor inactivation effectiveness was reported for some virus. Lack of efficacy in the presence of organic debris. Metal corrosive. Difficult in ensuring certain contact time in an open system.
	Isopropyl alcohol (Isopropanol)	C_3H_8O		
Chlorine and chlorine compounds	Hypochlorites	ClO^-	Most used chlorine disinfectants. Large bactericidal spectrum. No toxic residues. Not affected by water hardness. Inexpensive and fast mode of action.	Corrosive to metals (> 500 ppm). Inactivated by organic matter. Irritating and burning for skin, eyes and mucous membranes. Will discolor and bleach textiles. Toxic chlorine gas formation in contact with ammonia or acid.
	Chlorine dioxide	ClO_2	Wide spectrum of biocidal activity. Efficient mycobactericidal activity in short contacts time. It provides prolonged bactericidal effect than chlorine due to its high retain of antimicrobial active ingredients.	Long-term use can damage the outer plastic coat of some insertion tubes.
	Chloramine-t trihydrate	$C_7H_7ClNNaO_2S$	Chlorine retains longer which results in more prolonged bactericidal effect	Occupational asthma has been reported.
Peroxygens	Hydrogen peroxide	H_2O_2	Satisfying germicidal activity including bacterial spores (with longer contact time). Environment friendly due to its fast degradation. Accelerated hydrogen peroxide (AHP) was developed with widened material compatibility and application variability.	May have chemical irritation resembling pseudomembranous colitis
	Peracetic acid (PAA)	$C_2H_4O_3$	Rapid action against all microorganisms at low concentration. Reinforced removal of organic material without residue. Effective in the presence of organic matter. Sporicidal at low temperatures	Corrosive to copper, brass, bronze, plain steel, and galvanized iron. (corrosion decline by additives and pH modifications) Unstable, particularly when diluted.
Quaternary ammonium compounds (quats or QACs)	Alkyl dimethyl benzyl ammonium chloride	$C_{22}H_{40}N^+$	The most commonly used disinfectant in ordinary environmental surfaces with broad spectra of biocidal activity (lipid, enveloped viruses). Sporostatic. Good cleaning and deodorization property. Incorporation of QA moieties into polymers presents effective antimicrobial effect against biofilm.	Numerous studies show the adsorption of QACs onto the cotton substrate wiping material, which could lead to the failure of disinfection process. Susceptible with high water hardness. Less effective with gram-negative bacteria and non-enveloped viruses.
	Benzyl dimethyl octyl ammonium Chloride	$C_{17}H_{30}ClN$		
	Didecyl dimethyl ammonium chloride	$C_{22}H_{48}ClN$		

Source: <https://aricjournal.biomedcentral.com/articles/10.1186/s13756-019-0595-2#Tab2>