Electronic Supplementary Material (ESI) for Soft Matter.
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Table 1 - Examples of common biocides according to their chemical groups, common application, solubility, and limitations. (Supplementary material)

General group	*Applications*	*Limitations*	*Examples*	*Physical state and Octanol/water partition coefficient as log Pow*
Alcohols	Disinfectants, antiseptics, antimycotics, deodorants, and preservatives [1,2]		Ethanol isopropanol etc.	Polar liquid; Non-polar liquid
Aldehydes	Disinfection and sterilization in many areas such as in the leather tanning industry, poultry industry, cosmetic field, micro-biological field, food industry and medical area [1,3,4]	Usually commercially obtained as an acidic solution and it is activated (made alkaline) before the use; incompatible with strong oxidizers and strong bases	Glutaraldehyde (pentanedial)	Liquid -0.22
		Less active under acid conditions	Formaldehyde (methanal)	Flammable gas (often stored in aqueous solution) 0,35
		Less active under acid conditions	Ortho-phthalaldehyde (benzene-1,2-dicarboxaldehyde)	Solid 0.99 @ 30°C
Amphoteric surfactants	Commonly available household cleaning/hygiene agents [5]	Less active under acid conditions. Ideal: Neutral/alkaline conditions	Cocamidopropyl betaine	Liquid -1.28 to -3.63 @ 25°C
			Dodecyl-di (aminoethyl)-glycine	
			N-Alkyl aminopropyl glycine	
Anionic surfactants	Commonly available household cleaning/hygiene agents [5]	Effective only at low pH; Neutralized by detergent residues; Corrosive to soft metals, mild steel	Sodium dodecyl sulfate	
			alkylbenzene sulfonate (LAS)	
			Sodium lauryl sulfate (SLS)	Solid 1.6
			Sodium dodecyl benzene sulfonate (SDBS)	0.45
Cationic surfactants	Disinfectants; highly effective for the inactivation of SARS-CoV-2 [6]	Neutralized by certain surfactants. Ideal: Neutral/alkaline conditions	benzalkonium chloride	0.96-2.93 (C8-C12)
			Methydimethyl ammonium chloride	
			Alkyl isoquinolinium bromide	
			Dodecyltrimethylammonium chloride (DTAC)	
Halogens (or halogen releasing compounds)	Food industries and sanitization of equipment; water treatment [7–12]	Acid conditions; Vapor phase corrosion	Chlorine	Gas (stable active halogen liquid; chlorine tablets)
			Sodium hypochlorite (SH)	liquid - 3.42 @ 20°C
		Stabilized form slower and less	Chlorine dioxide (CD)	Gas (tablets) -3.22

		active under alkaline/neutral conditions		
			Sodium dichloroisocyanurate (NaDCC)	Solid -0.0056
			Sodium bromide	water-soluble solid
			Bromine-chlorine-dimethylhydantoin *(BCDMH)*	Solid 0.32-0.40
Peroxygens	Cleaning; antisepsis; air, water, and surface disinfection (including device and food surfaces) [1,9,11,13]	Corrosive in presence of chlorine ions; Rapid decomposition at high temperatures; rapid decomposition by metals, organic matter. Ideal: Acid conditions	Hydrogen peroxide	Liquid -1.36
			Peracetic acid	Liquid -0.52
Isothiazolinones	Preservative for industrial emulsions, adhesives, polishes, glues, household products, paper products, cutting oils [1,14,15]		1,2-benzisothiazolin-3-one (BIT)	Solid 0.7 @ 20°C
			2-methyl-4-isothiazolin-3-one (MIT)	Solid -0.49
			5-Chloro-2-methyl-4-isothiazolin-3-one (CMIT)	Solid 0.53
			2-n-Octyl-4-isothiazolin-3-one (OIT)	Liquid >3.1 (20°C)
			4,5-dichloro-2-octyl-4-isothiazolin-3-one (DCOIT)	Solid 4.68
Phenolics	Disinfectants (including aerial ones), antiseptics, surgical scrubs, toilet soaps, cosmetics, textiles and cutting oils, herbicides and fungicide [1,16,17]	Some surfactants can "over-solubilize" them reducing their effective availability	2.4-dichlorophenoxyacetic acid (2,4-D)	Solid 2.81
			2,4-Dichlorophenol	Solid 3.06
			2,4,5-trichlorophenol	Solid 3.72
			5-chloro-2-(2,4-dichlorophenoxy)phenol (triclosan)	Solid 4.8
			Hexachlorophene [2,2′-methylenebis(3,4,6-trichlorophenol)]	Solid 7.54
Polymeric biguanides	Disinfectant and antiseptic	Incompatible with anionic surfactants	1,6-bis(4-chloro-phenyl biguanide)hexane (chlorhexidine)	Solid -1.1
			Alexidine	Water soluble solid