

Table 5. Characteristics of permitted active ingredients in sanitizers for use in food premises³⁰

Sanitizer	Affected microorganisms/ Resistance or limitations ²⁹	Sanitizing/ rinse concentration	Toxicity	Stability	Odour	Residual activity	Hard water affects efficacy	Organic matter affects efficacy	pH affects efficacy	Corrosive (metals)
Chlorine-releasing compounds^{3,7,9,28,31-33} (most common: calcium and sodium hypochlorite)	Broad spectrum (bacteria, fungi, viruses) Spores: YES Biofilm: NO Resistance: <i>Cryptosporidium</i> , ³⁴ <i>Giardia lamblia</i> (less so), ³⁵ <i>Salmonella</i> , ³⁶ Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) ³⁷	100-200 ppm available chlorine Although 200 ppm is effective for numerous surfaces, 800 ppm is suggested for porous areas. Rinse @ ≥ 200 ppm	Skin and respiratory irritant. Burning pain, inflammation and blisters	↓ w/ light, >60°C	√	√	√	√	√ pH 6-7.5	√
Peracetic/ peroxyacetic acid (PAA) (usually mixed with hydrogen peroxide)^{31,38,39}	Broad spectrum (including <i>Pseudomonas</i> , <i>Salmonella</i> , <i>E. coli</i> , <i>Staphylococcus</i> , <i>Listeria</i>) Spores: YES Biofilm: YES Resistance: Biofilms of <i>Listeria monocytogenes</i> (exposed for 40 min to the minimum inhibitory concentration) ⁴⁰ <i>Salmonella typhimurium</i> , <i>L. monocytogenes</i> , <i>Escherichia coli</i> O157:H7 can become more acid resistant when exposed to mild acidic conditions ^{41,42}	200-1100 ppm Solution must contain a minimum of 200 ppm peracetic acid Rinse @ > 1100 ppm	Depends on wetting agents. Highly corrosive and extremely hazardous to skin. Can cause blistering, itching, scaling, or skin burns.	Good	√				√	√ some metals, mild and galvanized steel ↑ w/High T

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Hypochlorous acid ^{43,44}	Broad spectrum Spores: YES Biofilm: NO	140-200 ppm available chlorine	No reports of toxicity	↓ w/ light ↓ T > 25°C Short shelf life			-	✓	✓	✓
Hydrogen peroxide (H₂O₂) ^{3,9,45}	Broad spectrum (including <i>E.coli</i> , Influenza A and B, <i>Pseudomonas</i> , <i>Campylobacter</i> , <i>Salmonella</i> , MRSA, VRE) Spores: YES Biofilm: NO Resistance: <i>L. monocytogenes</i> in biofilm ⁴⁶	3% to 6% 200-1100 ppm Rinse @ ≥ 1100 ppm	Can cause skin irritation.	↓ w/ ↑ T Accel. H ₂ O ₂ more stable			✓	✓	✓	✓
Quaternary ammonium compounds (QUATS) ^{7,9,31}	Broad spectrum (including <i>L. monocytogenes</i> , vegetative bacteria) Generally less effective against gram-negative bacteria due to outer membrane Effective against enveloped viruses Spores: NO Biofilm: YES	200 to 400 ppm typical Rinse @ ≥ 400 ppm	Respiratory and skin irritant	Good	✓	✓	✓	✓		



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	Resistance: <i>L. monocytogenes</i> ⁴⁷ Limitations: Microfibre, cotton fibres, and cellulose wipes can absorb some of the QUATS. ^{15,16,48} Surface morphology, charge density, and microstructures in the cloth fibres influence degree of absorption. ⁴⁸									
Iodophors ^{7,10,31,49,50}	Broad spectrum. Good against yeasts, viruses, bacteria, algae, molds Spores: NO Biofilm: NO Resistance: General absence of resistance to povidone- iodine ⁵¹ and iodine, ⁵² although some resistance to methicillin-resistant <i>S.</i> <i>aureus</i> (MRSA) suggested. ³⁷	25 ppm, expressed as titratable iodine Rinse @ ≥ 25 ppm	Depends on wetting agents. Iodophors may bleach skin or cause irritation.	Vaporizes at 49°C				✓	✓ Only effective < pH 4	Stains silver May leave yellow residues on surfaces May cause pitting

