| Product type | Recommended Doses | Desired pH Range | Notes |
|---|---|---|---|
| Alkaline Cleaners | 5-10 g/L (mild)<br>10-20 g/L (strong) | 10-11.5 (mild)<br>12-14 (strong) | Generally used for removing heavy soil loads, tartrates, and proteins |
| Acidic Cleaners | 10-30 g/L (mild)<br>40-50 g/L (strong) | 1.5-2.5 (mild)<br><1.5 (strong) | Great for removal of mineral deposits and neutralizing alkaline detergent residues |
| Peracetic Acid (PAA) | 125-220 ppm | <8.2 | At alkaline pH values, PAA is ineffective |
| Chlorine Based Sanitizers | 200 ppm | <7 | Lower pH values maintain an abundance of hypochlorous acid rather than the hypochlorite ion favored in alkaline solutions |
| Citric-Sulfur | 150 ppm SO2 in 10 g/L Citric solution | 2.1-2.3 | Maintaining an acidic solution ensures SO2 is primarily present in its molecular form, which has the highest antimicrobial properties |

| Agent | Mode of Action | Dose | Contact time | Effectiveness | Drawbacks | Best used for | Notes |
|---|---|---|---|---|---|---|---|
| SO2 | Targets essential cell pathways and disulfide bonds | 150ppm in acidulated solution; 5-20g disc per 225L barrel | Instantaneous | Broad spectrum | Needs to be done every 3-4 weeks in barrels; highly pH dependent as a sanitizer; specific humidity requirements (60-80%) for use in barrel storage | Spraying valves, bung holes, spills; Preserving empty barrels | Citric-sulfur solutions should be used for quick sanitization purposes rather than large scale use; Barrels need to be fully dried for sulfur discs to be effective |
| ClO2 | Oxidatively decarboxylates amino acids | 200ppm free (use test strips to confirm concentration) | 5 minutes | Broad spectrum | Reacts with organics | Stainless steel, equipment, fittings, NOT barrels (binds to wood) | This is a different produce form chlorine bleach. Always avoid chlorine as it leads to TCA. |
| PAA | Targets cell membrane | 125-200 ppm | 5 minutes | Narrow, effective against wild yeast (Brett) | Reacts with organics, can spontaneously combust in high doses; residual PAA will inactivate sulfur | Tanks, tradeoff with peroxycarb for cleaning | Has extended effectiveness on most surfaces; requires low concentrations; good compatibility with hard water |
| Ozone | Non-targeted hyperradical oxidizer | 1ppm (use test strips to confirm concentration) | 10 minutes | Broad spectrum, inactivates but doesn't kill | Temperature sensitive (less than 70 degrees), short half-life in water, safety hazard, corrosive to rubber hoses and gaskets | Tanks, barrels if no heat available | No significant difference in volatiles in oak after treatment (Marko et al 2005) |
| Heat | Instantaneously kills | 170-185 degrees F | Instantaneous | Broad spectrum | Can cake on proteins and sugar, strip flavor, high energy cost | Porous surfaces (barrels), sterilizing (bottling line) | Extended use can leach oak volatiles |
| 70% ethanol | Causes rupture of membranes | 70% | Time to fully evaporate | Broad spectrum | Concentration must be exact, at >70%, microbes will hibernate and at <70% microbes can tolerate | Spraying valves, bung holes, spills | Should be used for quick sanitization purposes rather than large scale use |