

8. CLEANING INSTRUCTIONS FOR PACKED COLUMNS (CIP)

There is a range of cleaning methods, according to the nature of the substance to be removed. Please refer to the instructions given for the column packing in question!

Treatment	Contamination	Sterilization	Depyrogenation
1-2 M NaCl	Highly charged molecules	Ineffective	Ineffective
Buffer pH 3-5	Highly charged molecules	Ineffective	Ineffective
Treatment with pronase at a neutral pH, calcium ions	Hydrolysis of adsorbed proteins	Ineffective	Ineffective
Treatment with pepsin, pH 1.5-2	Hydrolysis of adsorbed proteins	Ineffective	Ineffective
Non-ionic detergents (e.g. Triton X-100, Tween 80)	Removal of hydrophobic proteins and lipids	Ineffective	Ineffective
Cationic detergents pH 9-11	Removal of hydrophobic proteins and lipids	Ineffective	Partial
Non-ionic detergents pH 3 (acetic acid)	Removal of hydrophobic proteins and lipids	Ineffective	Partial
Urea 6-8 M	Removal of protein aggregates	Ineffective	Unknown
1-100 mM EDTA in neutral or slightly acidic solution	Removal of metal complexes	Ineffective	Ineffective
2-3 M NaCl in 0.1-1 M HCl	Removal of various small, charged molecules and pigments	Ineffective	Effective
0.1-1 M NaOH	In particular the removal of bonded hydrophobic proteins and lipopolysaccharides	Effective	Effective
0.5-1 M acetic acid in 60% ethanol	Removal of lipids, pigments, lipo-polysaccharides and other lipophilic substances	Very effective	Effective
1500 ppm peracetic acid in 0.5 M sodium acetate, pH 5	Removal/denaturing of spores, viruses and bacteria	Very effective	Unknown
50-80% acetic acid	Dissolving and removal of precipitated proteins	Unknown	Unknown
40-60% ethanol	Removal of various proteins and lipids	Unknown	Unknown
Isopropanol-gradient up to 100% in water	Removal of non polar lipids	Ineffective	Unknown
0.1-1 M mineral or organic acids	Removal of various charged molecules and hydrolysis of bonded substances	Unknown	Unknown
0.1 M - 1 M HCl in 60% ethanol	Removal of various charged molecules and lipids	Unknown	Effective

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