

Decontamination using sodium hypochlorite

Dnr:

Version:

Date (prod./rev.):

1.0 2018.09 (11)

2018-09-14

1.1 2021.09 (58)

2021-09-09 09:46

Neo/Departments of: Biosciences and Nutrition (BioNut); Clinical Science, Intervention and Technology (Clintec); Laboratory Medicine (LabMed); Medicine Huddinge (MedH/HERM, LipidLab); Medicine Solna (MedS); Neurobiology, Care Sciences and Society (NVS)

Created by:

Neo Work Environment Group / Håkan Ottosson

Approved by:

Decontamination using sodium hypochlorite

A 0.5% solution is used for decontamination of laboratory equipment and surfaces¹. However, when using it to kill off microorganisms in a solution you have to consider all material in the solution that may react with sodium hypochlorite and thereby lowering the final concentration. Using sufficient amount of the concentrated solution to get a 1% concentration in the final solution that needs decontamination is normally sufficient.

The bottles of Sodium hypochlorite that we have in storage have a concentration of about 14%. However, a solution of sodium hypochlorite is not stable and decomposes over time. So, check estimated concentration using stability table below, and use larger amount to get a final concentration of 1%. (The expiring date of the bottles we keep in store may have expired but by calculate a new concentration they will be fine to use, unless very old)

- To decontaminate a solution in a 5 L jerrican (not filled to the brim!), add about 400-500 mL 14% Sodium hypochlorite. If the final volume is 5 L, the concentration will be $(0.4 \cdot 14\%) / 5 = 1.1\%$.
- If the decontaminated solution is free from harmful chemicals (e.g. antibiotics) it may be poured out in the sink, if not, dispose of it as chemical waste, properly labelled, in the chemical waste room at floor 3.
- If you are decontaminating equipment or surfaces a fresh solution is needed. Diluting 50 mL concentrated hypochlorite to 1 L will give a suitable concentration (1L is a lot if using on surfaces!)

Be aware of:

- Sodium hypochlorite is very reactive and corrosive. Use protecting gloves and, as always, safety goggles and a lab coat.
- Never mix sodium hypochlorite with an acidic solution (pH > 5 is probably OK). Toxic gases will be formed (chlorine, Cl₂).
- Leave the jerrican in a ventilated area over night. Gases will evolve and the can may burst if tightly closed. **Do NOT close the cap tightly until gas forming ceased.**

Table 1 Recommended disinfectants and concentrations for the inactivation of EAD agents²

Disinfectant Oxidising agents	Usual form supplied	Recommended working strength		Contact time for inactivation	Applications
		Usual dilution	Final conc.		
Sodium hypochlorite NaOCl	conc. liquid (50 000 ppm available chlorine)	1:10	5000 ppm available chlorine	10–30 min	Use for virus categories A, B and C and all bacteria. Effective for most applications, except when in the presence of organic material. Less stable in warm, sunny conditions above 15°C.
Calcium hypochlorite Ca(OCl) ₂	solid	7 g/L	5000 ppm available chlorine	10–30 min	NaOCl effective against prion proteins at 2% with contact time of 1 hour followed by rinsing with copious quantities of water.
Virkon	powder	20 g/L	2% (w/v)	10 min	Excellent disinfectant active against all viruses and bacteria.

Stability

Table 2 Illustrative examples of chlorine decomposition in hypochlorite solution @ 20°C³

Initial concentration	After 20 days	After 100 days
15% available chlorine	13%	10%
13% available chlorine	12%	8%
10% available chlorine	9%	8%
6.5% available chlorine	6.2%	6%

¹ Laboratory decontamination and waste management,

<http://www.wpro.who.int/philippines/mediacentre/features/laboratorywastemanagementdecontaminationevd.pdf>

² Excerpts from table 3.1 in Decontamination Manual – FAO (more methods in original table),

<http://www.fao.org/ag/againfo/commissions/docs/training/material/AusVet/plan-2009.pdf>

³ Table 4.2 in "Water Treatment Manual: Disinfection", https://www.epa.ie/publications/compliance--enforcement/drinking-water/advice--guidance/Disinfection2_web.pdf