

Bleach or sodium hypochlorite

Bleach, or sodium hypochlorite (NaOCl), has been used as a topical antiseptic and disinfectant since the 18th century.⁴³ Based on pH, sodium hypochlorite may exist as hypochlorous acid (HOCl), also present in neutrophils, or as a hypochlorite ion or as chlorine, its molecular form (Cl₂).⁴⁴ Sodium hypochlorite is broken down to hypochlorous acid when in contact with water. This reaction generates super-oxide radicals extremely effective against bacteria, spores, fungi, and viruses.⁴⁴ Hypochlorous acid has an inherent short shelf life, and until recently it was *not* commercially available. However, in 2007, a stabilized pure form of hypochlorous acid was described, adding this compound to the armamentarium of topical antimicrobials. In vitro, hypochlorous acid has been shown to be more effective (lower MIC and MBC) and faster (1 vs 5–15 minutes) than sodium hypochlorite to kill *Staphylococcus aureus*, *E coli*, and *P aeruginosa*.⁴⁵

Despite the in vitro greater antimicrobial effect of hypochlorous acid, sodium hypochlorite has been routinely used in human and veterinary dermatology for its low cost and safety profile. Sodium hypochlorite has several beneficial effects on human skin.⁴⁴ As recently reviewed,⁴⁴ bleach is a powerful, well-tolerated antimicrobial. It does not disrupt the epidermal skin barrier, it has anti-inflammatory properties, and it is able to decrease pruritus in atopic human patients. In human dermatology, sodium hypochlorite is used at a concentration of 0.005%. An in vitro study⁴⁶ showed that concentrations ranging from 0.005% to 0.01% are innocuous for human keratinocytes. However, the same authors tested the antimicrobial and antibiofilm activity of sodium hypochlorite against *S. aureus* only at concentrations as low as 0.01%. This study⁴⁶ confirmed sodium hypochlorite's anti-staphylococcal activity at such concentration.

Whereas to act as anti-biofilm compound, concentrations ranging from 0.01% to 0.16% may be needed.⁴⁶ In veterinary medicine, the in vitro antimicrobial activity of sodium hypochlorite has been tested S144 JAVMA | JUNE 2023 | VOL 261 | NO. S1 against clinical isolates of *S pseudintermedius*, *P aeruginosa*, and *Malassezia pachydermatis* showing a powerful antimicrobial activity. This was demonstrated with concentrations as low as 0.00156% able to kill such organisms in 3 to 5 minutes of contact time.⁴⁷ Regarding safety, the same group tested the toxicity of sodium hypochlorite on primary canine keratinocytes showing a lack of significant toxicity for concentrations up to 0.01% of sodium hypochlorite,⁴⁸ mirroring the human study previously reported.⁴⁶ Furthermore, 0.005% sodium hypochlorite was associated with a significant reduction in inflammatory markers, with concentrations of 0.05% lacking negative effects on the epidermal skin barrier.⁴⁸ Regarding the clinical applicability of sodium hypochlorite as a powerful antimicrobial, the data are scant with only 2 clinical studies published.^{48,49} In the first study,⁴⁸ a single application of 0.05% diluted sodium hypochlorite or water was applied at a concentration of 0.8 mL per 5 cm² on the thorax of atopic dogs (n = 4) and bacteria were counted over a 7-day period. At the end of the 7 days, although a significant difference was not seen between sodium hypochlorite and water, a visual reduction of bacterial colonies was seen in the treated group. In addition, after a single application of 0.05% sodium hypochlorite, there was a complete lack of side effects, confirming the high safety profile of sodium hypochlorite in dogs.⁴⁸ These data suggest that repeated daily applications of sodium hypochlorite, as anecdotally used, would make sodium hypochlorite an extremely viable, safe, and affordable treatment option for MDR bacterial infections in dogs.

This hypothesis was confirmed by a second clinical prospective, open-label pilot study,⁴⁹ reported the effects of a commercially available shampoo (**Command Shampoo for animals; VetriMax**) containing sodium hypochlorite and salicylic acid against canine superficial pyoderma. Dogs (n = 17) were bathed with a contact time of 5 minutes, 3 times weekly, and reassessed on days 0, 14, and 28. At each visit, a clinical and cytological evaluation of the pyoderma was done. After only 14 days of treatment, there was a significant reduction in clinical severity and in the cytology score with 82% of dogs having negative cytology after 4 weeks of treatment. Although the concentration of sodium hypochlorite present in this shampoo was not declared, this study confirms the powerful antimicrobial and anti-inflammatory activity of the sodium hypochlorite and salicylic acid combination as an alternative treatment option for canine superficial pyoderma.

Source:

https://avmajournals.avma.org/view/journals/javma/261/S1/javma.23.01.0001.xml?tab_body=pdf

To give a bleach bath to a dog, mix a very mild solution of bleach and water (around 0.05% concentration, or 1 teaspoon of bleach per gallon of water). Carefully bathe the dog, avoiding their face and eyes, and rinse thoroughly with plain water afterward to ensure no bleach residue remains.

<https://dogdorable.com/bleach-bath-for-dogs/>

Methods: Topical hypochlorite at 0.05% and tap water were applied to both sides of the thorax of four healthy dogs. The anti-inflammatory effect on canine keratinocytes was determined by real-time polymerase chain reaction; skin barrier integrity was assessed by evaluating stratum corneum lipid changes in canine stratified epidermal constructs.

<https://pubmed.ncbi.nlm.nih.gov/28906043/>

How to use a bleach bath

- Mix 2 ml of 2.2% household bleach for every 1 litre of water to make a 0.005% solution. Brands vary
- strength, so check the label. If the concentration is higher, use less bleach, and if the concentration is lower, use more bleach.
- Bath type Usual capacity Millilitres (mL) of 2.2% bleach required
- Baby bath 15 litres of water 30 ml (approx. two tablespoons)
- Full-sized bath 80 litres of water (for 10 cm deep) 160 ml (approx. half a cup)
- Soak trunk and limbs in the bath for 10–15 minutes. Do not submerge head.
- Rinse off with warm tap water and pat dry with a towel. Avoid sharing towels.
- Apply topical steroid and moisturisers if prescribed.
- Bleach baths are recommended at least twice a week.