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# Diluted sodium hypochlorite (bleach) in dogs: antiseptic efficacy, local tolerability and in vitro effect on skin barrier function and inflammation

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## Abstract

**Background:** Diluted sodium hypochlorite represents an inexpensive and widely available topical antiseptic, but there are no tolerability and efficacy data in veterinary dermatology.

**Objectives:** To determine the in vivo antibacterial effect and tolerability of topical diluted bleach application and to assess its in vitro effect on skin barrier lipids and anti-inflammatory properties or keratinocytes.

**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.

**Results:** The cell viability of primary keratinocytes treated with water and diluted hypochlorite at 0.05% and 0.01%, reduced the percentage of viable cells by 10%. The exposure of primary keratinocytes to 0.005% diluted hypochlorite significantly reduced the induction of inflammatory genes chemokine ligand-2 (CCL2;  $P = 0.015$ ) and thymus and activation-regulated chemokine (TARC/CCL17,  $P = 0.032$ ). There were no changes in skin lipid ceramide and nonceramide fractions in stratified epidermal constructs cultured for 17 days with 0.05% hypochlorite. Topical hypochlorite at 0.05% and tap water were well-tolerated without signs of skin irritation. Although a marked reduction in bacterial counts

was seen within 20 min of diluted bleach application compared to the tap water control, this was or marginally significant ( $P = 0.06$ ).

**Conclusions and clinical importance:** The results indicate that a topical diluted bleach solution, at either 0.05 or 0.005% hypochlorite concentrations, is a well-tolerated antiseptic that also exhibits an inflammatory properties.

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