

# Time and soil interaction in the germicidal efficacy of 4Hooves™



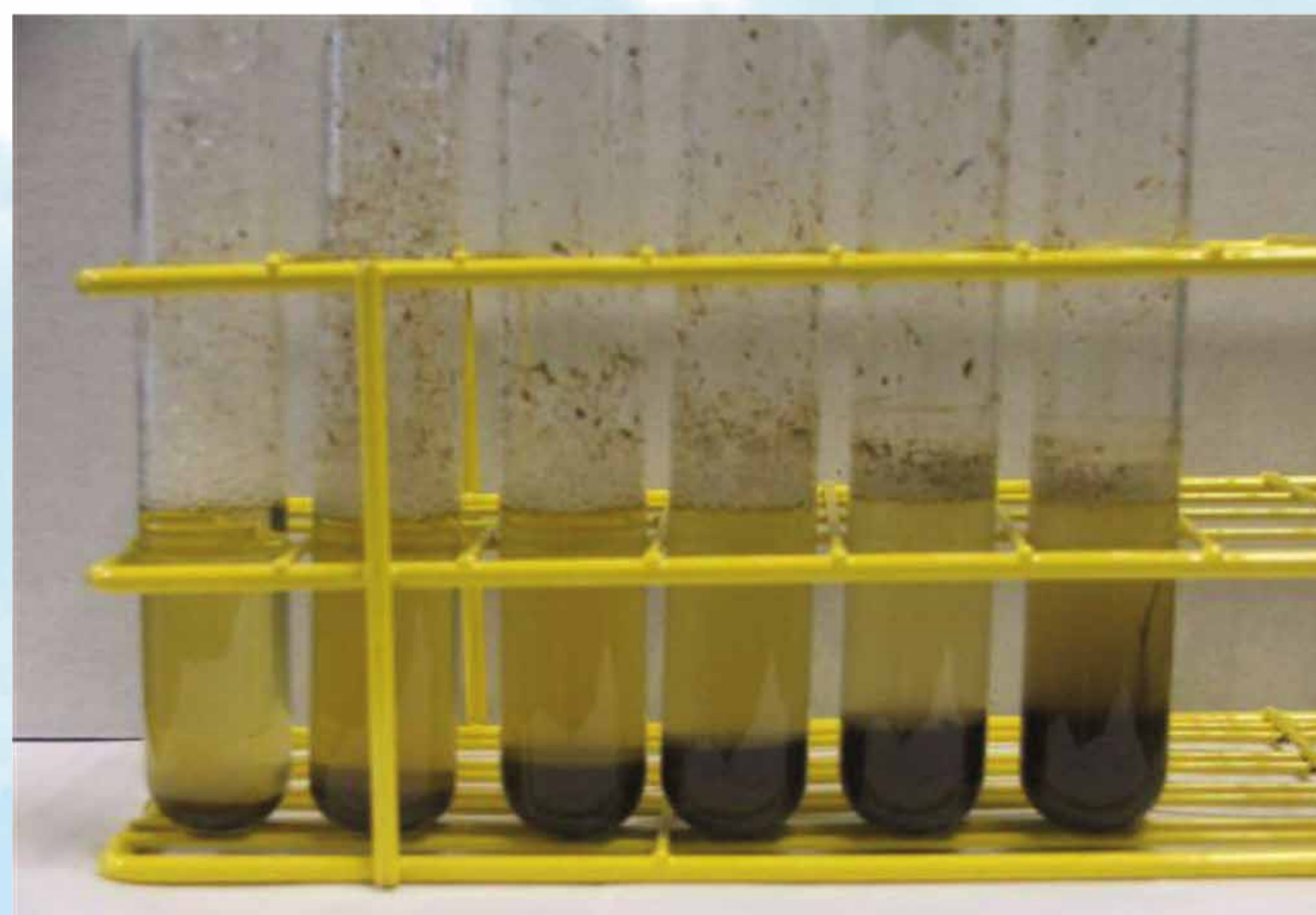
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## Introduction

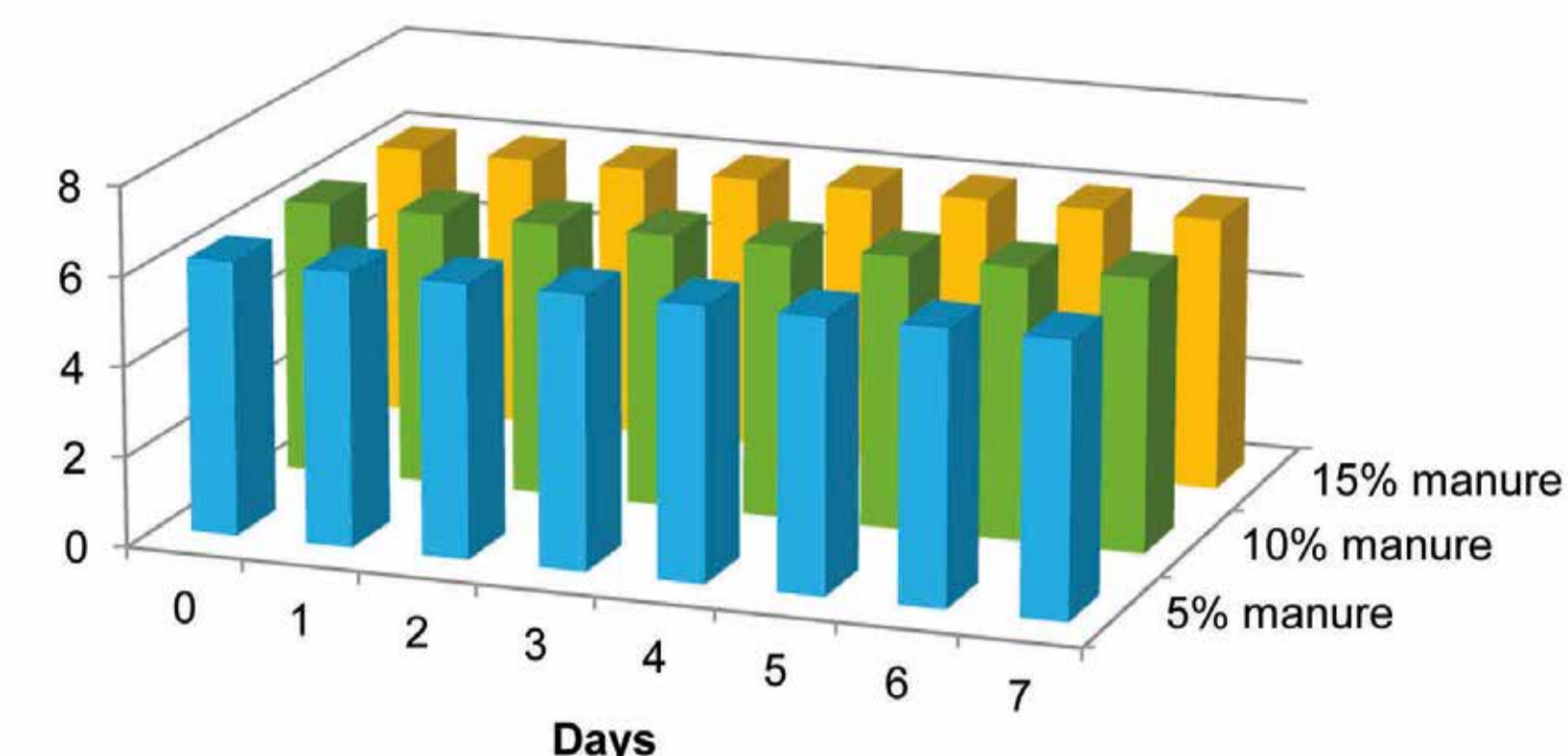
- The use of hoof baths is a common practice to prevent digital dermatitis on dairy farms.
- Because cows deposit urine and manure as they walk through the hoof bath, the efficacy of the active components present in sanitizers could be compromised.
- Previous in vitro studies (1) have shown the hoof bath product 4Hooves™ to tolerate manure and soil for about 200 cows.
- Maximum efficacy was maintained in the presence of 20% manure against *S. aureus* and *E. coli*
- Very low MIC and MBC at 5ppm and 10ppm of the active ingredient resp. were determined against treponemas (2) in the presence of 20% manure
- On small farms with fewer animals, the farmer may opt to keep the hoof bath solution unchanged for a few days before reaching the 200 cows recommendation.
- Objective of this study was to determine the efficacy of the product after continuous exposure to manure for up to 7 days

## Material and Methods

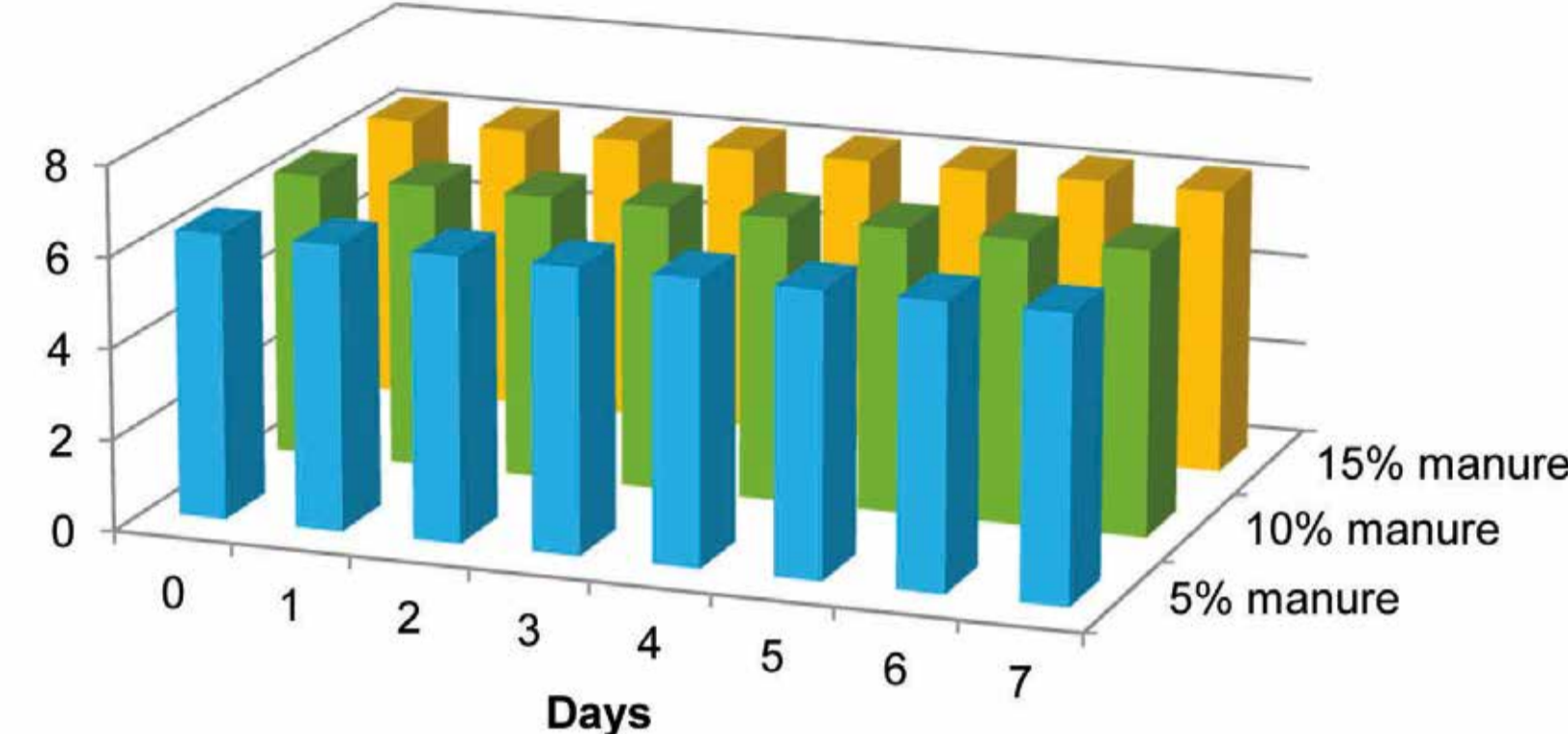
- 1% solution of 4Hooves™ (DeLaval) was prepared with hard water (300ppm CaCO<sub>3</sub>).
- The solutions were put in contact with 5%, 10% and 15%(w) of fresh manure from the field with authentic fecal bacteria.
- At 24hour intervals, aliquots of solutions were sterile filtered, and placed in the freezer until the end of the seven day study.
- After day 7 all solutions were tested using a modified EN1656 (3) test under heavy soil conditions, at ambient temperature, 5 minutes contact time, following the pathogens *S. aureus*, *P. aeruginosa*, *E. hirae*, *P. hauseri*.



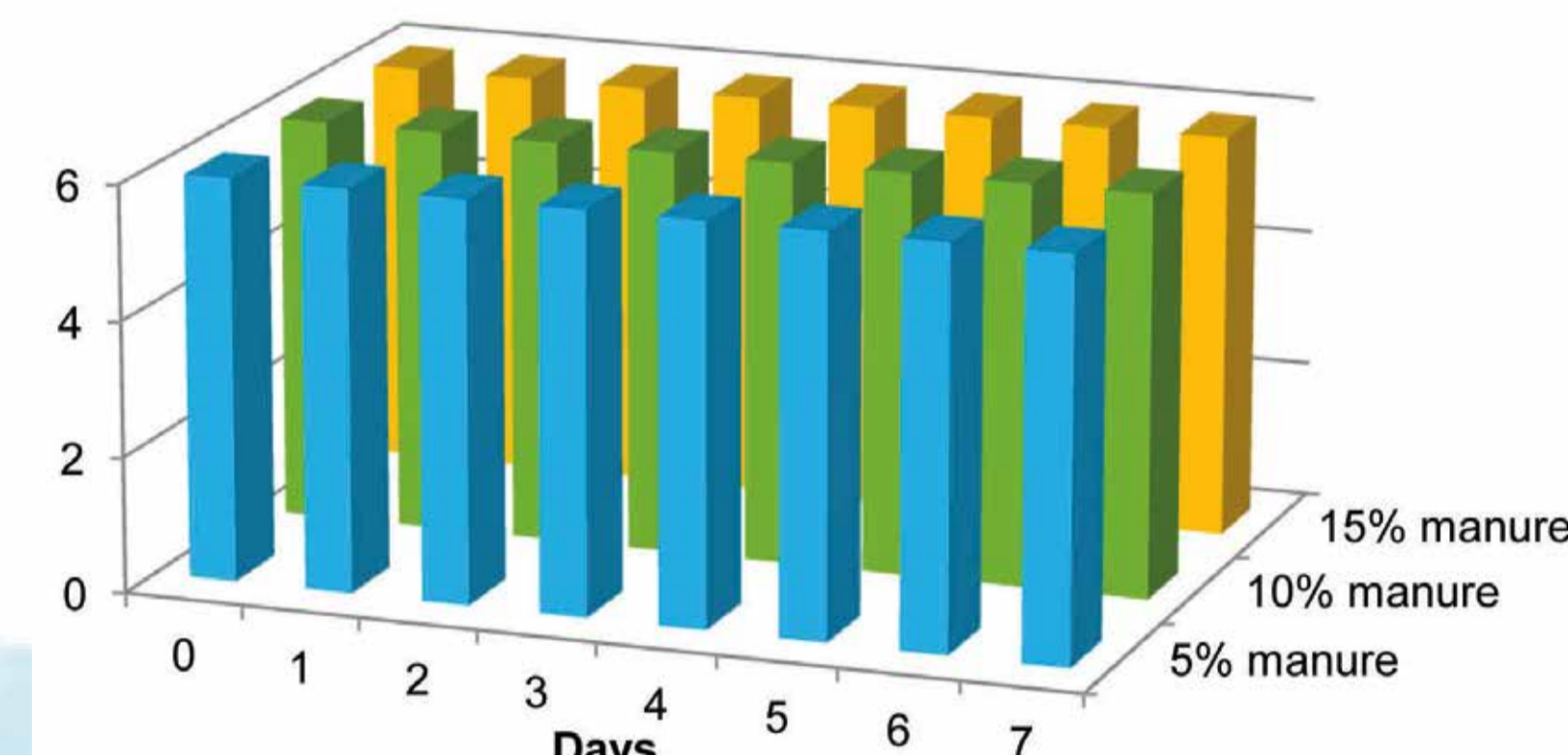
Log reduction (EN 1656) 5 min, RT, heavy soil, *S. aureus*



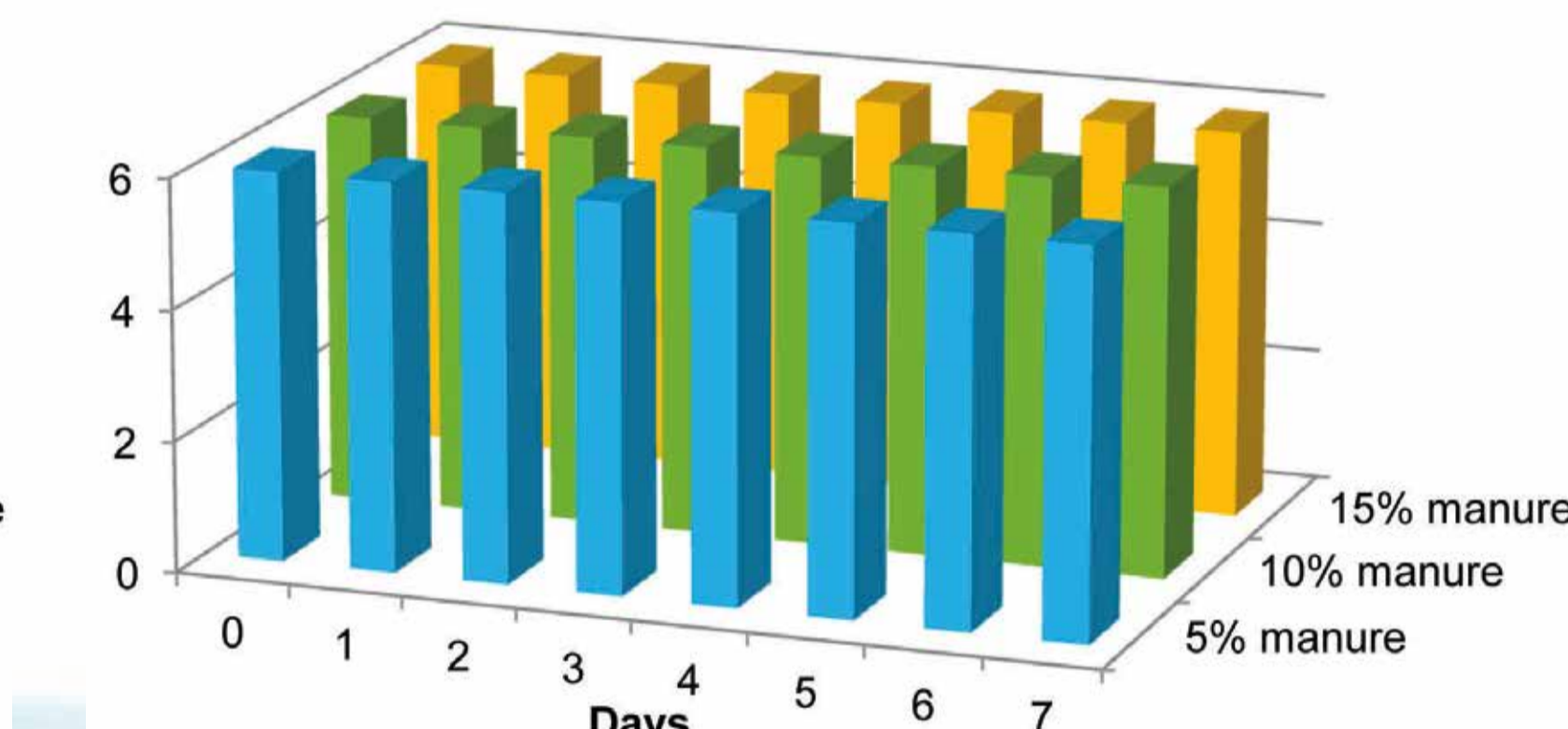
Log reduction (EN 1656) 5 min, RT, heavy soil, *E. hirae*



Log reduction (EN1656) 5 min, RT, heavy soil, *P. hauseri*



Log reduction (EN1656) 5 min, RT, heavy soil, *P. aeruginosa*



## Results and Conclusions

- In this study we show again that 4Hooves™ retains its excellent antimicrobial efficacy even after being in contact with manure and organic soil for 7 days. The data shows complete kill at all conditions for all pathogens.
- The germicidal efficacy of 4Hooves™ is not compromised by exposure to non-sterilized manure of up to 15% solids and for up to 7 days.
- Field recommendations for product usage should take into account the inevitable soiling of the hoof bath due to manure deposition. Timely refreshing of hoof bath solutions will ensure adequate germicidal activity is maintained.
- This study shows that, for small farms, having the same hoof bath solution over a couple of days will be satisfactory and that the efficacy of the product is not lost.



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**References:**  
<sup>1</sup> Buchalova M, Lindell KH, Skender A, Lopez Benavides MG, 2011. Germicidal efficacy-in-use of hoof bath products in: 16th Symposium and 8th Conference on Lameness in Ruminants, 28 February–3 March, Rotorua, New Zealand p154.  
<sup>2</sup> Hartshorn RE, Thomas EC, Anklam K, Lopez-Benavides MG, Buchalova M, Hemling TC, Döpfer D, 2013. Short communication: Minimum bactericidal concentration of disinfectants evaluated for bovine digital dermatitis-associated *Treponema phagedenis*-like spirochetes, *Journal of Dairy Science* 96, pp 3034-3038.  
<sup>3</sup> Chemical disinfectants and antiseptics - quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in veterinary field - test method and requirements (phase 2, step 1). 2000. pp 1-31 in EN 1656.