

Intra Hoof-fit Bath: the only proven preventive footbath protocol



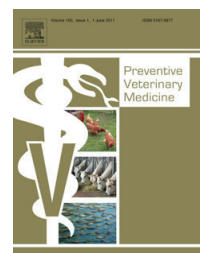
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March 2019

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The University of Calgary has compared 13 global published studies on foot bath products in a meta-analysis. These studies were all executed after 2002. By statistical analysis, they compared which products were significantly better than its reference (control) on prevention as well as on treatment of Digital Dermatitis (DD). Some studies were using raw materials in the footbath such as formalin, copper sulphate, peracetic acid, acidifiers and glutaraldehyde, while other studies included branded products such as Thymox, DoubleAction, Digiderm, Klingonblue, Dragonhyde, Virocid, Provita and Intra Hoof-fit Bath. A summary of this publication is available on next pages.

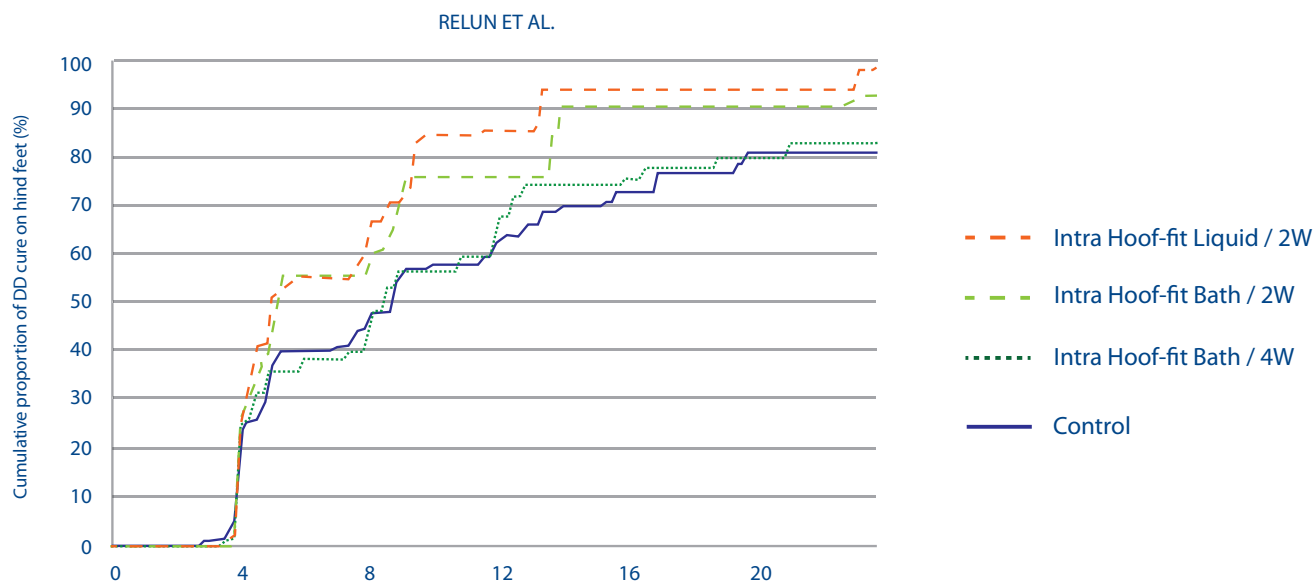
From these studies it can be concluded that:

- Intra Hoof-fit Bath is the only foot bath product that has scientifically shown to be significant in prevention as well as treatment of DD. None of the other raw materials or branded products showed a significant effect on both.
- Intra Hoof-fit Bath has realised its remarkable results based on a low frequency of usage. According to the study it is significant for prevention of DD when using the bath 4 consecutive milkings every 4 weeks and is significant for treatment of DD when using the bath 4 consecutive milkings every 2 weeks. This study has been the reason to advise an usage of 2 times during 2 days every 2 weeks in the protocol to use Intra Hoof-fit Bath.
- The study on Intra Hoof-fit Bath belonged to the studies with the longest duration, gathering data for 6 months. The study showed that no re-infection occurred during this half year period.

The study on Intra Hoof-fit Bath by Relun et al. was published in the Journal of Dairy Science, 95(7), 3722-3755. During a period of 6 months, 4.677 dairy cows in 52 farms (with endemic DD) were involved. 4 different treatment regimens were followed:

- No collective treatment, only M2 antibiotic treatment (= control)
- Intra Hoof-fit Bath, twice a day for 2 consecutive days, every 4 weeks (= FB/4W)
- Intra Hoof-fit Bath, twice a day for 2 consecutive days, every 2 weeks (= FB/2W)
- Intra Hoof-fit Liquid, once a day for 2 consecutive days, every 2 weeks (= CS/2W)

Assessing the curative effectiveness led to the following results:



Although Intracare is advising Intra Hoof-fit Bath to prevent and care, the Relun study confirms its significance in prevention and treatment, with long lasting efficacy at a low frequency of use.

Effect of footbath protocols for prevention and treatment of digital dermatitis in dairy cattle: a systematic review and network meta-analysis

By: C. Jacobs, C. Beninger, G.S. Hazlewood, K. Orsel, H.W. Barkema, accepted manuscript
Summary by Intracare B.V.

Introduction

Footbathing is the most common herd-level control method for Digital Dermatitis (DD); however, numerous products are used in varying concentrations and frequencies. Copper sulphate (CuSO₄) and formalin are the most common, however, CuSO₄ leads to ecotoxicological problems due to soil accumulation and was therefore banned from footbath applications in the EU since January 2016. Furthermore, there is little scientific evidence for its efficacy. Formalin has been officially declared carcinogenic. Therefore, there is a need for alternatives. The aim of this systematic review was to evaluate the evidence of footbath protocols with varying doses, products, and frequencies for the treatment and prevention of DD and use a network meta-analysis to compare the efficacy of footbath protocols reported in the literature.

Material and methods

All controlled clinical trials that assessed walk through footbath protocols for the prevention or treatment of DD in dairy cattle with a comparator group were included. Studies assessing antibiotic footbath treatments were excluded, based on the desire to discontinue use of antibiotics and that these practices are not supported by European Union policies. For all included studies bias was assessed and the Odds Ratios (OR) with 95% confidence intervals (CI) for prevention or treatment of DD were extracted or calculated. A random-effects Bayesian network meta-analysis was conducted to inform pairwise comparative efficacy of footbath protocols for prevention and treatment of DD.

Explanation to interpret the figures on the next page:

- The OR is a measure of association between an exposure (footbath product) and an outcome (prevention or treatment of DD).
- The bars in figure 1 and 2 represent the CI or the OR. If the whole bar is higher than 1.0, there is a significant improvement on the prevention/treatment of DD. These bars are coloured green. If the bar is not completely above 1.0, there is no significant improvement and the bar is coloured red.
- A wide CI (a long bar) relates to less accurate measurements, while a short CI relates to a higher accuracy.

Results

Multiple studies included appropriate information to be included in the network meta-analysis which represented 15 unique antibiotic free footbath products, including 2 experimental products. Annex 1 shows the reported ORs for prevention and treatment of DD with their corresponding footbath protocols. Figures 1 and 2 show graphically which OR values are significant: the products represented by a green bar.

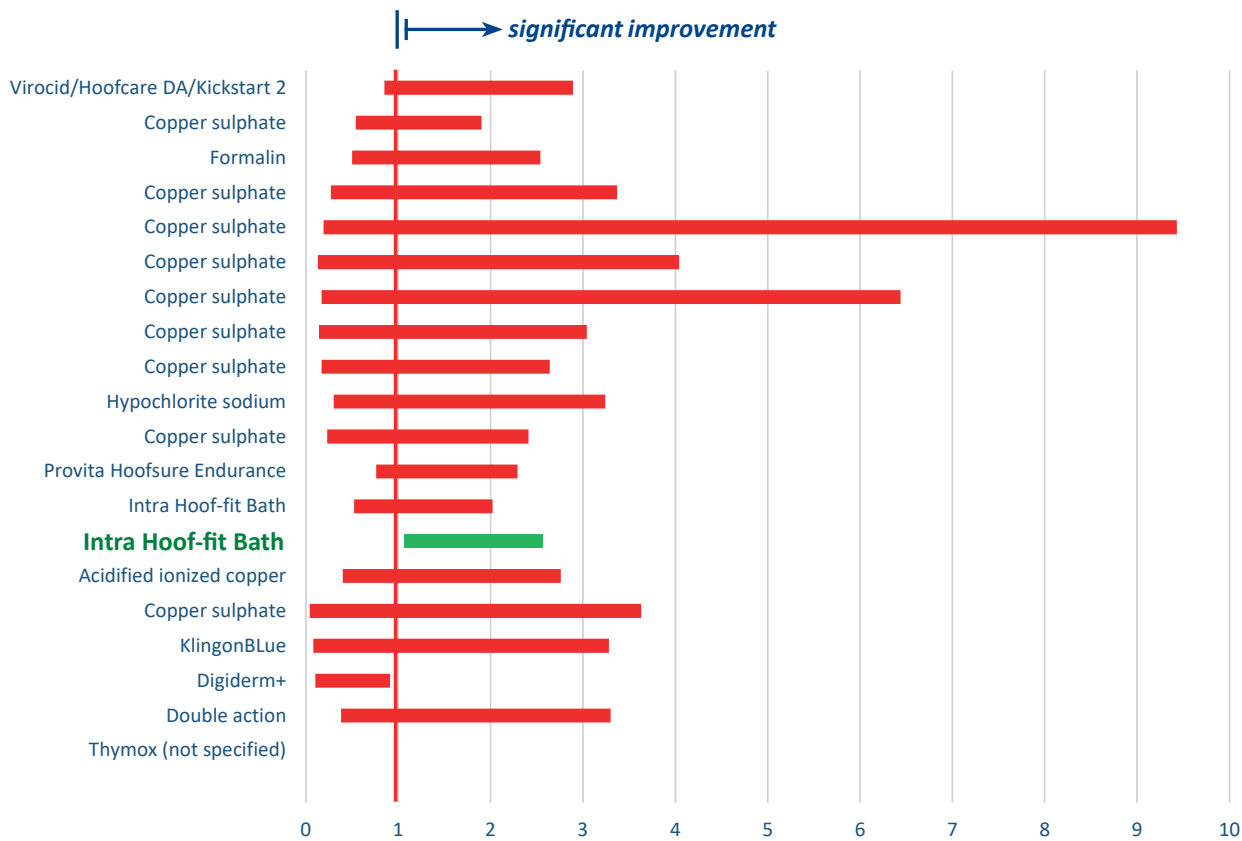


Figure 1. The OR confidence intervals per product on the prevention of DD.

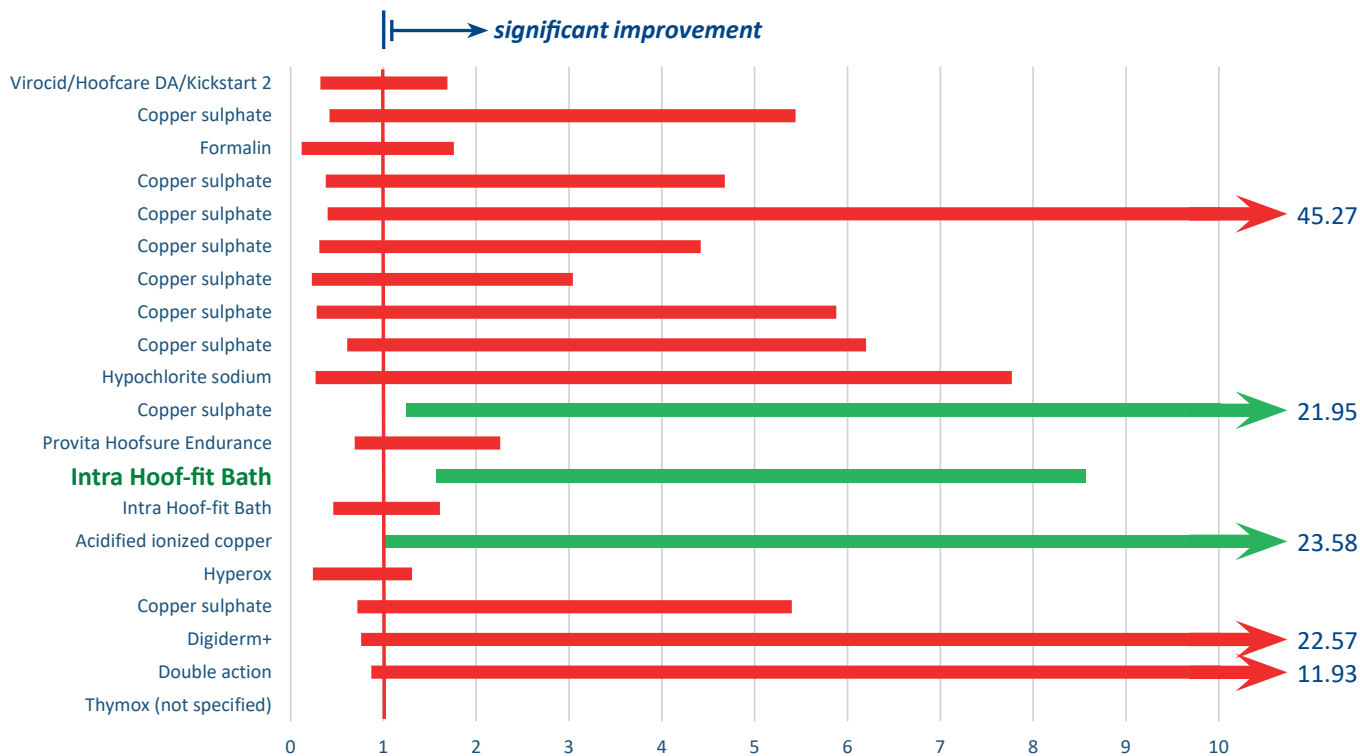


Figure 2. The OR confidence intervals per product on the treatment of DD. The cut-off value for the bars is set at 10. The upper confidence interval limit for the 5 products which exceeded 10 are shown next to the bars.

Prevention of DD

Only 1 study (Relun et al., 2012) reported a benefit for the prevention of DD using a footbath protocol. The reported OR of 1.26 (CI: 1.06 – 1.50) for Intra Hoof-fit Bath was the only significant OR for the prevention outcome (reference: untreated controls). This means that by using Intra Hoof-fit Bath, the odds for preventing DD is 1.26 times higher.

Treatment of DD

3 studies (Manske et al., 2002; Speijers et al., 2010; Relun et al., 2012, respectively) reported a benefit for the treatment of DD using a footbath protocol. The 3 significant OR values correspond to the following:

- 4.58 (CI: 1.03 – 23.58) for acidified ionized copper
- 4.74 (CI: 1.24- 21.95) for CuSO₄
- 3.19 (CI: 1.57 – 7.00) for Intra Hoof-fit Bath

Meta-analysis

In the network analysis for prevention of DD none of the pair-wise active treatment comparisons reached statistical significance. In the analysis for treatment of DD only CuSO₄ ≥ 5% used ≥ 4 times/week was superior to no treatment. As previously mentioned, CuSO₄ footbaths are illegal in the EU due to ecotoxicological problems.

Discussion and conclusion

As prevention of hoof diseases is the main goal for footbath applications, the prevention of DD can be seen as the most important parameter. For the prevention of DD by a footbath protocol, only a significant improvement was reported for Intra Hoof-fit Bath.

For the treatment of DD by a footbath protocol, significantly positive values for acidified ionized copper, CuSO₄ and Intra Hoof-fit Bath have been reported. However, footbaths should not be confused with topical applications, who have as goal to treat DD.

There were several aspects who were unequal in the included studies: follow up period, dimensions of the footbath used, number of cow passes per footbath and risk of bias. This increases the difficulty in comparing different products. Therefore, future research should include standardized protocols for frequency, concentration, footbath dimensions, number of cow passes, follow up period and clear descriptions of DD lesions with case and success definitions.

Annex 1: Overview of studied footbath protocols

Study	Footbath Product	Number of treatments per week	Duration of the study (weeks)	OR (95 % CI) for prevention of DD	OR (95 % CI) for treatment of DD
Bergsten et al. (2006)	Hoofmat water	14	16	Reference	Reference
	Hoofmat 7% CuSO ₄	14		-	-
	No treatment	0		Reference	Reference
	Foam system: tensiden and paracetic acid	14		-	-
Cramer & Benavides (2012)	5% formalin	3	8	Reference	Reference
	Experimental H	5		0.48 (0.27-0.84)	NS
	Experimental P	5		0.55 (0.32-0.92)	NS
Döpfer et al. (2013)	5% CuSO ₄	3	12	Reference	Reference
	1% Thymox	3		NS	NS
Goossens & Hemling (2007)	5% CuSO ₄	5	24	Reference	Reference
	2% DoubleAction	5		1.05 (0.38-2.92)	3.09 (0.87-11.93)
Holzhauer et al. (2012)	4% Formalin	2	16	Reference	Reference
	Digiderm+	10		0.31 (0.10-0.81)	3.58 (0.76-22.57)
Klaas et al. (2008)	Empty footbath	0	4	Reference	x
	KlingonBlue	1		0.57 (0.08-3.20)	
	Empty footbath	0		Reference	x
	7.5% CuSO ₄	1		0.47(0.04-3.59)	
Laven & Hunt (2002)	6% formalin	7	3	x	Reference
	2% CuSO ₄	7		x	1.80 (0.72-4.68)
	1% peracetic acid (Hyperox)	7		x	0.51 (0.24-1.07)
Manske et al. (2012)	Water	9	24	Reference	Reference
	0.6% acidified ionized copper	9		0.97 (0.40-2.36)	4.58 (1.02-23.58)
Relun et al. (2012/2013)	No footbath	0	24	Reference	Reference
	5% Intra Hoof-fit Bath	1		1.26 (1.06-1.50)	0.73 (0.46-1.15)
	5% Intra Hoof-fit Bath	2		0.65 (0.52-1.50)	3.19 (1.57-7.00)
Smith et al. (2014)	5% CuSO ₄	5	9	Reference	Reference
	3% Provita Hoofsure Endurance	5		1.08 (0.76-1.53)	1.04 (0.69-1.57)
Speijers et al. (2010)	No footbath	0	10	Reference	Reference
	5% CuSO ₄	4		0.72 (0.23-2.18)	4.74 (1.24-21.95)
	2% ClO ⁻ hypochlorite sodium	4		0.93 (0.30-2.94)	1.37 (0.27-7.50)
	2% CuSO ₄	4		Reference	Reference
	5% CuSO ₄	4		0.68 (0.17-2.47)	1.83(0.61-5.59)
	2% CuSO ₄	2		Reference	Reference
	5% CuSO ₄	2		0.63 (0.14-2.90)	1.25(0.28-5.60)
	5% CuSO ₄	2		Reference	Reference
	5% CuSO ₄ , alt. weekly with 10% NaCl	4		1.04 (0.17-6.27)	0.81 (0.23-2.81)
5% CuSO ₄ , alt. weekly with tap water	4	0.74 (0.13-3.91)	1.13 (0.31-4.11)		
Speijers et al. (2012)	5% CuSO ₄	4	14	1.24 (0.19-9.24)	1.43 (0.40-45.27)
	5% CuSO ₄	2		Reference	Reference
	5% CuSO ₄	2		0.92 (0.27-3.10)	1.27 (0.38-4.30)
	5% CuSO ₄	1		Reference	Reference
Teixeira et al. (2010)	5% formalin	2	2	1.01 (0.50-2.04)	0.46 (0.12-1.64)
	5% Dragonhyde	2		Reference	Reference
	10% CuSO ₄	2		0.86 (0.54-1.36)	1.43 (0.42-5.02)
	5% Dragonhyde	2		Reference	Reference
Thomsen et al. (2008)	No footbath	0	1	Reference	Reference
	1.5% glutaraldehyde (Virocid)	4		1.31 (0.85-2.04)	0.66 (0.32-1.37)
	2% quaternary ammonium compounds (Hoofcare DA)	4			
	1% organic acids (Kickstart 2)	4			

IntraHoof-fit

Intra Hoof-fit Solves your Hoof problems

- Supports farmers in keeping the hooves healthy
- Highly effective
- Strong adhesion to the hoof
- User friendly
- Contains no formalin or antibiotics



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