

Effectiveness of different footbath solutions in the treatment of digital dermatitis in dairy cows

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Introduction Digital dermatitis is a world-wide problem in dairy herds that accounts for approximately 20-25% of all cases of lameness (Laven, 2003). It is not only a serious welfare issue in dairy herds, but it also has serious financial implications. For example, each case of digital dermatitis is estimated to cost between £75-£82 in the UK (Esslemont, 2005). Often the most practical solution for controlling dermatitis is group topical therapy (i.e. footbathing). For this to be successful, an effective antibacterial product needs to be used. Neither antibiotics nor formalin can be recommended for use in footbaths. This is because antibiotics are expensive and their long-term use may lead to increased antibiotic resistance in cattle, and because formalin is both toxic and carcinogenic. Copper sulphate solutions are used extensively in footbaths for cattle, but long-term use may have adverse effects on the environment through increasing soil copper levels. The aim of this study was to compare the effectiveness of different footbathing regimes using different copper sulphate concentrations in the treatment of digital dermatitis.

Material and methods Lactating cows (n = 120) from the experimental herd at the Agri-Food and Biosciences Institute were allocated to one of four treatment regimes: 1) weekly footbathing with 5% copper sulphate (n = 40), 2) weekly footbathing with 2% copper sulphate (n = 40), 3) fortnightly footbathing with 5% copper sulphate (n = 20), or 4) fortnightly footbathing with 2% copper sulphate (n = 20). The cows were balanced for experiment, milk yield, body weight and condition score. Cows allocated to the weekly footbathing regime had on average a high prevalence of active digital dermatitis (DD) at start of the trial (>60%), whereas cows allocated to fortnightly footbathing had a lower prevalence of active DD (≤25%). During the study period (7 weeks) the cows walked through a water bath and then the allocated footbath solution on four consecutive milkings (weekly or fortnightly, respectively). Digital dermatitis was scored on the hind claws of all animals during milking on a weekly basis using a 5-point nominal scale developed by Döpfer *et al.* (1997). The data were analysed as binomial repeated measures analysis using GenStat. Only active lesions (i.e. early stage lesions and painful classical ulcerative stage lesions) are presented. For each cow DD lesions were scored as 'healed' when lesions were improving or became absent on both left and hind feet, and as 'not healed' when either or both hind feet had lesions that were getting worse or not improving.

Results For cows on the weekly footbathing regime (i.e. with high levels of DD) the prevalence of active DD lesions decreased faster when the 5% rather than the 2% copper sulphate solution was used (See Fig 1). Significantly improved healing of DD lesions was also shown with the weekly 5% rather than 2% copper sulphate footbathing regime (P<0.05). For cows on the fortnightly footbathing regime (i.e. with low levels of DD) there was no significant difference in number of active lesions, or in healing of lesions, between the 2% and 5% copper sulphate solutions (P>0.05).

Table 1 Proportion of cows that showed healing of DD lesions on different footbathing regimes.

Regime	CuSO ₄ 5%	CuSO ₄ 2%	SED
Weekly	0.65 ^b	0.50 ^a	0.054
Fortnightly	0.63	0.60	0.054

Rows with different superscripts are significantly different at P<0.05

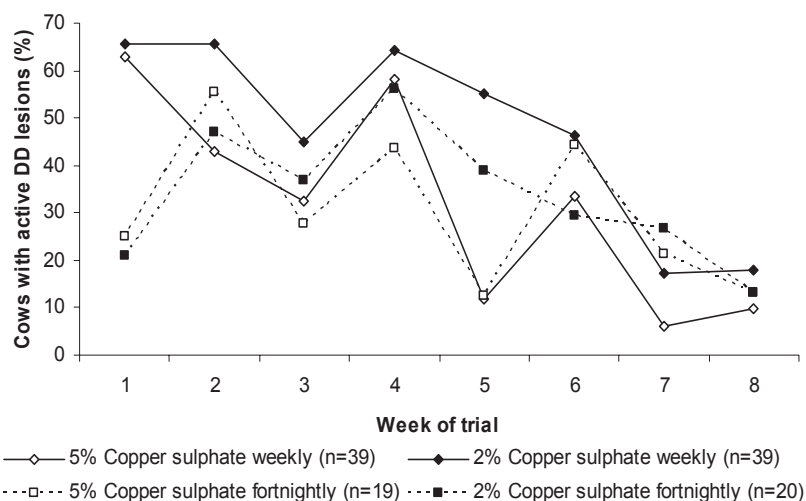


Figure 1 Percentage of cows with active digital dermatitis (DD) lesions on the different footbathing regimes.

Conclusions It is more effective to treat herds with a high prevalence of digital dermatitis with a 5% rather than a 2% copper sulphate solution in a weekly footbathing regime. It appears that when prevalence of digital dermatitis is medium (i.e. 25% of the herd with active digital dermatitis lesions), fortnightly footbathing with 5% or 2% copper sulphate will control the disease.

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