

# Footbath alternatives

by Nigel B. Cook

WITH THE price of copper sulfate escalating to more than \$70 per bag, many dairies are looking for ways to reduce footbath costs. A 60-gallon bath for 200 cows requires 25 pounds of copper sulfate (costing \$1.50/lb). That works out to \$37.50 per bath or almost 19 cents per cow, so there are now plenty of other economic options for footbaths. However, there seems to be some confusion about what different chemicals do, so it is perhaps timely to review footbath goals.

## Treatment or prevention?

Let me be very clear: Footbaths are used for prevention, not treatment of active painful lesions. Lameness cows with heel warts must be identified through locomotion scoring and be individually examined. Top-

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ical antibiotic therapy with a light wrap is the mainstay of treatment.

Think of footbathing feet for the control of heel warts similar to the use of teat dip for the control of contagious mastitis. It does not treat active infections, it helps control the spread of infection from cow to cow. For that reason, in most free stall barns footbaths must be used frequently – but there is dairy-to-dairy variation depending on hygiene.

## Hygiene determines frequency

The more manure contamination on cows' lower legs, the more frequently we must footbath. While some dairies with excellent leg hygiene may use a footbath only once a week, others must footbath 5 to 7 days per week.

Use a hygiene scoring assessment to determine frequency. Score the manure accumulation on the hoof and leg of rear feet on a four-point scale such as the one shown here.

In herds with fewer than 25 per-

cent of cows scoring 3 or 4, footbathing can be done as needed. Heel warts are rarely a problem. Conversely, where herds are 75 percent or more 3 and 4 scores, then footbathing is probably a necessity every day.

Typically footbaths can be run once or twice a day, even in 3x milking herds. But if the footbath is not in use, cows **must** be able to bypass it and not walk through a pit of manure. If there is no way around the bath, put something in it!

Cows appear to be more susceptible to heel wart infection in early lactation, so the final footbath frequency for groups within a herd can be manipulated.

For example, the closeup group can be footbathed once a week if we push cows through a bath at least twice. Early lactation cows should be footbathed at the maximum frequency determined by leg hygiene. Late lactation cows may be footbathed at 50-75 percent of the tar-

get frequency in order to save on chemical costs.

## Footbath location and design

Footbaths are often poorly designed and located. The best places for them appear to be in transfer lanes between the holding area and the pens, and in return lanes on either side of the holding area. In return lanes, make sure baths are located two thirds of the way down from the parlor so cows don't create a jam leaving the milking area.

Twin baths are optional. If a wash bath is used it should be located 4 to 6 feet in front of the treatment bath. Wash baths immediately adjacent to treatment baths allow for carryover of wash solution into the treatment bath as cows splash through, diluting active concentration of chemicals.

The treatment bath should allow for at least a 5-inch depth of solution and be at least 8 feet long, but preferably 10 feet. Width is deter-



## Footbath concentration calculator

footbath example: 8' long x 3' wide x 5" deep x 7.46 gals/cubic foot = 74.6 gallons

	chemical	solution	dose		lbs/bath	qts/bath	sachets/packs per bath
			qts/gal	g/gal			
1	copper sulfate	5%			31.1		
2	copper sulfate	10%			62.1		
3	Copper Hoof		0.04			3.0	
4	Footbath Booster + Copper (Dairy Solutions, Inc.)	3.2%	0.07		19.9	5.2	
5	Golden Hoof (Zinc)	10%			62.1		
6	zinc sulfate	5%			31.1		
7	zinc sulfate	10%			62.1		
8	Super Zinc (FarmRite)	10%			62.1		
9	Rotational Zinc (SSI)		0.04			3.0	
10	Hoof-Zink (Garco)		0.12			9.0	
11	Hoofsure Endurance (Provita)	1%	0.04			3.0	
12	37% formalin	0.5%	0.02			1.5	
13	37% formalin	2%	0.08			6.0	
14	37% formalin	3%	0.12			9.0	
15	37% formalin	5%	0.20			14.9	
16	New-Hoof Concentrate		0.02			1.5	
17	Double Action (West Agro)		0.08			8.0	
18	Victory (Westfalia)		0.02			1.5	
19	HoofPro+ (SSI)		0.04			3.0	
20	mild soap		0.04			3.0	
21	hydrated lime	6%			37.3		
22	rock salt	6%			37.3		
23	Lincomix 16g	0.01%		0.46			2.1
24	Lincomix 16g	1%		4.6			21.4
25	Oxytetracycline 102.4g	0.1%		3.94			2.9
26	Oxytetracycline 102.4g	0.8%		31.5			22.9
27	Bovi-Foam				no specific dose		
28	Kovax Foam				no specific dose		

**“Our current rules of thumb are that chemicals do not remain active for much more than 200-300 cow passes. The cleaner feet are and the shorter the period of time over which the group passes through the bath, the more effective the chemical will be.”**

## Hoof & leg hygiene scoring chart

(score at least 20% of cows in each pen)

- Score 1** – Legs and feet are clean; little or no manure contamination of lower limbs.
- Score 2** – Legs and feet are slightly dirty; lower limbs are lightly splashed with manure.
- Score 3** – Legs and feet are moderately dirty; there are distinct placques of manure on the foot, progressing up the leg.
- Score 4** – Legs and feet are very dirty; there are confluent placques of caked-on manure on the foot and higher up the lower leg.

### Scoring interpretation:

proportion of cows scoring 3 and 4	comment	suggested foot bath frequency
less than 25%	good	as required
25 to 50%	fair	2 days per week
51 to 75%	poor	5 days per week
over 75%	very poor	7 days per week

mined by the width of the alley. The floor of the bath should not be excessively rough, but it should be non-slip.

#### **Cleaning agents vs. disinfectants**

Footbath solutions may help clean the foot of manure and disinfect the interdigital space. Do not confuse the two actions.

Solutions of hand soap or rock salt are probably primarily cleaning agents; they loosen manure on feet and allow oxygen to get into the interdigital spaces. They can be used in the footbath program, but should probably not be the only chemicals used.

Other chemicals are disinfectants. These are traditional copper and zinc sulfates, formalin, quaternary ammonium compounds, and a range of commercial products. Footbath programs should always contain one or more disinfectants.

Antibiotics should only be used in outbreak situations where the infection rate must be brought under control. In these situations Lincomycin or Oxytetracycline can be used extra-label **under veterinary direction** for a short period of time (3 to 6 milkings) and then a disinfectant can be used to maintain the improvement.

In designing a footbath program, cleaning agents can be used for one third to half of the time, then other disinfectants can be used for the remainder of the baths.

Most chemicals are active for around 200 cow passes. Formalin may last 300 cow passes, while other chemicals may last only 150 passes. Activity will also depend on the amount of manure contamination. The most common footbath chemicals used on dairies are listed in the accompanying table, along with dose rates for a 75-gallon bath.

#### **Replacements for copper sulfate**

There are two approaches to take when seeking a replacement for copper sulfate in footbaths:

1. Use less copper sulfate.
2. Use something else.

We can use less copper sulfate by substituting a cleaning agent for some of the baths instead of using copper. Liquid hand soap or rock salt are commonly used. We can also use additives to the copper sulfate that permit lowering the effective concentration. Two commercial products I'm aware of allow the copper to dissolve and become more available, reducing the effective concentration to around 2 to 4 percent instead of 5 to 10 percent.

There are also several other chemicals to choose from. The cheapest is probably formalin, but be careful. This is a carcinogen and very careful handling is required. Use of the chemical on dairies is probably difficult to justify, but it is effective. If formalin is used, use a step-up program, such as 2 percent during week one, 3 to 4 percent during week two, 5 to 6 percent during week three, and then

return to 2 percent for control.

Several other commercial products also appear to be efficacious.

Zinc sulfate is a viable alternative that is efficacious, but the main complaint is it dissolves poorly, especially when used at the preferred 10 percent concentration. There are several commercial products available; the most recent one being a liquid zinc chloride which is much easier to handle on the dairy and there are good reports of efficacy in the field.

#### **Disclaimer**

Because of the lack of data on many of the footbath products commonly used, the information provided here has come largely from field experiences rather than rigorous scientific study.