Footbaths of the future

Recently completed research suggests a deeper and longer bath keeps solution in and your money out. It also concludes that the prebath of water theory should be disregarded.

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Footbath protocols are an integral component of infectious hoof disease control in free stall systems. Topical application of antibacterials such as copper sulfate, formalin, zinc compounds, and other disinfectants have been shown to aid the control of foot rot and digital dermatitis (heel warts). The footbath is a simple mechanism for treating large numbers of cattle quickly and efficiently.

Therefore, it is perhaps surprising that there is very little sound, scientific information on optimal hoof bath design. A common design is for the treatment bath to be preceded by a wash bath full of water and for each bath to contain about 50 gallons (190 liters) of solution. Wash baths do not keep the treatment bath — meaning that we are disinfecting the bath — so perhaps now is the time to question dogma and develop new guidelines, based on sound, scientific advice.

Should I use a water bath?

Proponents of putting a water (wash) bath in front of the treatment bath claim that they stimulate defecation in the prebath. They insist that this leaves the treatment bath cleaner and that water baths clean the foot before it enters the treatment bath. If we are serious about cleaning off feet, several days of bathing with a surfactant such as liquid hand soap or rock salt would probably be more effective. For that, a single bath will suffice.

Use of a water bath has two other significant problems. First, when they are located immediately adjacent to the treatment bath, the water from the wash bath is transferred to the treatment bath. This dilutes the antibacterial being used as the cows pass through the baths, potentially reducing efficacy.

Second, use of a water bath adds a significant amount of water volume to the manure storage. The Wisconsin blueprint recommends that: footbaths have a 10-inch (26 cm) step-in height. It is also hard to believe that a single immersion in water significantly cleans off the cow’s foot before it enters the treatment bath. If the bath is 10 feet (3.0 m) long and 36 inches (0.9 m) wide, we would not be able to fill the bath to a 3- to 4-inch depth and still have sufficient water to the manure storage. The Wisconsin Blueprint recommends that no wash bath is included in the footbath design.

What dimensions should I use?

Length is the critical dimension for footbaths. It determines the number of foot immersions that occur as the cow walks through the bath. At the typical length of 72 inches (1.8 m), half of the rear feet receive only one immersion as the cow walks through the bath — meaning that we are disinfecting one rear foot half as much as another. If transfer of chemical to the foot is important, we would suggest that footbath length should optimize the number of foot immersions.

From a behavioral study trial, the probability of rear feet receiving at least two immersions as a cow walks through the bath increases from 53 percent at 6 feet (1.8 m), to 84 percent at 8 feet, (2.4 m) to 96 percent at 10 feet (3.0 m). That means we need a footbath at least 10 feet long to ensure that all feet receive a minimal step-in height filled to 3.5 inches of chemical to all cows as cows walk through the bath. A 12-foot (3.7 m) bath achieves a significantly greater proportion of feet receiving at least three immersions compared to the 10-foot (3.0 m) bath.

The disadvantage of making the bath longer is that the volume and required amount of chemical increases if we don’t change the other dimensions.

In the same study, we also changed step-in height and bath width. Step-in heights of 5 and 10 inches (13 and 26 cm) were tested, and we found that the cows tolerated the reduced width. We wanted not to go below 20 inches and just for ease of throughput preferred 24 inches (0.6 m). The Wisconsin Blueprint recommends that footbaths be 10 to 12 feet (3.0 to 3.7 m) long.

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In summary, a bath 12 feet (3.7 m) long and 24 inches (0.6 m) wide, with 10 inches (26 cm) of step-in height filled to 3.5 inches (9 cm) would contain 52 gallons of solution. This is no more than most of the traditional shorter baths. Side-walls are sloped from a height of 3 feet above the floor of the bath to the upper edge of the bath, and the sides should be enclosed to create a tunnel. The design will promote cow flow through the bath and reduce defecation. Because the bath is a long tunnel, we would advise creating a hinged drop panel on one side of the bath so that, if a cow fell and couldn’t get up, she could be rescued. We are continuing to evaluate recommendations for chemical solutions and number of passes before changing solutions. The answers to those questions are actively being sought at this time.

The Wisconsin Blueprint aims to collect research-supported biological standards with animal well-being as its top priority. Based on the new footbath research, the Wisconsin Blueprint recommends that:

• no wash (water) prebath is included in the footbath design
• footbaths be 10 to 12 feet (3.0 to 3.7 m) long
• footbaths have a 10-inch (26 cm) step-in height filled to 3 to 4 inches deep
• footbaths be 24 inches (0.6 m) wide or wider

THE NEW FOOTBATH MODEL recommends a 10- to 12-foot length, 10-inch depth, 24-inch width, and one removable sidewall. Both sidewalls should be angled in, starting at about 3 feet above the floor of the bath. If not angled, a wider sidewalk distance may be required.

The link below provides access to a footbath calculator that ensures that, whatever chemical is chosen, the correct concentration is provided.