Dairy Section

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Teat Dips and Dry Cow Infusion Products: Efficacy, Use and Misuse

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Teat Dip Problems

Herd A: A mastitis problem in a large herd using a Clorox teat dip. The teat ends were severely eroded. Discussion revealed that the teat dip was actually a chlorine udder wash diluted to 4% chlorine and the excessive alkalinity was burning the teats. *Conclusion: Use only products intended for use as teat dips.*

Herd B: A mastitis problem in a large dairy herd which was on a Clorox teat dip and dry cow therapy program. The dairyman stopped dipping and claimed he had fewer mastitis problems. Further discussion revealed that several months before he had begun using glycerin in the dip to improve skin condition. Unfortunately the resulting chemical reaction produces glyceraldehyde and glucose which support bacterial growth. He was therefore spreading organisms from cow to cow with the "dip." *Conclusion: Never add any other chemicals to a chlorine teat dip.*

Herd C: A mastitis problem in a small dairy herd using a 0.5% iodine teat dip and dry cow therapy. This was one of many unfortunate dairymen who used a .5% iodine solution in a 99.5% petroleum base which was designed to be a good skin conditioner. Studies have shown that the product is ineffective and in fact may increase infection. *Conclusion: Use one of the products which have been thoroughly field tested.*

Herd D: A mastitis problem in a small dairy herd using a 1% iodine teat dip. A bacteriological survey showed that the problem was due to *Streptococcus agalactiae.* An analysis of the situation revealed that he was using a teat sprayer. He was not getting enough teat end coverage to get adequate disinfection. Other experience has shown that it is very difficult to do an effective job with a sprayer. *Conclusion: Do not recommend teat sprayers until a good one is designed and properly field tested.*

Herd E: A mastitis problem in a large dairy herd using a chlorhexidine (Nolvasan) teat dip. In this herd the complaint was that they were not making very rapid progress in reducing mastitis. Chlorhexidine was used n several U.S. studies and has been shown to be nearly as effective as iodine and chlorine if used in the proper concentration. The solution should contain 1% (10,000 ppm) of chlorhexidine. Using it at this concentration makes it the most expensive teat dip on the market. The high cost encourages dairymen to overdilute the solution, greatly reducing its efficacy. *Conclusion: Teat dips must be used in the recommended concentrations.*

Herd F: A mastitis problem in a large herd using a 1% iodine teat dip solution and dry cow therapy. A bacteriological survey of the herd revealed a *Pseudomonas* problem. A check of the spray system used to wash udders and rinse inflations yielded *Pseudomonas.* Source: The quaternary ammonium compound used in the water. Others have indicated similar findings. *Conclusion: Amoid quaternary compounds in udder disinfection.*

Teat Dips - A Summary

Use products on which there is adequate evidence of safety and efficacy. Most water based products can be used with a fairly high degree of confidence that they are efficacious, although this will vary from 40 to 80%. This includes iodophors, all three forms of chlorines, chlorhexidines, hexachlorophenes, quaternary ammoniums and cetylpyridinium. Most iodophor teat dips have emolients in them: Lanolin .05% - 4.0%; Glycerin 3.0% - 9.0%. The addition of more emolient will probably have an adverse affect upon teat dip efficacy.

Beware of oil based teat dips unless there is conclusive evidence of the prevention of new infections under controlled conditions. bi know of no company that has that data. To date all oil based products

have performed poorly, some have actually increased the new infection rate.

I expect FDA in the near future to publish in the federal register that teat dips will be considered as drugs and have to go through the new drug application route.

Mastitis Treatment Problems

Herd 1: A 270 cow herd threatened with being shut off the market because of high leucocyte nounts. *Strep. ag.* infection was assumed to be the problem based on bulk tank milk cultures. The owner was advised to have composite samples from each cow cultured and then treat the infected cows. Because he did not have the cows individually identified and it would be inconvenient to separate the herd, the owner decided to "blitz" treat the entire herd.

The veterinarian provided the owner with multiple dose vitals of intramuscular penicillin-dihydrostreptomycin and directions on how to use the product (10 cc. per quarter twice 12 hours apart following milking). The milk plant offered to run antibiotic tests to determine when the milk could again be shipped.

On the fourth day, after six milkings had been withheld, the dairyman was back on the market and shipping milk. On the fifth day he had seventy cases of acute mastitis with fevers to 107°.

At the end of two weeks 140 cows had had acute mastitis. Eighty of these were improving and looked pretty good, although there was garget in the foremilk. Forty others were still in trouble with hard, caked udders, and cows late in lactation were drying up. Production had dropped from over 10,000 pounds to under 5,000 pounds.

The diagnosis: yeast mastitis. The organism: *Candida sp.* The cause: faulty disinfection, multiple dose products and/or inadequate numbers of sterile teat cannulas resulted in the introduction of environmental pathogens.

This owner had used 300 cannulas to infuse 270 cows twice (he needed 2,160 sterile cannulas) and he had used a disinfectant which was not effective against yeast forms. *Conclusions: 1) don't "blitz" treat if you don't have to; 2) use single dose products; 3) use individual sterile cannulas; and 4) be sure the person infusing the udder understands the necessity of asepsis and disinfection.*

It is possible to initiate a *Strep. ag.* control program that will create a problem worse than the *Strep. ag.* It is possible to embark on a dry cow treatment program that will create a serious mastitis problem. Yeast mastitis is the result of homemade contaminated infusion products or methods of infusion including multiple dose vials and the use of syringes and cannulas.

Yeast mastitis results in a fever (often 105°), a large amount of swelling, a meaty udder and a drastic drop in milk production with a not too severe alteration in the character of the milk. Antibiotic treatment does not affect the course of the disease. Most cows will recover and many of them will return to satisfactory production during the current lactation without treatment.

Herd 2: A large dairy with severe, even gangrenous mastitis at parturition. Cultures yielded *Bacillus cereus* in pure culture which was resistant to penicillin and cloxacillin. It had been introduced as spores in the dry cow treatment. *Conclusion: Dry cow treatments must be pathogen free or sterile.*

Herd 3: A herd with a coliform mastitis problem. A veterinarian found that he had excellent results using a mixture of gentamicin in a commercial mastitis infusion product as a treatment in early cases of coliform mastitis. He subsequently mixed a similar product in multiple dose vials and dispensed this to the client. The results were most unsatisfactory. *Conclusion: Gentamicin and penicillin are incompatible; some inactivation occurs within 6-8 hours and complete inactivation of both drugs occurs within 96 hours.*

Herd 4: A herd of 2200 cows with a *Strep. ag.* problem. A "blitz" treatment was employed. Starting the third day after treatment, 1200 cases of mycoplasma mastitis occurred in 48 hours.

Mycoplasma bovigenitalium has been a problem in the United Kingdom. *Mycoplasma agalactia var. bovis* has been a problem in Connecticut, New York and California.

Mycoplasma are the smallest free-living microorganisms. They result in mastitis with a sudden onset, a marked drop in milk yield and an udder which may be edematous, hard and swollen or which may be slack. The cow is usually *not* sick.

Treatment is not effective. In some herds recovery occurs during the dry period, in others recovery does not occur. Recovered cows may be shedders of the organism. Losses have varied from 20 to 80% of the cows in the infected herds.

"Blitz" treatments may result in problems from the following causes: 1) sanitizing products in syringes leaving residues causing cows to dry up; 2) *Mycoplasma*; 3) fungi; and 4) *Pseudomonas*.

Products not intended for intramammary use, when mixed by the veterinarian and infused into the udder, may have significantly greater milkout time than an intramammary infusion product.

Home mixed products create a tremendous problem because of the unknown factors involving residues. It is possible that some of these products may cause residues which are not eliminated over an extended period of time. The milkout time of these products is influenced by both the vehicle and the suspending agent.

Add to this the increasing level of surveillance by FDA, state regulatory agencies and the creameries (all are concerned with residues appearing in milk and all are mounting increased surveillance programs to try to catch these residues), and the combination of increased surveillance and the increased use of non-lactating products which are causing residues going beyond normal milkout times are resulting in an in-

creased number of infractions being detected.

The drugs which are effective against the gram-negative organisms are even harder to milk out and eliminate residues than the products which are normally used against gram-positive organisms.

A number of products used for mastitis infusion are irritating and the vehicle functions to reduce this irritation. What a veterinarian does not know about the vehicle when he is home-mixing a product can create problems. Penicillin is not stable in propylene glycol (Furacin solution). Furacin is not compatible physically or chemically with penicillin. Spectinomycin is not available for use as a mastitis treatment: 1) it would take a tremendous amount to be effective; 2) nothing is known about residues; and 3) present knowledge suggests it would be ill-advised to infuse this product into the mammary gland.

I have heard that the following homemade products have been infused into the mammary gland: 1) lincocin cough syrup; 2) chicken drinking water medication; and 3) 1,000,000 μ penicillin and 2,000 μ neomycin in aqueous base plus a red color. *Who knows the residue times*? This neomycin in the kidney could be four months!

What is the responsibility of the veterinarian who formulates his own product? He is responsible for the sterility and stability of that product: 1) a mastitis product must be pathogen free; and 2) how does he determine the efficacy of his product? Will it really work? This is difficult to determine with small numbers. Are the drugs compatible? How long is the drug active? How long do residues remain in the milk? Is the risk worth the gain?

Present law holds the veterinarian equally responsible with the owner when violative residues are found and it can be established that the veterinarian administered the drug without advising the owner of the stipulated withdrawal time.

"Tail Tags" have been used successfully in Michigan to identify cows treated during the lactation period. They are sold to members of MVMA at cost: $2.25/roll of 80 and $24.00/box of 12 rolls.

Plastic hospital identification wristbands may be useful as a means of identifying cows which have been dry cow treated.

A major problem for the drug companies is that they must demonstrate that the products can be used within the label requirements. When a product is not labeled for intramammary use that product may be withdrawn from the market by FDA if it is misused and residues appear with any degree of frequency. For this reason drug companies have a great deal of concern about use by veterinarians of products not labeled for intramammary use.

FDA regulations state that the longest withdrawal period for approval for any drug for lactation animals is 96 hours. No matter how effective a drug is against mastitis, even coliform mastitis, unless the regulations are changed the drug cannot be approved for use if the withdrawal needs to be longer than 96 hours.

An Rx legend is required when: 1) Dry cow treatment withdrawal times exceed 72 hours. The legend must be Rx on dry cow treatment if the withdrawal time is over 72 hours. 2) Adequate directions cannot be written for lay use. This may be because of antimicrobial specificity, resistance, and safety.

Evidence of needle marks from intramuscular injection are discernible for up to thirty days. These animals are retained while tissue samples are tested for residues.

Don't overlook the fact that milkout times are longer in mastitic quarters. They are probably also longer in older cows and in late lactation.

What about a second dry cow treatment if cows are freshening with mastitis? This is tough, but we don't recommend it because: the teats are filthy, the teat canal is opened and something may be carried into teat.

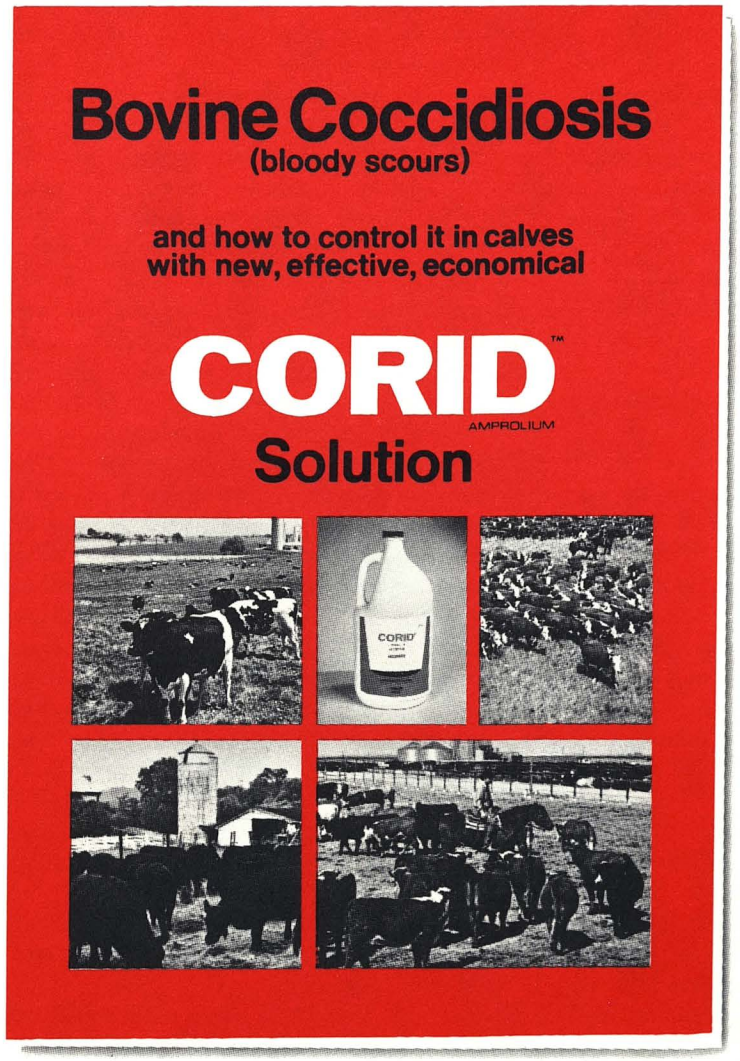
Dry cow treatment will not protect the udder during the last ten days prior to calving. Don't condemn the product. We are aiming at: 1) existing infections; and 2) the first three weeks of the dry period.

When we treat one quarter or treat intramuscularly we must remember to tell the owner he must withold the milk from all four quarters.

We may be just ahead of serious trouble on residues in meat. USDA and FDA are poised to drop the hatchet. They don't consider this a threat, but a promise. If we don't clean up residues in all dairy cows they may: 1) pull more products; and 2) require cows to be sold suspect (a fourteen day holding period for the packer awaiting assay results).

The time has arrived to identify the problem and correct it. Perhaps each of us can help by taking a hard look at things such as: 1) intramuscular injections; 2) dry cow treatment; 3) dry cow treatment in lactating cows; 4) home mixed veterinary products; 5) directions to the owner; 6) methods of identifying treated cows; and 7) complacency.

Watch for it in your mail:



Although coccidiosis is the third most costly parasitic disease of cattle and endemic across the United States, until now products available to control coccidiosis have been less than satisfactory.

CORID (amprolium) Solution is the first specific product for treatment and prevention of bovine coccidiosis in calves. CORID works rapidly, is well tolerated by calves, and is economical to use. CORID is readily accepted when administered in the drinking water or as a drench. This brochure discusses bovine coccidiosis and the role of CORID in its management; it is being sent to all veterinarians involved in bovine practice. Additional copies are available on request.

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