Table 3. *In vitro* digestibility of dry matter in alfalfa hay

Hay Treatment	H_2O at Baling	D.M. Digestibility	
		18 hr	36 hr
	(%)	(%)	
Dry Control	19	26.1	30.4
Treated	28	25.2	29.6
Wet Control	29	20.6	27.4

prevail no benefit could be expected. If a person has the equipment for applying a preservative, the proper management technique would be to use preservatives during periods when some advantage could be expected and to bale hay in the usual manner the rest of the time.

Effect of Prepartum Antibiotic Infusion on Mastitis Infection in Dairy Cows at First Calving

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Story in Brief

Mastitis infection continues to be a problem in dairy herds. This report deals with research directed toward prevention of infection in cows at the start of the first lactation.

One-half of a group of heifers was infused with an antibiotic two weeks prior to the aniticipated date of calving. Quarter milk samples for microbiological examination were collected within 8 days after freshening, at 13-16 days and again at 27-30 days.

Two heifers in the antibiotic infused group and 8 of the control group were found to be infected when sampled within the 8 day period after freshening. At the 13-16 day sampling period none of the infused group were infected, but 7 of the control group were infected. At 4 weeks, 2 infused heifers and 3 controls

were infected. There was a significant difference between the two groups of animals in the number of quarters found to be infected at the first two collection periods, but not at the fourth week sampling.

It appears that prepartum antibiotic infusion offers some protection against mastitis infection at calving.

Introduction

Dipping teats of cows with an effective bactericidal solution after each milking and infusing an approved antibiotic into all quarters of the udder at drying off are practices that have reduced the incidence of mastitis infection in dairy herds. In the OSU dairy herd, this program along with culling of chronically infected cows has reduced the infection level to about 5 percent of the quarters.

Very little attention has been given to the incidence of mastitis infection in cows at the time of first calving. It would be logical to expect that the incidence of infection in first lactation animals would be lower than in the total herd, yet this has not been found to be true. In a previous study, once-a-day teat dipping of preparturient heifers beginning about 2 weeks before calving produced no significant reduction in the incidence of mastitis infection at calving (Animal Science Research Report MP-101, 1977).

In the present study, a dry cow antibiotic preparation was infused into the udder of heifers approximately 2 weeks before the anticipated calving date to determine its effect on the incidence of mastitis infection at the time of freshening.

Materials and Methods

By random allotment 68 heifers in the OSU dairy herd were divided into treatment and control groups. Some of these had to be dropped from the experiment for various reasons, leaving 27 treated heifers and 29 controls on which data were obtained. The four breeds in the study were Jersey, Guernsey, Holstein and Ayrshire; however, Holsteins and Ayrshires predominated. All of the heifers were kept in the same pasture prior to calving.

Two weeks before the anticipated date of calving, each of the quarters of heifers in the treatment group were infused with 300 mg of Benzathine Cephapirin, an experimental dry-cow antibiotic preparation by Bristol Laboratories, Syracuse, New York. Skin swabs of a small area of the teat surface of each quarter were collected, and duplicate samples of secretion from each quarter were taken before the anitbiotic was infused. Swabs of the teat skin of comparable animals in the control group were collected on the same day that they were on animals in the treated group, but no quarter secretion samples were taken. The average period of time between infusion of the antibiotic and calving was 18.1 days for the treated group and the time on experiment prior to calving was 18.4 days for the control group. Culture procedures were employed as outlined by the National Mastitis Council.

Table 1. Infection status of heifers at various sampling periods after calving

Sampling Period	Heifers		Quarters	
	Control	Infused	Control	Infused
No. of experimental units	29	27	116	107[a]
No. infected at freshening or at 4-8 days[bc]	8/29[d]	2/25	12/116	2/99[a]
No. infected at 13-16 days[e]	7/27	0/24	7/108	0/96
No. infected at 27-30 days	3/28	2/27	3/112	2/107[a]

[a]One blind quarter.

[b]In the control group, four animals had clinical mastitis at first sampling and three were treated with antibiotics; in the infused group one animal had clinical mastitis and was treated.

[c]Difference between groups of heifers approached statistical significance (P ca .07); difference between groups on quarter basis was statistically significant (P<.025).

[d]Numerator denotes number of units infected and denominator denotes total experimental units at specified sampling period.

[e]Difference between groups statistically significant for heifers (P<.01) and quarters (P<.025).

Duplicate milk samples were collected between 4 to 8 days after calving, or if clinical mastitis was evident, they were collected prior to infusion with an antibiotic. Duplicate milk samples were collected again between 13 to 16 days and at the end of 4 weeks. In a few cases, samples at a particular collection were not valid and are not included in the data. Clinical mastitis cases verified to be caused by infection and sub-clinical infections detected at scheduled sampling periods were counted.

Results and Discussion

The incidence of mastitis at first calving in the control group of heifers was 28 percent. This level of infection also was observed in the control group in a teat-dipping experiment conducted previously and is high enough to be of concern to dairymen. The incidence of infection in the antibiotic infused heifers was only 8 percent (Table 1). Clinical mastitis involved 50 percent of the infected heifers in both groups. By comparison, Sinkevich *et al.*, (1974) noted 25 percent infections were evident as clinical mastitis in cows calving for 2 or more times.

Quarter samples from udders of 28 pregnant heifers cultured prior to infusion of the antibiotic revealed 6 infected animals. Of the 2 heifers in the treated group found to be infected at freshening, one was not infected prior to calving and the other was infected with a different species of bacterium from that found during the pre-parturient sampling. Evidence was obtained that the dry cow antibiotic preparation cleared up infections existing in the pre-parturient period and probably prevented some new infections from developing by the time of freshening.

Of the 2 infected heifers in the infused group one clinical mastitis quarter was treated. This heifer tested negative in the second sampling period but the results were excluded from the data because of the unknown effects of the

antibiotic so soon after the treatment. The second heifer recovered spontaneously from the sub-clinical infection without treatement. No new infections developed in this group between the two sampling periods.

Three of the 8 infected heifers in the control group were treated. One heifer was treated in one quarter for clinical mastitis after freshening, but cultures prior to treatment revealed infection in an additional quarter. All quarters were negative on the second sampling. This heifer was excluded from consideration at the next sampling period because of the inability to determine the effect of the antibiotic on the treated as well as the untreated quarter so soon after the treatment. A second heifer was treated in one quarter from which *Staphylococcus epidermidis* was cultured. *Streptococcus dysgalactiae* was isolated from another quarter which was not treated. The infection persisted as a sub-clinical infection through the entire study. This heifer was retained in the experiment. A third heifer was treated in two quarters from which no infectious organisms were isolated. *Escherichia coli* and *Staphylococcus aureus* were isolated from the other two quarters. *E. coli* was not isolated at the 4-8 day sampling; however, *Staph. aureus* was isolated from the same quarter at the 13-16 day sampling. This heifer was also retained in the study. One other control heifer mistakenly not sampled was excluded from the experiment in this sampling period only.

Thus, two heifers showing clinical mastitis soon after freshening which were treated at that time were excluded from the experiment for the 13-16 day sampling period. On the other hand, two others were retained because subclinical infections existing during the initial sampling period persisted into the second sampling period.

The lowered incidence of infection in the infused group compared with the controls at the 13-16 day sampling period was significant. The fact that no new infections occurred in the infused group during the first two weeks after calving, whereas 7 infections were present in the control group at the 13-16 day sampling suggests that pre-parturient infusions exerted a protective effect for a period of time after freshening. Perhaps a decreasing concentration but residual antibiotic present in the udder for several days protects the gland from infections during this stress period until its own natural defenses increase in competence.

There was no appreciable difference between the two groups at the 27-30 day sampling, suggesting that the pre-parturient infusion exerts no protective effect after that length of time after freshening. Several of the heifers evidently had recovered spontaneously by this time since the level of infection was relatively low in both groups. However, the fact that approximately 9 percent of the heifers were infected at this point in the lactation means that mastitis infection in first lactation cows is a problem that deserves further attention.

Analysis of the data on the basis of quarters shows that the lowered incidence of infection in the infused quarters compared with the controls was

significant for the 8-day period after freshening and for the 13-16 day sampling period. However, the difference between the two groups at the 27-30 day sampling was negligible. The results of the 27-30 day sampling period corresponds with the heifer analysis for the same period.

Literature Cited

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