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Antibiotic Feeding to Dairy Cattle

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The growth-stimulatory effect of certain antibiotics on poultry and swine has been widely demonstrated during the past few years. The data relative to the effects of these substances on ruminants, however, are not so complete. Early work at the Oklahoma Agricultural Experiment Station with steers and at the Texas Agricultural Station with lambs indicated that aureomycin feeding resulted in anorexia and poor growth. In contrast, more recent studies at various agricultural experiment stations (Arkansas, Iowa, Kansas, Louisiana, New York-Cornell and Pennsylvania) have shown that aureomycin ingestion produces a growth stimulation and a reduction in incidence of scouring in young dairy calves. The levels at which aureomycin has been fed has varied over quite a wide range, but in most instances the amounts were far below those employed therapeutically.

At Iowa State college dairy calves fed aureomycin (80 mg. per calf daily) gained approximately 25 per cent more in body weight over the period 4 to 116 days of age than similar calves fed no antibiotic. Moreover, the calves fed the antibiotic consumed more feed, were more vigorous, and had smoother hair coats. Scouring was less among aureomycin-fed calves, but since the incidence of scouring was low in both groups, it is doubtful that the difference in growth can be attributed to this factor.

It has been demonstrated further that dairy calves 14 to 16 weeks of age, receiving hay and grain, respond favorably to aureomycin feeding. Thus, the growth stimulatory effect of the antibiotic apparently is not limited to the very young calf that has not developed a functional rumen. Experiments at Iowa State College also have shown that the increased growth rate does not continue long after the aureomycin is taken from the ration, subsequent growth being about the same as that of calves fed no antibiotic. The initial advantage due to antibiotic feeding seems to be maintained, however, for a considerable period of time. Calves previously fed aureomycin gained 2.0 pounds daily when continued on the antibiotic (80 mg. per calf daily) from 16 to 28 weeks of age, while those not receiving aureomycin after 16 weeks gained 1.6 pounds daily over the same period. Those calves not previously fed aureomycin gained 2.1 pounds daily when fed the antibiotic from 16 to 28 weeks. Those fed no antibiotic at any time gained 1.7 pounds per day during this period.

In the above experiment, over the period 16 to 28 weeks of age, several body measurement changes were recorded and in all instances the trends were similar to those for body weights. The differences among groups, however, were least for

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height-at-withers (the measurement which might be expected to measure most accurately changes in skeletal development). The differences among groups were slightly greater for chest depth and were much greater for chest and barrel circumferences. This would indicate that although an increase in rate of skeletal development probably accounts for a part of the increased weight gains of aureomycin-fed calves, other physical changes, including improved "condition," also are involved.

This study of the effect of aureomycin on older dairy animals is being continued to determine the long-time effects of antibiotic feeding. The group of experimental animals at Iowa State College consists of 20 heifers receiving 240 mg. of aureomycin per animal per day, and 20 heifers in a control group. Some of the animals are now approaching 2 years of age. No adverse effects on growth or on breeding efficiency attributable to the antibiotic feeding have been observed. It seems probable that the differences in size between the animals in the two groups may become less as the heifers approach maturity, but it is too early to make definite conclusions in this regard.

Information relative to the effects of other antibiotics on dairy cattle is meager. It appears that terramycin has an effect similar to aureomycin. No other antibiotics have been examined sufficiently to warrant definite conclusions at the present time. A recent preliminary report from the Louisiana Agricultural Experiment Station indicated that the feeding of aureomycin and tyrothricin to lactating dairy cows over a period of 60 days had no apparent effects (beneficial or detrimental) on the animals.

Since the amount of antibiotic fed experimentally has varied widely, more work is needed to establish accurately the level of antibiotic feeding that produces maximum growth response. There is some indication that for aureomycin this level may be somewhere between 10 and 30 mg. daily per 100 pounds of body weight in the young calf. It must be recognized, however, that the requirements for maximum response may vary greatly, depending upon other environmental factors. Thus an optimum level in one herd may not be the optimum level for another herd, and, in fact, may not be optimum in the same herd in years to come. Moreover, whether the effective level changes with the age of the calf is not known at the present time.

The way in which antibiotics exert their effect on animal growth is not clearly understood, although data currently being accumulated by several research organizations may eventually lead to the answer. It has been demonstrated that aureomycin feeding not only results in more rapid growth, but also in a simultaneous increase in feed consumption. It is possible that under certain conditions the antibiotic may enhance development of a favorable bacterial flora and elimination of undesirable bacteria in the gastrointestinal tract with a subsequent improvement in health, vigor and appetite. It seems probable that the dairy animal most likely to benefit from antibiotic feeding is the young calf, particularly under conditions where poor growth, scouring and high mortality are found. (In this connection it should be pointed out that several commercial organizations are now producing whole milk replacements that contain antibiotics.) Antibiotics also may be very useful in feeding veal calves where a rapid growth rate is highly desirable. To be most effective, antibiotic feeding should start shortly after birth, probably by addition to the milk or to the milk replacement. Since a calf does not eat large amounts of concentrates until several weeks after birth, adding the antibiotic only to the concentrate mixture would not be adequate.

The major objective of this report has been to present briefly some of the information available on the feeding of antibiotics to dairy animals. Many of the antibiotics, of course, have been used extensively and successfully in the treatment of pneumonia, diarrhea and other diseases of the young calf, but no attempt has been made to summarize data in the therapeutic field. It should be remembered
that an antibiotic is considered a drug rather than a nutrient, and that extremely small amounts (much smaller than therapeutic dosages) are sufficient to affect maximum growth responses. Although some of the effects of antibiotic feeding now are recognized, the mode of action and many of the long-time effects are not well understood. Particularly, more research is needed to determine the long-time effects both physiological and economic, upon development of the animals, upon milk production and upon reproduction. Moreover, we should have more information on the effect of feeding an antibiotic and its subsequent usefulness in the treatment of disease. Until some of these problems are clarified, recommendations as to the use of antibiotics in dairy cattle rations can only be tentative.

It should be emphasized that under no circumstances can antibiotics be expected to replace good feeding and management practices.

Mastitis Prevention

Suggestions for preventing mastitis losses are as follows:
(1) Guard against udder injuries by removing sticks and other sharp objects from barnyards. Also, doorsills should be kept free of ice so cows will not slip or stumble over them.
(2) Suitable partitions between stanchions are also an important safety feature. Adequate stall space and bedding should be provided in order to prevent cows from stepping on each other’s teats.
(3) Sterilize milking equipment and use only machines which are properly adjusted.
(4) Avoid rough hand stripping.
(5) Milk infected udders last.
(6) Buy only clean, healthy replacements which are known to be free of mastitis.
(7) Work out a practical control program with the veterinarian, using both medical treatment for affected cows and preventive methods with those that are free of the disease.

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