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A BLIND, CONTROLLED FIELD STUDY OF THE EFFECT OF SUPPLEMENTAL ZINC-FEEDING ON MASTITIS IN DAIRY COWS

Emanuelson U.[1], Hallén Sandgren C.[1,2], Larsson A.-M.[3]

The aim of this study was to evaluate if feeding supplemental zinc to lactating dairy cows could improve udder health under practical field conditions. The study was conducted in two herds with all lactating cows (n=137) assigned to each of three treatment groups: 1) control (placebo); 2) Zn-oxide; 3) Zn-proteinate. The cows were housed in tie-stalls and fed the equivalent of 375 mg Zn per day during lactation. The treatments were blind to the farmer. The effect of treatment on the incidence rate of clinical mastitis was evaluated with a generalised linear mixed model. The model included the fixed effects of herd, parity, stage of lactation, season and treatment, and the random effect of cow. The estimated incidence rate per 100 cow-days at risk were 0.011, 0.048, 0.026 for treatment 1, 2 and 3, respectively, but differences were not statistically significant. Our conclusion was therefore that feeding supplemental Zn had no beneficial effect on resistance to clinical mastitis.

INTRODUCTION

It has been claimed that feeding supplemental zinc to lactating dairy cows could improve their udder health (e.g. Kellogg, 1990). However, data addressing the effect on clinical mastitis are limited and often anecdotal (Harmon & Torre, 1994). Most studies have been performed on experimental stations and the aim of the present study was therefor to evaluate the effect of Zn on clinical mastitis under practical field conditions.

MATERIAL AND METHODS

The study was conducted in two dairy herds from November 1995 to May 1996. All lactating cows (n=137) were assigned to each of three treatment groups: 1) control; 2) Zn-oxide; 3) Zn-proteinate. The cows were housed in tie-stalls and fed the equivalent of 375 mg Zn per day during lactation. Control cows were given a corresponding amount of placebo. The treatments were blind to the farmers. Calving and exit dates, monthly milk production, somatic cell counts and veterinary treated cases of clinical mastitis were recorded in the official Swedish milk and disease recording schemes (Emanuelson, 1988).

The incidence rate of clinical mastitis was calculated for each cow and stage of lactation as number of cases divided by number of days at risk. Stage of lactation was defined as "days in milk" -10 to -1 (i.e. before calving), 0-6, 7-13, 14-20, 21-27, 28-55, 56-83, 84-111, 112-139, 140-223 and 224-391, respectively.

The effect of treatment on the incidence rate was evaluated with a generalised linear mixed model, using the GLIMMIX-macro of SAS, with a binomial error distribution and a logit link function. The model included the fixed effects of herd, parity (1, 2 and 3+), stage of lactation, season and treatment, and the random effect of cow within herd.

RESULTS

The total incidence of clinical mastitis was low during the observation period, and very few significant differences could be established. Only stage of lactation had a significant effect ($p<0.001$), with the highest incidence rate occurring at, or just after, calving.

The differences between treatments were not statistically significant ($p=0.21$), but tended to indicate a detrimental effect of Zn on mastitis resistance. Thus, the incidence rate of clinical mastitis per 100 cow-days at risk, estimated from the generalised linear mixed model, were 0.011, 0.048, 0.026 for treatment 1, 2 and 3, respectively. Corresponding odds ratios were 1.0, 4.5 and 2.4, respectively, but confidence intervals were very wide.

CONCLUSIONS

Our conclusion from this study was that feeding supplemental amounts of zinc to lactating dairy cows had no beneficial effect on clinical mastitis. However, the Zn status of the cows and the feeds used was not known, and Zn supplementation may possibly play a role in mastitis resistance when inadequate status is at hand.

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[1] Swedish Association for Livestock Breeding and Production, Eskilstuna, Sweden
[2] Kalmar Husdjurstjänst, Kalmar, Sweden
[3] Blekinge-Kronobergs Husdjursförening, Växjö, Sweden