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The Effect of Periparturient Treatment with Fenbendazole on the Milk Production of Cows

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Tharaldsen, J. and O. Helle: The effect of periparturient treatment with fenbendazole on the milk production of cows. Acta vet. scand. 1989, 30, 247–252. – Cows and heifers from 22 herds were used in a trial to determine the effect on milk yield of anthelmintic treatment given at calving. Alternate animals were treated with either fenbendazole suspension or a placebo. Cows given fenbendazole showed a mean reduction in milk yield of 221 kg in the subsequent lactation compared with the placebo-treated cows, a difference which was statistically significant. In heifers no significant effect of the treatment was found on milk yield. When looking at the pooled data from both cows and heifers, the reduction in milk yield of the fenbendazole-treated animals was 151 kg, which also was statistically significant. The results indicate that anthelmintic treatment of dairy cows cannot be generally recommended in Norway.

trichostrongylids; cattle; anthelmintic.

Introduction

It has generally been assumed that gastrointestinal parasites are of little importance in adult cattle, due to a considerable resistance to the establishment of the parasites from the second grazing season onwards (*Michel* 1976, *Gibbs* 1988). Nevertheless, in recent years investigations from several countries revealed that nematodes may interfere with milk production in cows, and that an increased yield can be gained through anthelmintic treatment (*Todd et al.* 1972, *Bliss & Todd* 1976, *Pouplard* 1978). The results have been conflicting, however (*Fox & Jacobs* 1981, *Thomas & Rowlinson* 1981, *Kloosterman et al.* 1985).

Gastrointestinal nematodes may cause severe disease and reduced weight gain in young cattle in Norway, even though the grazing season is often limited to 4 months or less (*Tharaldsen* 1976, *Tharaldsen & Helle* 1984). Trichostrongylid nematodes are found in young cattle allover the country, including high mountain pastures and in the very far north. The main species are *Ostertagia ostertagi, Cooperia oncophora,* and *Nematodirus helvetianus* (*Tharaldsen & Helle* 1984).

The objective of this investigation was to determine if anthelmintic treatment of cows at calving would be economically advantageous under Norwegian conditions. As the intake of parasites is limited to the grazing period, the greatest effect of the treatment would presumably be found if the animals were dosed after housing in the autumn. Such treatment would keep the animals largely free from parasites during the extended housing period. In this trial, cows were treated on the first day after calving to avoid problems with drug residues in the milk.

It is generally accepted that there is no close correlation between worm burden and faecal egg count in adult cattle, which is supported by the observations of *Michel et al.* (1982) and by *Thomas & Rowlinson* (1981). Due to this, and for practical reasons, parasitological examination of the participating cows were not done. The effect of anthelmintic treatment on milk production was evaluated by comparing milk yield in fenbendazole-treated and placebo-treated animals.

Material and methods

Farms and animals

The investigation included 22 farms with 20 or more expected calvings in the treatment period from September 1980 to the end of January 1981. The selected farms represented different regions of the country, both geographically and climatically, being situated in the south-east of Norway (the counties of Akershus and Vestfold), in the south-west (Rogaland), and in Mid-Norway (Sør- and Nord-Trøndelag). Selected herds were members of the Norwegian Dairy herd recording system, and spent the major part of the summer on pastures, where the parasite contamination was supposed to be representative for the area. Heifers alone were treated on 1 farm site, as the cows on this farm were permanently housed.

A total of 462 animals were treated with either fenbendazole or a placebo, but 46 of these had to be omitted from the trial because they were slaughtered or sold, or because of diseases, etc. The final material thus consisted of data from 416 animals; 232 cows from 21 herds and 184 heifers from 22 herds. A total of 212 animals were treated with fenbendazole and 204 with the placebo. The latter are referred to as untreated animals.

Climate

Data on precipitation and temperature were supplied by the Norwegian Meteorological Institute. There were no marked deviations from the normal climatic conditions during the grazing period preceeding the trial.

Treatment

On the day after calving, the animals were dosed orally either with a suspension of fenbendazole[1] at a dose rate of 7.5 mg per kg body weight, or with an identical volume of a suspension without the anthelmintic[2]. The anthelmintic and the placebo were given alternatively to the cows in each herd in the order they calved, and the same procedure was carried out separately for the heifers. Bottles containing the fenbendazole or placebo suspension were identical except for the colour of the screw cap; the colour code was unknown to those giving the treatments.

Production data

The milk yields of all animals were recorded monthly by the local Dairy Herd recording, as were the fat and protein contents in milk samples from each individual. When all participating animals had completed the lactation period following treatment, milk production data were obtained from Landbruksdata A/L (Agricultural Computer Center), with assistance from Husdyrkontrollen (Norwegian Dairy Herd Recording). When necessary, a correction factor was applied to convert each lactation to a standard 305 day figure. No adjustments were made for temporarily diseased animals. Analysis of variance was performed on the production of milk, fat and protein for the lactation period after treatment, but with the results from the previous lactation included in the model as a covariable (*Snedecor & Cochran* 1967). For heifers, the fictitious yield of the previous lactation was given a fixed value of 5000 kg milk. The analyses were carried out

1 Panacur , 10 % VM Suspension.

2 Suspension prepared by Hoechst A.G.

using the GLM (General Linear Model) procedure of the SAS Institute (*Ray* 1982).
An analysis on the possible interaction between treatment and herd was also made. Such effect might be expected if the levels of parasitic infection in the different herds were markedly different. No signs of interaction were found, and the interaction factor was not included in the statistical model.

Results

The mean milk yield in the different herds of cows and heifers, respectively, varied from 5446 kg to 7176 kg, and from 3929 to 5994 kg. The effect of the fenbendazole treatment on the milk production of cows and heifers is shown in Table 1. The fenbendazole-treated cows on the average produced 221 kg *less* milk than the placebo-treated cows. This difference was statistically significant ($p < 0.05$). The fenbendazole-treated heifers priduced 97 kg less milk than the untreated heifers, but this difference was not significant. Analyses of pooled data from cows and heifers showed that the milk production of the fenbendazole-treated animals was 151 kg lower than that of the animals given the placebo, a difference which was statistically significant ($p < 0.05$).
There were no significant differences between treated and untreated animals concerning the production of milk fat and milk protein.

Discussion

There is no obvious explanation for the negative effect of the fenbendazole treatment on milk production of the animals used in this investigation, which resulted in 151 kg (2.55 %) less milk in cows and heifers, and 221 kg (3.34 %) less in cows compared with the controls.
Results from some trials in the USA in the early 1970's showed marked improvement in the milk yield of cows treated with anthelmintics, compared with untreated cows (*Todd et al.* 1972, *Bliss & Todd* 1976). These results received much attention, but also skepticism, as a number of factors might have influenced the results. Similar trials have since been carried out in several countries, and with variable results (*Pouplard* 1978, *Fox & Jacobs* 1984, *Kloosterman et al.* 1985). Also others have reported results which have had the same tendency as ours. *Harris & Willcox* (1976) found that cows dosed with thiabendazole yielded 283 kg less milk than untreated cows, although

Table 1. Effect of treatment with fenbendazole at calving on milk production in the lactation period following calving.

				Difference between fenbendazole treatment and placebo (in kg):		
Animals	Treatment	n	Kg milk	milk	fat	protein
Cows	Placebo Fenbendazole	112 120	6617 6396	–221*	–3	–1
Heifers	Placebo Fenbendazole	92 92	5047 4950	– 97	0	–1
Cows + Heifers	Placebo Fenbendazole	204 212	5921 5770	–151*	–1	–3

* $p < 0.05$.

the difference was not statistically significant. *Thomas & Rowlinson* (1981) observed a non-significant response to treatment of –163 kg and –10 kg fat in an experiment in a single herd of 96 animals, while *Fox & Jacobs* (1981) in a trial with five herds reported yield differences which varied between –170 and +576 kg. The variability could have been due to real differences in the level of parasitic infection of the animals in various parts of the world. It could also be that the species of nematodes involved were different in different trials, as suggested by *Barger* (1979). *Haemonchus* appears to be common in North American dairy herds (*Grisi & Todd* 1978, *Herd & Heider* 1985), but is hardly ever seen in Norwegian cattle. In late autumn and early winter a major proportion of the worm burden may consist of inhibited larvae, against which the efficacy of anthelmintics such as fenbendazole may be reduced (*Elliot* 1977). Other studies, however, have not shown such lack of effect on the inhibited stages (*Duncan et al.* 1976, *Anderson & Lord* 1979).

Investigations at one research farm in south-eastern Norway since 1968 have shown that gastrointestinal parasites may regularly be the cause of economic losses in young cattle (*Tharaldsen* 1978). Parasitological investigations during the grazing season of 1980 at this farm showed that larval contamination from spring onwards was substantial (*Helle & Tharaldsen* 1982). Climatological observations from the various regions do not indicate that the conditions were especially unfavourable for the parasites in question this year. Although we have no parasitological examination of the animals studied in this investigation, there is no evidence that these were not randomly selected and exposed to the same level of parasitism which usually occurs in the districts concerned.

Normally one would expect that at least animals in their first lactation period would benefit from anthelmintic treatment. It is commonly assumed that in cattle more than 1 year old, parasitism is at a subclinical level, but may reduce the live-weight gains of still growing animals (*Myers & Todd* 1980). However, even in heifers outbreaks of clinical ostertagiasis have occurred about the time of parturition (*Petrie et al.* 1984). In Norway heifers are usually kept on separate, but permanent pastures before calving, which may result in different levels of parasitic infections compared with cows. There was a small and insignificant reduction in the milk production of the treated heifers in this study, a result which is difficult to explain.

The milk fat and milk protein was relatively less reduced compared with the amount of milk produced by the fenbendazole treated animals, but this trend was not so pronounced that any conclusion can be drawn.

In their large-scale study in England, involving more than 11,000 cows, *Michel et al.* (1982) found a mean increase in the milk yield of 42 kg, with no greater effect in heifers than in cows. No differences were observed in the effects of the 3 anthelmintics used (thiabendacole, fenbendazole or levamisole), and none of them seemed to give negative results compared with placebo treatment or no treatment at all. It seems to be generally accepted that there are few adverse effects on the host of the anthelmintics currently used against gastrointestinal nematodes. *Jara et al.* (1984) found that albendazole, fenbendazole and oxfendazole caused a short-lived reduction in cellulose digestibility and a decrease in volatile fatty acid concentration in the rumen of sheep. However, it is unlikely that fenbendazole per se should have significant influence on the milk production, in light of its rapid elimination from the body.

Any treatment within the first day after calving might be unfortunate, as the cow's ability to metabolize the anthelmintic at this point in time may be reduced. The same point in time has been used by several investigators (*Michel et al.* 1982, *Fox & Jacobs* 1984), seemingly without having caused any problems.

The main conclusion of this study is that anthelmintic treatment of dairy cows is generally not to be recommended in our country. This does not exclude the possibility that cattle from rather heavily parasitized herds might benefit from treatment.

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Sammendrag

Effekten av behandling med fenbendazol etter kalving på melkeproduksjonen.

Kyr og første kalvs kviger fra 22 besetninger ble brukt i et forsøk for å bedømme effekten av anthelmintisk behandling like etter kalving på produksjonen i den påfølgende laktasjonsperiode. Annet hvert dyr fikk behandling enten med fenbendazol eller placebo. Kyr som ble behandlet med fenbendazol hadde en statistisk signifikant nedgang i melkeproduksjonen på 221 kg melk i forhold til placebo-behandlede dyr. For kvigene hadde behandlingen ingen signifikant effekt. For materialet fra kyr og kviger sett under ett var den gjennomsnittlige reduksjonen for de fenbendazolbehandlede dyra 151 kg, og dette var statistisk signifikant. På grunnlag av disse resultatene kan en generelt ikke anbefale behandling av melkeku her i landet.

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