

## 7 Summary

### **Effectiveness of oxacillin in treatment of mastitis and concentration and activity of three antimicrobial factors of milk in negative culture results in clinical mastitis**

Bacterial infection is the most important cause of mastitis in cattle. Antimicrobial therapy is used for treatment. It should be used after isolation of the causative agent and the determination of its antimicrobial resistance pattern. Unfortunately, this is not possible in all cases, because 10 to 40 % of the milk samples from affected quarters yield no bacterial growth on culture.

The objective of this study was to determine efficacy of Oxacillin in the antimicrobial therapy of mastitis (experiment 1) and to evaluate possible reasons for bacteriologically negative mastitis milk samples (experiment 2).

Experiment 1 was conducted on a dairy farm with 800 cows in milk with a rolling herd average of 8000 kg per year. Animals from all stages of lactation with clinical mastitis were included in the study. Clinical findings were recorded on days 0, 1, 2, 7, 14 and 21. Milk samples were cultured for microbiological investigation on days 0, 7, 14 and 21. Animals included in the study were treated for at least three times in 24 hour intervals with 1000 mg Oxacillin intramammarily. Cases were classified as clinical cure if the attitude of the animal was back to normal and body temperature was below 39,0°C. The affected quarters had to be free of signs of acute inflammation like increased temperature, pain and/or swelling. The gross appearance of the milk had to be normal.

The clinical cure rate was 60.8 % on day 14 and 48.1 % on the day 21. On average animals were treated 3.4 times with Oxacillin. The clinical cure rate on day 14 was 66.6 % (4 of 6 six animals) for mastitis due to *Sc. agalactiae* and 50 % (4 of 8 cases) for *S. aureus*–mastitis.

Clinical cure rates did not differ between cases with and without no bacteria isolated.

The antimicrobial activity in milk has been described by many authors. In this study it was evaluated whether lysozyme, lactoferrin and the lactoperoxidase-thiocyanate-peroxide system (LPS) could be the reason for negative culture results in samples for cases of clinical mastitis.

Experiment 2 was conducted on a dairy farm with approximately 2900 cows and a rolling herd average of approximately 7100 kg.

Animals from all stages of lactation with clinical mastitis were included in the study. Animals were examined clinically and milk samples were collected for microbiological investigation and to test for inhibitory substances.

Lysozyme concentrations were determined using the "lysoplate-technique" which is based on the lysis of *Micrococcus lysodeicticus* suspended in the agar. Lactoferrin concentrations were measured in an enzyme linked immunosorbent assay (ELISA, Meisel, 1990). Activity of the LPS was determined spectrophotometrically (Shindler et al., 1976; Bjoerck and Mullan, 1993).

The concentrations or activities of the three factors were significantly higher in diseased quarters than in quarters without clinical signs of mastitis. No correlations could be determined between the three factors and milk production, parity and stage of lactation. The concentration of lysozyme increased with severity of the clinical signs (local swelling and changes in secretion). The concentration of lactoferrin was significantly lower in quarters with only limited tissue alterations than in quarters with medium or severe alterations ( $p \leq 0.05$ ). For the LPS-activities no correlation to the severity of clinical signs could be found.

Results from this study indicate that the three factors examined did not impair the results of microbiological culture of milk samples from quarters with clinical mastitis. No differences in the concentration of lactoferrin or LPS-activities were found between mastitis with positive and negative culture results. The concentration of lysozyme was even higher in culturally positive samples than in negative samples ( $p \leq 0.05$ ).