Subclinical ketosis in dairy cattle – the silent profit robber

by Dr Abdülkerim Deniz, Bayer Animal Health, Leverkusen, Germany.

Successful calving, healthy metabolic functions postpartum and good milk performance in lactation depend highly on the transition period (three weeks before and after calving) of dairy cows where they should be able to manage energy intake and overcome negative energy balance.

Subclinical ketosis is one of the metabolic diseases associated with negative energy balance during the transition period. Subclinical ketosis is manifested by the elevated BHB (beta-hydroxybutyrate) concentration in blood, urine and milk in dairy cattle, especially in the first 2-3 weeks after calving. The prevalence of subclinical ketosis is around 9-34% in dairy cattle farms. According to Duffield (2000), subclinical ketosis may start at serum BHB above 1,000µmol/L. However, at exactly what level individual cows will express clinical signs are extremely variable.

Furthermore, there are studies in which the cut off value is expressed as 1,200µmol/L. Subclinical ketosis causes losses through decreased milk production and association with periparturient diseases. Serum BHB concentrations of 1,200µmol/L or above in the first week following calving were associated with increased risks of subsequent abomasal displacement and metritis, whereas the critical BHB threshold in the second week postpartum for the risk of abomasal displacement was set at ≥1,800µmol/L. The best threshold for predicting subsequent risk of clinical ketosis from serum obtained during week one and week two postpartum was ≥1,400µmol/L of BHB.

Table 1. Milk loss due to subclinical ketosis (elevated blood BHB) in first and second week postpartum in dairy cattle.

<table>
<thead>
<tr>
<th>Groups</th>
<th>n</th>
<th>Day 0-1</th>
<th>Day 3-10</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>228</td>
<td>497 (384-646)</td>
<td>756 (533-1,263)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Catosal</td>
<td>244</td>
<td>500 (376-674)</td>
<td>683 (512-956)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Table 2. Median (interquartile range) serum BHB concentrations (µmol/L) at baseline (day 0-1) and follow-up (day 3-10) sample collections in mature cows (lactations ≥3) randomly assigned to receive either placebo or Catosal.

Fig. 1. Rate of healthy animals (BHB <100µmol/L in milk) on 5 and 10 days after treatment with Catosal (the difference is significant on day 10, p<0.05).

Fig. 2. Effect of different dosage of Catosal on blood BHB (baseline change). On day 7 and 10 post-treatment the difference between control and treatment groups is significant (p<0.05).

Recent studies

Catosal is a metabolic stimulant and energising product, containing butafosfan and vitamin B12. It has been widely used for a decade in food producing animals for the pre-Continued on page 9

International Dairy Topics — Volume 10 Number 6 7
Catsal. The prevalence of healthy animals after treatment with animals and milk production. Resulted in increased rates of healthy cows. Treatment with Catsal for four days. Control group was 48.6%, while it was only 23.8% in the Catsal treatment group. Sahal et al. (2011) compared the effect of different dosages of Catsal in subclinical ketosis. Cattle (n=52) postpartum between first and second week were tested by Precision Xceed device on blood BHB concentration. Those who had blood BHB of 1,000–3,000µmol/L without clinical sign of ketosis were included in the study. One group (Catsal 5) was treated with 5ml/100kg Catsal for four days, another group (Catsal 10) was treated with 10ml/100kg Catsal for four days. Control group cows were treated with injectable water for the same days. All treatments were conducted intramuscularly. Both dosages of Catsal were able to bring down blood BHB significantly compared to the control group on days 7 and 15 post-treatment.

The dosage 10ml/100kg of Catsal looked better to decrease blood BHB on days 7 and 15 post-treatment (more than 60% decrease from baseline). Fig. 2 presents the change of blood BHB from baseline after treatments. Total milk yield for 30 day in Catsal 5, Catsal 10 and control group was 863, 779 and 640kg respectively (Fig. 3). The difference between Catsal 5 and control (p<0.01) and Catsal 10 and control group (p<0.05) was significant. The effect of Catsal treatment in cows that underwent the operation of left abomasal displacement (LAD) was studied by Fürll et al. (2006). Treatment of cows with 5ml Catsal for 100kg bw. intravenously just two hours before surgical operation of LAD controlled the blood BHB concentration subsequently. The blood BHB concentration increased in the control group animals without treatment of Catsal 48 and 72 hours after the operation (Fig. 4).

Cows with elevated blood BHB concentration (>1,000µmol/L) between one and two weeks post-partum (n=9-10 in each group) and without sign of ketosis were treated with Catsal or Asian originated generics of Catsal for four days intramuscularly at a dose of 5ml/100kg. A marked decrease in blood BHB was observed in Catsal group compared to control and generics (Fig. 5).

The conception rate of cows treated with Catsal was significantly higher than control group and generic 3 in the first insemination (Fig. 6).

Conclusion
Subclinical ketosis is an economically important disease and should not be underestimated since it has production and reproduction aspects. Milk production loss (around 300kg per lactation), reproduction disturbances (low conception rate, increased artificial insemination), high risk for abomasum displacement, metritis and mastitis and clinical ketosis are important economic consequences of subclinical ketosis on dairy cattle farms. The disease runs subclinically, therefore it might be called the silent profit robber because of the impact on the profitability of dairy farms. Catsal, as a metabolic stimulant containing butafosfan and vitamin B12, has been shown to be very effective for the treatment of subclinical ketosis in dairy cattle in different studies that have been conducted worldwide.