Ketosis screening using FTIR

How does it work?

3-4 years back screening for ketosis on DHIA samples was introduced in the first laboratories. The calibration is semi quantitative, the levels of BHB and acetone in milk is rather low so there were challenges! At this year’s ICAR meeting in Berlin two presentations from labs who have used the calibration for several years in routine showed that there are certainly benefits to be harvested by the farmers if they make use of the results they get! A rough calculation showed that the return on investment is 6-8 times for an average herd.

The two presentations:

Jean Bernard Daviere from Clasel in Western France gave a presentation at the ICAR afternoon session on Wednesday where he outlined why Clasel has chosen to offer ketosis screening to the farmers in their organization. The presentation, which can be seen at ICAR’s homepage describes very well the damaging effects of ketosis by showing the difference in milk yield, reproduction and a number of health parameters between those cows graded as healthy and those graded as ketotic.

Also General Manager, Daniel Lefebvre from Valacta in Canada, presented the results they have seen in East Canadian herds over the last years. Also here huge amounts of data, - from almost 350.000 cows in more than 4200 herds were basis for Daniels presentation which showed severe effects for the cows which had high contents of BHB during beginning of lactation! This presentation, “Ketosis testing at Valacta”, was given at a FOSS symposium held on Tuesday evening and can be found on FOSS’ homepage.

Frequency:

In both labs they have looked into the frequency of ketosis and the conclusion is, not surprisingly, that the frequency of especially subclinical ketosis is higher than anticipated.
In Canada they find an average prevalence of 24% from day 5 to 35 but for multiparous cows the highest average prevalence, almost 33%, is seen in second week after calving. For primiparous cows the highest prevalence, also 33%, is seen in the first week after calving.

In France the frequency was seen to vary due to season and year from 12% in sept/oct 2012 to 25% during Winter 2012/13 whereas Winter 2013/14 was down to 14% so the quality of forage has an impact too.

So in general these registrations supports the first reports stating a frequency somewhere between 15 – 25 % of the cows in early lactation suffering from clinical or sub clinical ketosis!

But more important, - are there any consequences of the elevated BHB levels?

**Consequences of ketosis?**

Most milk producers know that the consequences of clinical ketosis are severe and very frequently shorten the life of a cow dramatically due to other diseases or lack of pregnancy in time.

And here it must be remembered that when screening DHIA samples a number of cows are wrongly grouped as non-ketotic though they have had high values of BHB, but at a time where they were not analyzed. So most probably the true difference between ketotic and non ketotic cows is even bigger!

The effect of elevated levels was certainly documented in the two presentations where analyses had been made, splitting the herds in those cows having had an increased level of ketosis right after calving and those who had not. In Canada cows were split in 3 groups, positive, suspicious and negative. In France in five groups from very positive to certainly negative.

First of all milk yield was lower, the higher the BHB level! In Canada a difference of 2.5 kg milk was recorded (3 groups) whereas almost 6 kg milk loss was registered in France (5 groups) at high levels of BHB and acetone.

Also the reproduction was severely affected. In Canada the number of days open was 154 for those who had a positive BHB result and 131 day for those who had only had negative results. The intermediate group had 147 days, so quite a number of these cows too are likely to be subclinically ketotic. Also in France a difference of
15-20 days was seen depending of the race. See enclosed graphs for Holstein (PH) Normande (NO) and Montbelliarde (MO).

For general health both presenters looked into whether high BHB and/or acetone affected the frequency of mastitis, displaced abomasums and clinical ketosis.

In Canada it was found that the risk of left displaced abomasums was 4% for those registered with high BHB levels, 3% for the suspicious ones and 2.3 for those not registered with high levels. Similarly the %age with clinically ketosis was almost 11%, 5.5% and 2.3% and also the cell count was higher for those with higher BHB levels.

In France average somatic cell count was 229.000 for those not registered with high BHB or acetone levels and 525.000 for the group registered with the highest level of BHB and acetone. Here displaced abomasums was seen 4-8 times higher for the high groups and also the frequency of lameness was affected.

**And what can be gained by screening for ketosis?**

In Canada they found that 40% of the herds had 20% or less cows with elevated BHB levels at the beginning of lactation, and of course some herds hardly ever have any cows with elevated levels. However, my experience when working with the Herd Navigator, is that even the best herds, from time to time, may run into ketosis problems and then it can be very costly if procedures are not corrected quickly!

In France the costs for screening of the herd per cow is 3 Euros per year. Based on this and average costs for above mentioned diseases a rough calculation showed that the return on investment is 6-8 times for an average herd if the farmers acts upon the results!

Based on these presentations I believe that implementing screening for ketosis is well justified!! Even though it is not an easy calibration to implement; results on single cow level cannot be used for very much, - and it takes close collaboration with the advisory service to ensure the farmers get benefit from the results!