

No 141: Low Butter Fats on Farms this Summer

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Butter fats are falling and even crashing on many dairy farms this summer. Interestingly, even those farms feeding mixed diets with little reliance on grazing are also reporting reduced butter fats. One wonders if there is an issue with milk analysis and farmers may wish to seek reassurance on this from their milk buyer.

Heat stress may be a contributory factor in view of the recent hot weather. Dry matter intake can be reduced by some 10 - 30%, and particularly forage. If the proportion of concentrate in the ration increases, the cow is more predisposed to acidosis and therefore butter fat depression. More typically, milk yield is lost.

Some herds are milking extremely well and low milk quality may simply be a reflection of unseasonably high yields diluting the milk constituents. Increased numbers of cows in early lactation will also reduce butter fat concentration in milk. This is also worth checking as the calving index continues to slip.

On a nutritional basis, consideration of the data from the FWTNI Milk Yield from Grazing system reveals some other interesting possibilities. Comparing the averages for May and June in 2009 and 2010 (see Table 1) shows:

1. The month's average milk yield from grazing is some 3 litres per cow per day lower in 2010.
2. This is associated with reduced grass dry matter intake of at least 1kg per cow per day this summer.
3. Grass NDF levels are lower this year, being some 5% units less in May and 2.4% in June.
4. Grass oil content is marginally higher this summer, up by 0.4% units in June.

Table 1

		May		June	
		2009	2010	2009	2010
Milk Yield from Grazing	(M+ litres)	15.9	13.1	15.0	12.2
Grass DMI	(kg/day)	13.4	12.1	13.2	12.2
Grass NDF	(%)	44.7	39.1	46.9	44.5
Grass Oil	(%)	3.3	3.5	2.9	3.3
Intake from Grazing:					
NDF	(kg/day)	6.0	4.7	6.3	5.5
Quickly fermented carbohydrate	(kg/day)	4.3	3.5	4.4	3.7
Unsaturated oil	(kg/day)	0.38	0.36	0.38	0.34

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Certainly the combination of low fibre and higher oil content in grazing grass is not conducive to good butter fat production. However, when this is considered in association with reduced grass intakes the following becomes apparent:

5. The daily fibre intake (NDF) from grazing is significantly lower by some 0.8 to 1.3 kg per day in 2010. Since average grazing this summer has supplied only 4.7 and 5.5kg of NDF per day in May and June respectively compared to the target minimum daily NDF intake of 6.6kg, it is clear that butter fats in milk will fall due to:
 - Lower rumen production of the VFAs acetic and butyric acids which originate from fibre digestion and are essential for butter fat production in the mammary gland.
 - Compromised rumen health associated with reduced dietary fibre intake, lower saliva production, inadequate rumen buffering and therefore lower rumen pH and sub-clinical acidosis. Increased concentrate feeding to compensate for limited grazing may also exacerbate this effect. This will further reduce the VFA production essential to maintain butter fat.
 - Data from Delaby et al (2001) showed that for each kg of concentrate feeding to grazing cows, butter fat decreased by 0.6g/kg of milk production. The same author also reported that as the herbage supply increases for cows supplemented with concentrates, there is a marked increase in selective grazing. Cows select more leaf which is fermented rapidly to propionate and this increases milk protein but depresses milk fat.
- The probable result of the above is the rumen biohydrogenation of unsaturated dietary fats at lower rumen pH. This results in increased intestinal absorption of unsaturated fatty acids, notably CLA and trans fatty acids, which then block the uptake of circulating fat into the mammary gland thereby directly inducing milk fat depression.
6. The high level of sunshine in recent months would be expected to increase grass sugar levels, but average data values show this not to be the case. The daily intake of quickly fermentable carbohydrates from grazing is therefore lower this year than last which may, to some extent, balance the negative impact of low fibre intake on rumen acidosis. However, with additional concentrate feeding on many farms, the total daily supply of all sources of rapidly fermented carbohydrates must be considered to identify any effect on milk butter fat.
7. The daily intake of unsaturated oil from grazing is similar this summer to 2009. The negative impact on butter fat of incomplete biohydrogenation of these oils in the rumen, which can occur when intake of these oils is high and/or at low rumen pH, has been detailed above. Since the intake of unsaturated oils is significant from grazed grass, it is probable that the combination of factors is inducing lower butter fats this year.

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Actions

To address butter fat depression the following actions should be considered to maximise fibre intake and stabilise rumen health:

1. Know the potential milk yield and dry matter intake from grazing. Appropriate feeding plans can then be made to optimise summer performance and prepare the herd for winter.
2. Supply additional dietary fibre as buffer fed forages, considering, of course, the current situation and concerns regarding the shortage of forage stocks. Whole crop cereals can be a useful buffer feed where the addition of this extra starch is not going to add to an existing propionate excess.
3. Select the correct concentrate feed:
 - High NDF concentrates - include ingredients such as soya hulls, citrus pulp, malt by-products and sugar beet pulp.
 - Control the intake of rapidly fermentable carbohydrates such as sugars and fine ground starch to meet, but not exceed, daily rumen requirements. Maize and cracked cereals should be considered as they have slower rates of starch fermentation and therefore less impact on reducing rumen pH.
4. Rumen buffers and yeasts may have some effect on elevating butter fat this summer by elevating rumen pH.
5. Rumen by-pass fats will only be effective if the negative impact of CLA and trans fatty acids, which block fat uptake into the mammary gland, is first controlled.

In summary

Low butter fats this summer may be related to heat stress, higher milk yield or changing calving pattern on some farms. However, data would suggest that the key factor is sub-optimal NDF intake and its consequent effect on rumen digestion and health. A number of actions may be taken to alleviate the problem of butter fat depression, but of course these must be appropriate to the situation on the farm. Solutions could include increased feeding of forage buffer (if available in view of the shortage of forage stocks) and/or fibrous feed materials such as soya hulls, citrus pulp, malt by-products and sugar beet pulp.

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