

In order to try and clarify some of the doubts that arise concerning the relationship between the dairy herd's feeding regime and quality of milk on the one hand and changes in the quality of raw milk when pasteurised on the other, we undertook a small programme of analyses of different parameters of milk at different times of the year and, thus, under different fodder regimes, and before and after pasteurisation:

- analysis of raw milk in the late autumn / winter / early spring period when cattle are fed 3.5 kg of concentrate and dried forage
- analysis of raw milk in late spring / summer / early autumn period when cattle are given 3.5 kg concentrate, dried forage, freshly cut grass and graze.
- analysis of milk pasteurised at 63-65°C during 30 minutes, as sold by our dairy and with which we make our cheeses.

To date, the following results concerning the nutrient content and health standard of milk according to fodder regimes are available:

Fodder regime:	"winter" March 2011	"summer" May 2011
(a) Protein (%)		
3.09	3.26	
(b) Total fat (%)		
3.93	3.86	
of which:		
(c) * saturated fatty acids (%b)		
76.01	73.29	
(d) * non saturated fatty acids (%b)	23.98	26.71
of which:		
(e) Omega 3 (%b)	0.66	0.64
(f) Omega 6 (%b)		
2.00	1.40	
(g) ratio omegas 6:3 (max. 3.13:1)	3.13	3.18:1
(h) Omega 9	17.69	
21.33		
(i) Calcium (mg/Kg)		
1104.14		

1173.36		
(j) Phosphorus	875.18	
882.45		
(k) Calcium-Phosphorous ratio (n)	1.5:1	
1.32:1.0		
(l) Bacteriology (n°/ml)	9000.00	9000.00
(m) SCC (n°/ml)		
168000.00		
148000.00		

The changes in the natural seasons over the year and, thus, changes in the dairy herd's feeding regime have an influence on the nutritional quality of milk. The protein content is higher in summer than winter, whilst fat content is lower. This is because the herd consumes more green forage in the Spring to Summer period and, thus, feed has a higher water content. On the other hand, a higher proportion of non-saturated fatty acids was observed, increasing 11% between winter and spring. Most of the increase is due to a greater content in Omega 9, although the percentage of Omega 3 and Omega 6 also increased. It is important to emphasize the fact that the Omega 6 Omega 3 ratio, already very good in winter (3.03: 1.0), improved in the spring to summer period (2.22:1.0 in August).

With regards to the calcium and phosphorous content of our herd's milk, both the content of each and an adequate balance between the two are of importance. The lack or excess of either of these macro minerals can effect the absorption of the other. The calcium-phosphorous ratio is lower in cows' milk than human milk (2:1), thus making the absorption of calcium more difficult. An adequate calcium-phosphorous ration would be 1,5 : 1. As can be seen from the above table, the ratio of our milk is better in spring and summer than in winter, although it does not reach the 1.5:1 ration that is generally recommended. (In the document "Getting to know milk" we analyse all these parameters and their importance for health and nutrition).

As far as the changes in the composition of our milk following pasteurization (at 65-70°C during 30 minutes) are concerned we have undertaken analyses of the content of both raw and pasteurized milk on the same day, bearing in mind the recurring debate concerning pasteurisation. As the following data show, there are small alterations in some parameters, although these changes are not significant. Thus, the calcium content fell by 5.8%, whilst phosphorous rose by 3.9%, leaving the calcium-phosphorous ratio at 1.24:1. About 2% of Omega 3 and Omega 6 were lost, although the balance between the two did not alter.

We hope to undertake further analyses in a few years time in order to adequately evaluate the impacts of the conversion to organic farming methods for the quality of our dairy herd's milk.

We also wish to carry out a more exhaustive analysis of the nutrient content and health quality of our milk according to our dairy herd's fodder regime as part of an applied research project (see "Research project proposal: biodiversity, cow fodder and milk quality" on this website). Such analysis would include measuring the content of other nutrients such as vitamins. However, to date, we have had no success in getting Farm Research Institution uptake.

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