



The key to high quality products lies in your raw milk supply...

**Influence the composition, volume and
hygienic quality of your raw milk through
payment systems**

Guide your suppliers in the right direction

The farmer is in control

The idea is simple - pay for what you get - and encourage farmers to supply the type of raw milk you need in your production.

Farmers are in control of the quality, quantity and composition of the raw milk. The composition of raw milk is determined by the breed of cow and by the type of fodder fed to the cows.

By paying for the individual components, an incentive is provided for the farmer to focus on breeding and feeding practises. The same is true for the hygienic quality of the raw milk.

By incorporating bacteria contents and somatic cell count in the payment system, the farmer is encouraged to do his best to provide high quality raw milk.

Changing raw milk composition

In 1995 an IDF study showed that 82% of the countries participating in the study had reached their objectives through payment systems. This goes to show that the incentives provided by a payment system directly influences the quality, quantity and composition of the raw milk supply.

The objectives of payment systems vary depending on production type and the characteristics of the raw milk in the region. Depending on market demand and the supply situation in a certain region, dairies may be interested in receiving raw milk with different fat percentages:

- Higher, if the dairy sells a lot of cream, butter and other high fat products.
- Lower, if there is a surplus of fat, that can not be utilised.

If the prices of the milk components reflect the value of the dairy products that can be successfully marketed, an incentive is created for the farmer to produce raw milk of an appropriate composition.

Manufacturers of milk powder have special interests in raw milk with a high content of protein (i.e. solids), as this determines the yield per kg of raw milk.

Cheese manufacturers are interested in the fat, protein and casein contents, because these components determine the cheese yield. The casein percentage of the protein determines the cheese yield. This percentage is reduced when the milk contains a large number of somatic cells. This makes somatic cell count a very interesting parameter for cheese manufacturers.

Improving raw milk quality

Processing can not improve the basic milk quality. Therefore the quality of the raw milk determines the quality of the dairy product.

High levels of bacteria and somatic cells cause disagreeable taste in dairy products and reduce storage life. Furthermore, changes in protein and fat can occur, and raw milk may become contaminated as a result of high bacteria levels.

The quality of the raw milk supply can be influenced via the payment system. Premiums and deductions based on e.g. bacteria content, somatic cell count, freezing point depression (added water) and antibiotic residue create the incentive to upgrade the quality of raw milk.

Thereby the payment system influences the actions of the farmer, because negligence with hygiene, adulteration of raw milk by adding water, failure to discard raw milk from mastitic cows or cows on antibiotics, will cost the farmer money. In worst cases the milk will be rejected entirely, no payment will be made.

On the other hand, farmers supplying superior quality raw milk will be rewarded by an extra payment.

Possible determinants of raw milk price and rejection limits

Increased price factors

High Fat & Protein
Low Bacteria Content
Low Somatic Cell Count
Good Taste
Fresh
Cool

Reduced price factors

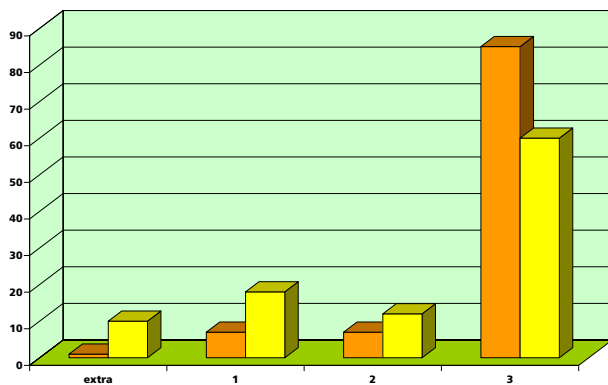
Low Fat & Protein
Moderate Bacteria Content
Moderate Somatic Cell Count
Acceptable Taste
Stale
Too high temperature

Rejection criteria

Added Water
Too High Bacteria Content
Too High Somatic Cell Count
Bad Taste
Inhibitory Substance/Antibiotics
Harmful Contaminants



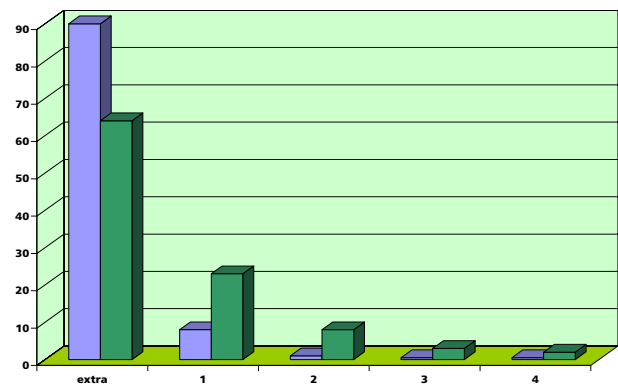
Improvements in hygienic quality



The development in an area of Poland 1995-1996

In Poland the positive trend is clear:
In 1996 almost 30% of the milk suppliers supplied milk below 400,000 CFU/ml, while the figure was only 8% in 1995.

In the same time span, the percentage of suppliers delivering milk with a bacteria count above 3,000,000 CFU/ml dropped from 85 % to 65%.



Development in bacteria classification in Denmark

In Denmark in 1972 the first class bacteria limit was changed from 400,000 to 200,000 CFU/ml. First the percentage of farmers in the first class dropped from 80% to 65%, but it only took six months before 80% of the farmers were supplying first class milk again.

This positive trend has continued, and today the first class extra limit is below 30,000 CFU/ml. As the graph shows, 90% of the farmers now deliver milk of this quality.

The graphs above illustrate examples of positive development in Bacteria Classification as a result of the influence of payment systems.

The Danish payment system - an example

The Danish payment system outlines the minimum prices to be paid and the maximum deductions to be made, as well as a minimum sampling frequency and parameters tested. The price of raw milk is determined from fat and protein contents in the raw milk. A deduction or a premium is given in accordance to the quality classification.

The system is flexible and allows dairies to pay higher prices and to test additional parameters. Thereby the payment system can be designed to cater to the needs of an individual dairy or dairy group. A similar flexibility is also seen in other countries, e.g. New Zealand.

Milk price - compositional quality

The price of fat and protein is based on the EU intervention prices for year 2004 on butter and skim milk. They are adjusted for the milk treatment costs. Recommended values in 2004:

Fat:	DKK 21.94/kg of fat
Protein:	DKK 37.30/ kg of protein
Milk treatment costs:	DKK 0.12/kg milk
Base price example:	
4.20 % fat: $0.0420 \times 21.94 =$	+ 0.92
3.40 % protein: $0.0340 \times 37.30 =$	+ 1.27
Milk treatment costs:	<u>- 0.12</u>
Base price/kg of this milk:	DKK + 2.07

The base price is finally adjusted with premiums or deductions according to the quality classification.

Quality tests - To grade the quality of milk a sample of milk received from the individual milk producer must be taken at least once a week. The sample is submitted to the following tests:

1. Bacteriological test every week
2. Cell count and inhibitory substances determinations at least once every 4 weeks.
3. Determination of added water at least once every 12 weeks.

Quality premiums and deductions

Bacteria Quality Grading

	Class limits CFU/ml	Recommended price adjustment DKK/kg milk (2004)
Class 1 extra	< 30,000	+ 1%
Class 1 B	< 50,000	0
Class 2	< 200,000	-4%
Class 3	> 200,000	-10%

Somatic Cell Quality Grading

	Class limits cells/ml	Recommended price adjustment DKK/kg milk (2004)
Class 1 S	< 200,000	2%
Class 1 extra	< 300,000	1%
Class 1	< 400,000	0
Class 2	< 500,000	-4%
Class 3	> 500,000	-10%

If inhibitory substances are found, and these are identified as antibiotics or chemotherapeutics, then price deductions are made. The deduction in payment to the milk producers correspond to the value of at least two days' milk production.

Milk price examples

„Good Case“

Fat 4.30%, protein 3.60%, CFU 15,000, SCC 190,000

Base price:	$(21.94 \times 0.043) + (37.3 \times 0.036) - 0.12$	+ 2.17
Bacteria grading: Class 1 extra		+ 1%
Somatic cell grading: Class 1 Super		+ 2%
Price/kg milk:		DKK 2.23

„Room for Improvement Case“

Fat 3.95%, protein 3.10%, CFU 150,000, SCC 760,000

Base Price:	$(21.94 \times 0.0395) + (37.3 \times 0.031) - 0.12$	+ 1.90
Bacteria grading: Class 2		- 4%
Somatic cell grading: Class 3		- 10%
Price/kg milk:		DKK 1.64

FOSS

FOSS Analytical
69, Slingerupgade
DK-3400 Hilleroed
Dänemark

Tel.: +45 7010 3370
Fax: +45 7010 3371

info@foss.dk
www.foss.dk

