The Milk Day

Trento 4th February 2015

Milk quality testing and regulation

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The DRRR – About us

The DRRR covers the following scientific sectors:

- Chemical testing
- Microbiological testing
- Organoleptic testing
- Physical-mechanical testing

We provide services for:

- Food industry
- Packaging / Commodities industry
- Construction and Building materials

DRRR proficiency testing schemes

- More than 220 regular PT’s in 2014
- More than 250 PT’s planned in 2015
The DRRR - Accreditation

- The DRRR is an inspection body accredited for proficiency testing services acc. to DIN EN ISO/IEC 17043:2010:
- The DRRR accreditation covers:

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<th>Parameters</th>
<th>Food and Feed and Commodities</th>
<th>Commodities</th>
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<td>all chemical testing parameters, and all microbiological testing parameters (risk group 1 and 2)</td>
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<td>Organoleptic testing parameters</td>
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<td>Various physical-mechanical testing parameters</td>
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Dairy chain

From the cow to the supermarket - how is the quality of milk tested
Testing for milk quality

Quality testing of milk and dairy products in Germany.

In principle it is similar in all EU countries

1. Testing for milk payment according to legal regulations

2. Testing for harmful chemical residues and contaminants as well as pathogen microorganisms according to food safety regulations
Testing for milk payment

The legal regulation for milk payment testing is documented in the federal milk quality regulation.

Main quality parameters are:

1. Fat
2. Protein
3. Freezing point
4. Somatic cell count below 400.000
5. Total count of bacteria below 100.000

According to the tested values the payment for the farmer is calculated.
Milk payment testing

The milk is collected at the dairy farm. 50 ml milk of each farm are sampled by the truck driver.

The milk is transported to the dairy plant.

But the milk samples are transferred to the milk payment lab.
1. The milk payment lab tests the milk payment parameters. The dairy plant must pay according to the values of the milk payment lab.

2. Big milk payment labs are testing up to 25,000 samples a day and more. So rapid testing methods like IR-spectroscopy are commonly used.
The food and consumer protection authorities are in charge of protecting the consumers. Legal limits of risk parameters have not to be exceeded by food manufactures. Limits are published in documents like EU regulation 2073. So the food manufactures are responsible to assure that their final products do not exceed the legal limits of e.g.:

1. Chloramphenicol
2. Mycotoxins
3. Aflatoxin M1
4. Trichlormethan
5. Radionuclides
6. Residues
7. Many others
Testing for consumer protection

The plant’s lab and its contract lab routinely test the intermediate and final products to assure that the legal requirements are fulfilled and additionally crosscheck the payment labs.
The labs of the food and health authority test the final products in the supermarket to assure that no risk and no harm affects the consumers according to the food safety regulation.
Requirements for labs in milk payment testing

Due to the high number of samples the application of the reference methods would be very expensive. The reference method for fat is Röse-Gottlieb. A routine lab runs up to 40 tests of Röse-Gottlieb a day.

A good calibrated IR spectrometer can achieve high quality testing results. It can test fat, protein and freezing point in 1 minute.

But calibration is difficult. If the calibration is wrong a high number of samples is tested wrong.

The difference of 0.01% fat means for all Europe about 68.000.000 Euro/year.
Requirements for dairies

Dairies are challenged to identify whether the milk is contaminated or not. They need to know this before the production is started. Ideally the dairy wants to know if the milk is contaminated before the truck driver pumps the milk in his truck.

What is needed is a rapid test that is easy to operate and easy to read for a truck driver.

Once the milk is in the dairy it can be stored for about one day than the milk must be heat treated. So the dairy has about 24 hours to check for residues and contaminants.
The food safety authorities can take the time they need for applying the reference methods
Requirements for testing methods

Indirect methods like IR-spectroscopy are fast and relatively cheap and can be tested directly in the matrix.

But they need to be calibrated. And for a calibration, calibration material is needed.

In ideal cases the calibration material connects the reference method to the indirect method.

So the calibration material is a limit to the calibration
Requirements for testing methods

In field of dairy a variety of test kits are applied. The test kits usually are easy to operate, no sample preparation is necessary.

The challenge for test kit producers is to assure sufficient
- selectivity
- sensitivity
- accuracy

Until now most test kits are applied as a pre screening

Many kits only test for present-absent
To develop a quantitative test kit is a far bigger challenge.
Thank you for your attention!

If you have any questions or suggestions please do not hesitate to contact us.

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