MILKOTESTER

Milk density determination

A/ With pycnometer and Mor-Vestval scales

This is the most exact method for determination of milk and its derivatives' density.

B/ With aerometer (lacto-density-meter)

Compared with the above method this is quick and easy readable with satisfactory accuracy. We recommend it. For more detailed description see Appendix Methods.
During the lactation period and under the influence of different zoo engineering factors the density of the different milk kinds varies in the following bounds:

Milk kind	Minimum	Maximum	Average
Cow	1,027	1,033	1,030
Buffalo	1,026	1,032	1,029
Goat	1,027	1,033	1,030
Sheep	1,031	1,040	1,034

Determination of total proteins

A/ Kjeldahl method

Heating with concentrated sulphuric acid in the presence of catalyst mineralizes a definite volume of the milk sample. The liberated ammonium combines with the sulphuric acid and forms ammonium sulphate. After adding surplus soda caustic ammonium is liberated. When distilled it combines with the boronic acid.

The quantity of the combined ammonium is determined by titration with acid with determined titer. Combined with the ammonium acid the initial nitrogen content is determined, and also the proteins in the milk.

B/ Titration with formalin

Formalin, added to the milk, combines with the amino group in the protein's molecule and forms methyl groups, which have no alkaline reaction. Milk acidity increases by the liberated carboxylic groups, which are titrated with soda caustic solution. The used volume soda caustic is proportional to the protein content in the milk.

Determination of casein content in the milk

A/ Kjeldahl method

The total nitrogen content in the milk is determined. Casein is precipitated with acetic acid (acetate buffer) and is filtrated. The content of nitrogen in the filtrate is determined. Casein content is the difference between the two results for nitrogen using the Kjeldahl's method.

B/ Titration with formalin

More details for this method – see Appendix Methods.

Determination of salts in milk

For the salts in milk and its derivatives is judged by its ashes content. Milk dries, becomes carbonized and turns to ashes till constant mass. The ashes received are calculated in percentage.

Determination of solids in milk

Solids describe the content of fats, proteins, carbohydrates and salts. Its value may be used for determination of each of these parameters in case of known other values.
Salts are determined by drying till constant mass – see Appendix Methods.

Express methods by using another milk analyzers

It is possible another device to be used for determination of some of the quality parameters of milk and its derivatives samples, intended for calibration, but it has to be noted that it is possible incorrect values to be received, that's why it is necessary to be completely sure in the accuracy of their readings.

By using it the fat, lactose and protein content may be determined. Problem may arise with determination of salts and SNF. This is due to the impossibility of the infrared method to determine the solids and in order to receive the solids in the sample their meaning is accepted as a constant.

Determination of some of the parameters by formulas

There is dependence between the different parameters in milk and its density, which may be expressed with mathematical equation. On that base different formulas, tested and confirmed by the classical laboratory methods for analyses, are developed. We recommend the following:

SNF determination.

For determination of SNF the correlation dependence exists between the milk's density, fat and SNF in the milk. When the density and the fat are known, the SNF can be calculated.
There are several formulas with different applicability.

A/ When the solids and fat are known
SNF is calculated by subtracting the fat percentage from the solids.
SNF = Total Solids – F (%)
where
Total Solids in (%),
F – fat content in (%),
This formula is used for determination of SNF in whey, buttermilk, and cream.

B/ Known quantity of fat and density (most commonly used method when maximum accuracy is needed).
We recommend the following formula:

$$SNF = \frac{0{,}075 * F\,\% + 100 - 100 / density}{0{,}378}$$

This is a universal formula and actual for milk of almost all kind of cows and sheep all over the world.

Determination of lactose content

We recommend the following formulas:

A/ for cow milk

Lact. = SNF * 0,55 (%)

where

SNF – content of SNF in percentages (%),

0,55 – constant coefficient.

B/ for sheep milk

Lact. = SNF* 0,45 (%)

where

SNF –solids-non-fat content in percentages (%),

0,45 – constant coefficient.

<u>This is an actual coefficient for sheep breeds on the territory of the Balkan Peninsula.</u>

Determination of salts content

We recommend using the following formulas:

A/ for cow milk

Salts = SNF* 0,083 (%)

where

SNF – solids-non-fat content in percentages (%),

0,083 – constant coefficient.

B/ for sheep milk

Salts = SNF * 0,075 (%)

– solids-non-fat content n percentages (%), w
– constant coefficient. h
e

re
SNF
0,075

This is an actual coefficient for sheep breeds on the territory of the Balkan Peninsula.

Determination of total proteins content

We recommend using the following formulas:

- solids-non-fat content in percentages (%), **A/** for cow milk
– constant coefficient. Protein = SNF * 0,367 (%)

where
SNF
0,367

– solids-non-fat content in percentages (%), **B/** for sheep milk
- constant coefficient. Protein = SNF *

0,475 (%)
where
SNF
0,475

This is an actual coefficient for sheep breeds on the territory of the Balkan Peninsula