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METHOD OF MILK RECORDING OF COWS

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BRIEF HISTORY

The ISO Recommendation R 1546, *Method of milk recording of cows,* was drawn up by Technical Committee ISO/TC 34, *Agricultural food products,* the Secretariat of which is held by the Magyar Szabványügyi Hivatal (MSZH).

Work on this question led to the adoption of Draft ISO Recommendation No. 1546 which was circulated to all the ISO Member Bodies for enquiry in March 1968. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Belgium	Ireland	Spain
Brazil	Israel	Sweden
Canada	Korea, Rep. of	Turkey
Czechoslovakia	Netherlands	U.A.R.
France	Norway	United Kingdom
Hungary	Poland	U.S.S.R.
India	Portugal	
Iran	Romania	

The following Member Body opposed the approval of the Draft :

New Zealand

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in April 1970, to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 1546 | April 1970

METHOD OF MILK RECORDING OF COWS *

INTRODUCTION

Capacity for milk production is one of the criteria for assessing the genetic qualities of cattle.

This capacity is assessed from systematic records of the amount of milk produced and of one or more of the quality characteristics of the milk, i.e. : butterfat content, solids-non-fat, protein content, etc.

The obtaining of these data, their recording and their rational utilization, to assess the capacity for milk production of a herd of cattle, constitutes what is known as "milk recording".

The method of milk recording described in this ISO Recommendation conforms to the requirements of the European Agreement on the Standardization of Milk-Butterfat Recording Practices drawn up by the European Committee on Milk-Butterfat Recording Practices (ECMBR).

Milk recording fulfils a twofold purpose :

(1) at the level of the individual breeder, it provides an objective means of selection of the females under test, based on the quantity and quality of their milk, and permits a more efficient management of the herd, technically and economically;

(2) at the collective level, it contributes to the characterization of a given breed, to the determination of the value of a sire, and to research activities generally on questions related to genetics and economics.

The milk recording practices described in this ISO Recommendation should be carried out by either

Method A : i.e. exclusively by qualified staff attached to the controlling authority; or

Method B : i.e. by the owner of the cows or his representative, in collaboration with the controlling authority. However, the analysis of the milk should be effected only by the controlling authority.

The form in which milk recording data are presented, and their interpretation, demand a rigorous standardization of the various operations assigned to the recorders, and no less strict a standardization of the general organization of the control work, and this to meet both the animal husbandry requirements and those associated with the mechanical processing of the data in question, should this be desired.

Finally, this standardization is required especially for selling breed stock on a well organized basis.

1. SCOPE

This ISO Recommendation describes the method of milk recording which should be adopted for all cows of dairy breed or of breeds with a predominant milk capacity, in any one herd**.

This ISO Recommendation concerns, however, only milk production and fat production.

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* The principle of the method described is applicable also to buffalo cows.

** A herd is defined as a group of cattle kept for the same purpose, belonging to the same owner, and accommodated in the same group of farm buildings.

2. GENERAL PRINCIPLE

Determination of the total milk and butterfat production of the cow during her successive lactations or operational years throughout her life, from the data obtained at selected time intervals, without any correction or modification, for the quantity of milk and of fat produced over 24 hour periods.

3. RECORDING STAFF

Milk recording should be carried out by specially qualified and suitably trained personnel.

4. TECHNIQUE OF MILK RECORDING

4.1 Duration

Each periodical milk recording operation should extend over a period of 24 hours; an exhaustive milking* should be carried out every time that it is felt necessary.

4.2 Determination of the quantity of milk produced

By means of a weighing machine graduated in units of not more than 200 g, which is approved by the authorities responsible for supervising the milk recording practices and tested periodically, determine the mass of milk collected at the usual milking times from the cow under test, during 24 hours. Express the result in kilogrammes, to one decimal place**.

4.3 Determination of the butterfat content

4.3.1 *Constitution of the sample.* At each milking, draw a sample after complete mixing of the milk. The size of these primary samples should be proportional to the quantity of milk obtained at each of these milkings, except in the case of milkings carried out at approximately equal time intervals, when samples may then be of equal size.

Mix the primary samples well and render homogeneous the average sample thus obtained.

4.3.2 *Keeping of the samples.* It is important that the milk be kept under conditions in which it cannot deteriorate. One method of ensuring this is to maintain it at a temperature as close as possible to, but above 0 °C. Another method is to add a preservative or antiseptic to the milk (for instance, potassium dichromate in the proportion of 1 g per litre of milk, mercuric chloride in the proportion of 1 g per litre of milk, or formalin in the proportion of 1 to 2 ml per litre of milk). In the second method, provision should be made for the treated milk to have a distinctive colour to avoid it being mistaken for untreated milk. Moreover, should the additive be highly toxic, the receptacle containing the treated milk should be clearly marked to identify it.

4.3.3 *Method used.* Determine the butterfat content of the average sample by the Gerber method*** or any other method giving equivalent results. The method used should be mentioned in the milk-recording report.

Calculate from this, to *three decimal places,* the mass in kilogrammes** of fat produced during the 24 hours.

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* Milking carried out at the normal time interval immediately preceding the milkings which are the subject of the daily recording in question. The results of this milking are noted but not normally included in the calculation. Should however the results of a daily milking be mislaid or lost, it is preferable, rather than to discard the recording, to use the results of the exhaustive milking in their place in the calculation.

** Milk recordings will be expressed in pound (lb) units in countries which are not yet geared to the metric system, and where this is still normal practice.

*** See ISO Recommendation R ..., *Milk – Determination of fat content – Gerber method* (in preparation).

5. FREQUENCY OF RECORDING

A record of the quantity of milk and of butterfat produced in 24 hours should be made at least once a month. The time interval between two successive recordings should be within the following extreme limits :

- 26 to 33 days, for monthly recording;
- 18 to 24 days, for three-weekly recording;
- 12 to 16 days, for fortnightly recording.

These same recording intervals should, as a general rule, be maintained throughout the period of lactation or of the operational year. Any departure from this rule should be recorded in the report.

6. DURATION OF CONTROL

Milk recording can be carried out over the whole of the lactation period, i.e. using the "lactation period method", or over 365 consecutive days, i.e. using the "operational year method". These two methods are described below.

6.1 Lactation period method

This method is defined by the following criteria :

(*a*) the control should be exercised during the whole lactation period;

(*b*) the lactation period is taken as beginning on the first day after calving;

(*c*) milk-butterfat control (weighing of milk, sampling for analysis) should not be carried out before the fourth day after calving;

(*d*) the lactation period is considered ended when the cow is no longer milked twice a day. In this case, by convention, the date for stopping control is taken,

- in the case of fortnightly control, as the seventh day
- in the case of three-weekly control, as the tenth day
- in the case of monthly control, as the fourteenth day

} after the last normal recording, the day in question being included in the calculation.

Lactations may however be calculated for as long as the cows with over 3 kg of milk daily are milked regularly at least once a day for a period longer than one week.

6.2 Operational year method

This method is defined by the following criteria :

(*a*) the control begins at any given date and ends on the day preceding that date in the following year;

(*b*) milk-butterfat control (weighing of milk, sampling for analysis) should not be carried out before the fourth day after calving;

(*c*) the lactation period is considered ended when the cow is no longer milked twice a day. In this case, by convention, the date for stopping control is taken,

- in the case of fortnightly control, as the seventh day
- in the case of three-weekly control, as the tenth day
- in the case of monthly control, as the fourteenth day

} after the last normal recording, the day in question being included in the calculation.

Lactation may, however, be calculated for as long as the cows with over 3 kg of milk daily are milked regularly at least once a day for a period longer than one week.

7. REFERENCE LACTATION PERIOD

Whichever method is followed, and in order to be able to compare the milking value of cows, the lactation periods of which are different but exceed 305 days, a period designated as the "reference period", corresponding to the first 305 days of lactation, should be taken as the basis of comparison.

The results of this reference lactation period of 305 days should be provided in addition to those of the lactation period or operational year, for all cows belonging to any one of the following categories :

- registered cows;
- cows entered in the grading register;
- cows which, on account of their descent and performance, have the right to be entered in the herd book or in the grading register;
- cows which, on account of their descent and performance, have the right to be issued with an official pedigree certificate.

8. EXPRESSION OF RESULTS

8.1 Methods of calculation

The total quantity of milk and butterfat, as well as the percentage of butterfat in the milk, can be calculated from the data collected during milk recording, in one of the three ways given in the Annex.

NOTE. – Variants of these methods of calculation are permitted, but, if any is used, this should be mentioned in the milk recording report.

The total masses of milk and of butterfat should be expressed in kilogrammes*, the figure being obtained from the calculated value by rounding it to the whole number immediately above it if the first decimal is 5 or more, otherwise to the whole number below.

The percentage of butterfat in the milk should be rounded to two decimal places on the same principle.

8.2 Remarks

8.2.1 If, owing to vis major** (paid holidays for instance), the recording is suspended for a period not exceeding 60 days, the missing figure or figures may be replaced by the means of the results of the recordings immediately before and after it.

If the interruption exceeds 60 days, such averages will not be recognized.

8.2.2 The results obtained by the methods of calculation given in the Annex should be registered without any correction or modification whatsoever.

9. MILK-RECORDING REPORT

The milk-recording report should record the results obtained, without modification or correction. It should also mention

(1) which method was used for carrying out the milk-recording (Method A or Method B)***;

(2) the method of calculation used, if it differed from the three methods given in the Annex;

(3) details establishing the identity of the animal;

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* Milk recordings will be expressed in pound (lb) units in countries which are not yet geared to the metric system, and where this is still normal practice.

** The heat period of the cow is not considered a vis major.

*** These methods are defined in the Introduction.

(4) the factors liable to affect the yield, in particular :

- the date of birth of the cow, in years and months, according to the registration in the herd book (each month begun counting as a whole month). For cows for which the date of birth is not known, the age should be estimated from an examination of the teeth;
- the number of daily milkings;
- the exact dates of all calvings;
- the duration of each previous lactation, or the number of milking days completed during the operational year;
- the total production of milk and of fat, in kilogrammes*, obtained in each previous lactation or operational year, and the corresponding percentages of fat;
- the content in proteins or solids-non-fat, if this has been determined;
- the date of commencement of the operational year;
- if possible, the duration of mammary repose (dry period) previous to each calving;

and, optionally :

- the method of milking (by hand or mechanical);
- the nature of the diet;
- the state of health (any accidents or diseases which have occurred during the lactation period or previously);
- the special environmental conditions : stabling, lowland or mountain pasturage (altitude of mountain pastures, duration of mountain grazing), possible utilization for work;

(5) intervals between recordings in days (in Arabic numerals).

Where milk-recording is not always carried out at the same time as butterfat recording, the intervals between the butterfat recordings should be indicated separately in days;

(6) Whether the frequency of testing has been changed in the course of the lactation or operational year.

* Milk-recordings will be expressed in pound (lb) units in countries which are not yet geared to the metric system, and where this is still normal practice.

ANNEX

METHODS FOR CALCULATING THE TOTAL QUANTITY OF MILK AND OF BUTTERFAT AND THE AVERAGE PERCENTAGE OF BUTTERFAT

A.1 METHOD No. 1

Let :

C be the number of 24 hour testings carried out;

S the sum of the masses (M_1 ... M_n) in kilogrammes, given to one decimal place, of the milk weighed in the C testings;

s the sum of the masses (m_1 ... m_n), in kilogrammes, given to three decimal places, of fat determined during these testings;

N the number of days of lactation.

The total mass, in kilogrammes, of the milk produced during the lactation is equal to

$$\frac{S}{C} \times N$$

The total mass, in kilogrammes, of the corresponding butterfat is equal to

$$\frac{s}{C} \times N$$

The average percentage of butterfat in the milk is equal to

$$s \times \frac{100}{S}$$

If N is greater than 305 days, give the above results corresponding to 305 days.

A.2 METHOD No. 2

Let :

$M_1, M_2, \ldots M_n$ be the masses, in kilogrammes, given to one decimal place, of milk weighed in 24 hour testings $C_1, C_2, \ldots C_n$;

$m_1, m_2, \ldots m_n$ the masses, in kilogrammes, given to three decimal places, of the butterfat determined during these testings;

$I_1, I_2, \ldots I_{n-1}$ the interval in days between testings C_1 and C_2, C_2 and C_3, ... C_{n-1} and C_n;

I_0 the interval in days between calving and the first testing;

I_n the interval in days between the last testing and the end of the period of milk recording.

The total mass, in kilogrammes, of milk produced during the lactation is equal to

$$S = M_1 \left(I_0 + \frac{I_1}{2}\right) + M_2 \left(\frac{I_1 + I_2}{2}\right) + M_3 \left(\frac{I_2 + I_3}{2}\right) + \ldots + M_{n-1} \left(\frac{I_{n-2} + I_{n-1}}{2}\right) + M_n \left(\frac{I_{n-1}}{2} + I_n\right)$$

The corresponding mass, in kilogrammes, of butterfat produced is equal to

$$s = m_1 \left(I_0 + \frac{I_1}{2}\right) + m_2 \left(\frac{I_1 + I_2}{2}\right) + m_3 \left(\frac{I_2 + I_3}{2}\right) + \ldots + m_{n-1} \left(\frac{I_{n-2} + I_{n-1}}{2}\right) + m_n \left(\frac{I_{n-1}}{2} + I_n\right)$$

The average percentage of butterfat in the milk is equal to

$$s \times \frac{100}{S}$$

If the number of days of lactation is greater than 305, give the results corresponding to the first 305 days.

A.3 METHOD No. 3

Let :

$M_1, M_2, \ldots M_n$ be the masses, in kilogrammes, given to one decimal place, of milk weighed in 24 hour testings $C_1, C_2, \ldots C_n$;

$m_1, m_2, \ldots m_n$ the masses, in kilogrammes, given to three decimal places, of the butterfat determined during these testings;

$I_1, I_2, \ldots I_{n-1}$ the intervals in days between testings C_1 and C_2, C_2 and C_3, ... C_{n-1} and C_n;

I_0 the interval in days between calving and the first testing;

I_n the interval in days between the last testing and the end of the period of milk recording.

The total mass, in kilogrammes, of milk produced during the lactation is equal to

$$S = I_0 M_1 + I_1 \left(\frac{M_1 + M_2}{2}\right) + I_2 \left(\frac{M_2 + M_3}{2}\right) + \ldots + I_{n-1} \left(\frac{M_{n-1} + M_n}{2}\right) + I_n M_n$$

The corresponding total mass, in kilogrammes, of butterfat produced is equal to

$$s = I_0 m_1 + I_1 \left(\frac{m_1 + m_2}{2}\right) + I_2 \left(\frac{m_2 + m_3}{2}\right) + \ldots + I_{n-1} \left(\frac{m_{n-1} + m_n}{2}\right) + I_n m_n$$

The average percentage of butterfat in the milk is equal to

$$s \times \frac{100}{S}$$

If the number of days of lactation is greater than 305, give the results corresponding to the first 305 days.