

STANDARDIZATION OF MILK

Standardization:

Defined as the adjustment of one or more of the milk constituents to meet the legal requirement or nominated level.

In market milk industry, normally involves reducing the butterfat content by addition of skim milk or

Through the removal of cream

Objectives

To comply with the legal requirements for particular milk/dairy products.

To provide the consumer with a uniform product.

To ensure economics in production.

➤ Addition of skim milk increases the volume of milk available for sale

and

➤ Removal of cream allows the production of other value added dairy products s/a table cream, butter or other Dairy products

Methods of Calculation

For standardization of milk or cream for product manufacture, usually the proportions of the various ingredients of known composition to be mixed, -- required to be estimated.

Done by:

- Pearson's Square method
- Algebraic equations

Pearson's square Method

Draw a square and place in the Centre of it the desired fat percentage.

Place at the left hand corners of the square, the fat percentage of the materials to be mixed.

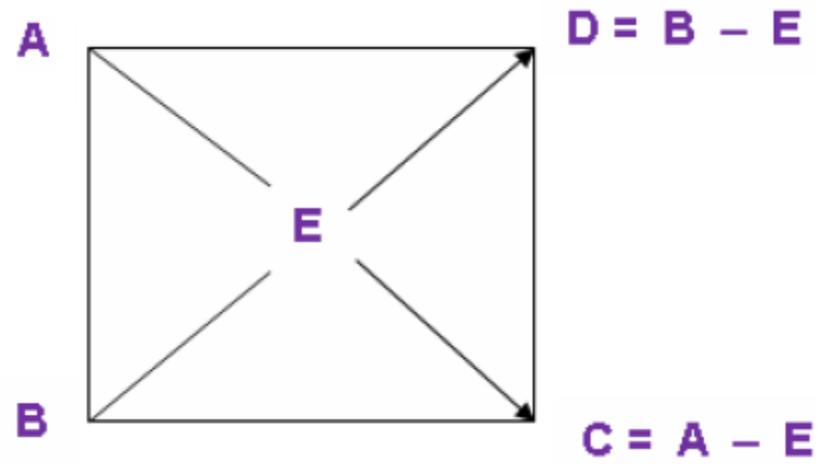
Next, subtract the number in the Centre from the larger number at the left hand side of the square and place the remainder at the diagonally opposite right hand corners.

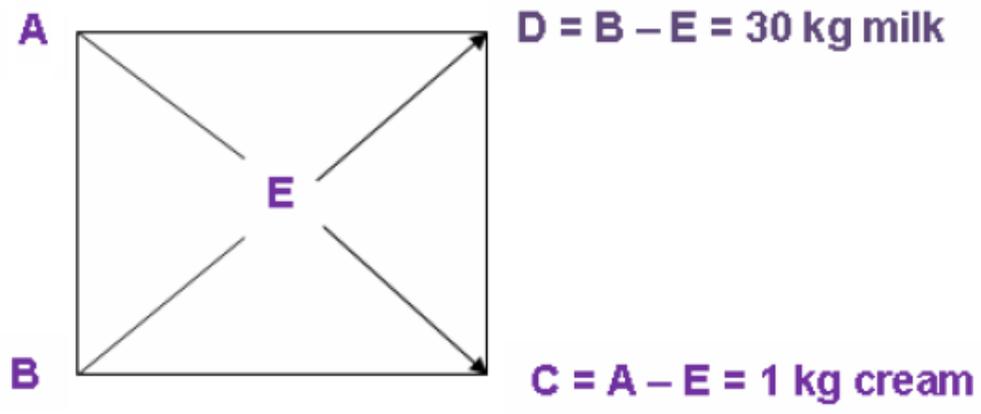
The number on the right hand side now represents the number of parts of each of the original materials that must be blended to have the desired fat content in resultant mix

The number at the upper right corner refers to the parts of material whose fat test was placed at the upper left corner.

The number at the lower right corner refers to the parts of material whose fat test was placed at the lower left corner.

If the numbers on the right are added, the sum obtained will represent the parts of the finished product.





Numericals

Examples Problem 1

600 kg of cow milk testing 4% fat is to be standardized to toned milk by removing 33% fat cream. Calculate the amount of toned milk

Examples Problem 2

1000 kg of double toned milk (DTM) is to be prepared by mixing whole milk, testing 5.5% fat and skim milk testing 0.2% fat. Calculate the amount of whole milk and skim milk required.

Algebraic Equations

We have to know the composition of the products to be mixed, the final product and the quantity of any one product.

Mass balance equations are formed and solved

□ The formula for determining the quantities of skim milk and raw milk on this basis as follows:

✓ Skim milk (kg) = kg standard milk required x (% fat in raw milk - % fat in standard milk)

✓ □ Whole milk (kg) = kg standard milk required x (% fat in standard milk - % fat in skim milk)

□ Problem

Prepare 500 kg milk testing 3.0% fat and 8.5% SNF. You are provided with whole milk having 5.0% fat and 9.0% SNF and skim milk powder having 0.5% fat and 96.0% SNF.

□ Solution:

Let the quantity of the whole milk = X kg

Quantity of SMP = Y kg

Quantity of water = Z kg

Fat equation:

SNF equation:

$$X + Y + Z = 500$$

Methods of Standardization

Batch standardization

- Process most commonly used in the dairies
- The demerits of batch standardization -- the time taken for agitation, testing and final mixing.

Continuous standardization

- ✓ Employs an inline sampler in association with a testing device, which samples, measures and displays the fat content every 20 seconds.

Automatic standardization

- ✓ An extension of the continuous process.
- ✓ The separator is replaced by a microprocessor/controller unit linked to the sampler/tester system
- ✓ The merits of this automatic process are time and labour savings and ensure more accurate standardization than other methods

Tri-Process Machine

- ✓ Tri-process machine - designed to clarify, separate, standardize milk in a single unit.
- ✓ The general construction -- similar to that of standard cream separator.
- ✓ The tri-process separator --- external valves in the discharge lines of cream and skim milk
- ✓ A precise needle valve is fixed in the outlet for cream, which controls the cream flow rate
- ✓ There is a bypass line connected from the cream discharge line to the skim milk discharge line.

Thankyou