# EXPERIMENT 6  STANDARDIZATION OF MILK

**Structure**

## 6.1  INTRODUCTION

Normally, fat and/or solids-not-fat of milk is adjusted to a desired level so that the particular type of milk conforms to prescribed legal standards.

PFA Standards of different milks in India

| Class of milk | Minimum % | |
|---|---|---|
| | **Milk fat (m.f.)** | **Milk solids-not-fat (MSNF)** |
| Standardized milk | 4.5 | 8.5 |
| Recombined milk | 3.0 | 8.5 |
| Toned milk | 3.0 | 8.5 |
| Double toned milk | 1.5 | 9.0 |

Basically, there are two methods by which whole milk can be standardized. They are: a) removal of excess fat by separation, b) addition of skim milk or skim milk powder and water. In non-availability of whole milk, skim milk powder and cream or white butter or butter-oil can also be used for standardization. For standardization of a single component i.e., either fat or SNF of milk, "Pearson's square" method is used. Whereas for fat and SNF both, the Algebraic method is suitable.

## 6.2  OBJECTIVES

Prepare standardized, recombined, toned and double toned milk.

## 6.3  EXPERIMENT

### i. Principle

Excess fat of whole milk can be reduced to the desired level by proper adjustment of cream screw and/or skim milk screw of a cream separator, standardizer or tri-process machine.

In case where fat or SNF is to be adjusted, the quantity of fat or SNF source is

calculated using Pearson's square method. To calculate, a square is drawn and the desired fat or SNF percentage is placed in the centre of it. At the left hand corners of the square, fat or SNF percentage of given material is placed. The difference between the number in the centre and the number placed on the left hand corner is taken and the differences on diagonally opposite right hand corners are placed. Then, the numbers on the right hand side represent the points of each of the original materials that must be blended to get a product with the desired fat or SNF test. The numbers at the upper right hand corner refer to the material whose fat or SNF is placed at the upper left corner. Similarly, the number at the lower right hand refer to the material whose fat or SNF is placed at the lower left hand corner.

For standardization of milk for fat and SNF by using algebraic method, normally three equations are developed:

1) Mass

2) Fat and

3) SNF equations.

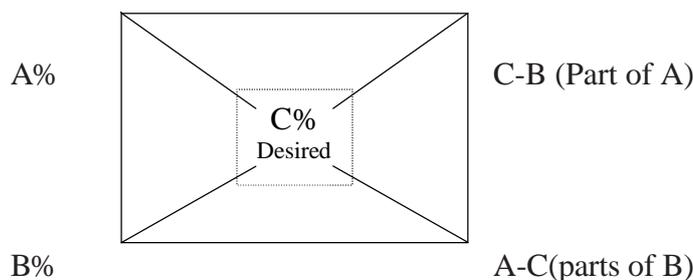Solving these 3 equations, the quantity of various ingredients required will be calculated.



A%                                    C-B (Part of A)

C%
Desired

B%                                    A-C(parts of B)

**Fig Pearson's Square**

Add (C-B) + (A-C) = total containing C%

## ii. Requirements

Stainless steel multipurpose vat, weighing balance, S.S. containers, stirrer, bottles, lactometers, thermometers, fat testing unit, buffalo milk /cow milk/skim milk of known composition, skim milk powder and /or cream/butter oil/white butter of known composition, and fat testing reagents.

## iii. Procedure

1. Determine the fat and SNF.

2. Calculate the quantity of cream, milk, skim milk or skim milk powder required in the standardized milk.

3. Weigh each ingredient separately.

4. Mix the ingredients thoroughly in a multipurpose vat.

5. In case SNF level is to be raised, mix skim milk powder while constantly stirring the contents in the vat.

6. Pasteurize the product by the Batch or HTST process and cool below 4-5º C.

7. Fill the milk in the clean sterile bottle/polythene bags.

8. Store milk around 4-5º C till distribution

### iv. Observations

The following observations should be recorded:

i) Composition of ingredient

Particulars                                   % Fat          % SNF

   a) Milk

   b) Cream

   c) Skim milk

   d) Skim milk powder

   e) White butter

ii) Quantity of ingredients

   a)  Buffalo/cow milk                   …………..      Kg

   b)  Skim milk                          …………..      Kg

   c)  Skim milk powder                   …………..      Kg

   d)  Cream                              …………..      Kg

   e)  White butter                       …………..      Kg

iii) Type of milk prepared               …………..

iv) Quantity of milk prepared            …………..      Kg

v) Composition of milk prepared

   a)  % Fat

   b)  % SNF

vi) Quantity of milk packed              …………..      Kg

vii)  Loss of milk                        …………..      Kg

viii) Temperature of storage of milk     …………..      °C

### v. Results

i)  Quantity of …………….. milk packed …………. Kgs

ii) % loss of milk = (total quantity of milk taken – quantity of milk packed) *100 / quantity of milk taken

---

## 6.4   PRECAUTIONS

1. Properly check the calculation before mixing the materials

2. Determine fat and SNF contents before packaging to make sure that it conforms the legal standards.

3. Do not use acidic or sour milk or skim milk powder with brown colour and stale flavour.