## Determine of Specific Gravity of Milk

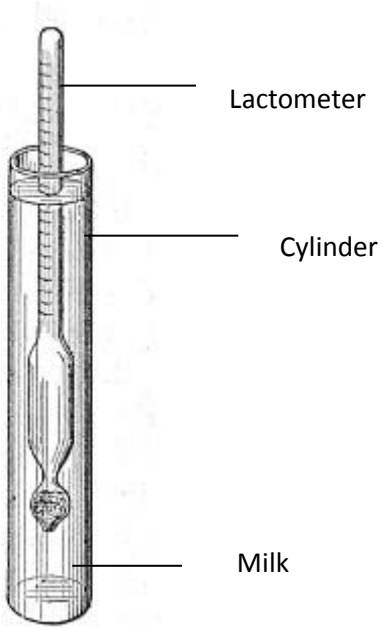
**Specific gravity of milk** means its density compared with water. The specific gravity of milk varies according to the proportion of fat, solid-not fat, and water. The specific gravity of the whole cow's milk ranges from (1.028 to 1.034) gm/ml, with an average of (1.032) gm/ml which means that milk is (1.032) times heavier than water

**Aim:**

To determine the basic nature of milk.
To identify the adulteration of milk.

**Relevant Information:**

Lactometers are used for rapid determination of specific gravity. The method is based on law of floatation which states that when a solid is immersed in a liquid. It is subject to upward thrust equal to the weight of the liquid displaced by the body and acting in upward direction.




Lactometer and Cylinder

**Material required:**

Whole milk, skim milk, partially adulterated milk.

**Equipment required:**

1. Lactometer
2. Jar/cylinder
3. Diary floating thermometer
4. Beakers.

**Procedure:**

1. Adjust the temperature of milk sample at 15.5 °C

2. Mix the milk thoroughly

3. Fill the clean and dry glass jar with milk by add milk to brim of the jar to avoid the incorporation of air.

4. Lower the lactometer gently in the milk making sure that the lactometer floats freely without touching the sides of the jar.

5. Read the lactometer reading at the top of the meniscus within one minute.

6. Record the temperature of milk.

**Calculation:**

Specific gravity of milk can be calculated by the following formula

$$\text{Specific gravity} = \frac{\text{Corrected lactometer reading}}{1000} + 1$$

Note: If the milk temperature is not exactly (15.5) ˚C, correct the lactometer reading by **adding** (0.2) lactometer degree for degree Celsius above (15.5) ˚C, also **subtract** (0.2) lactometer degree for degree Celsius below (15.5) ˚C

**Example**: Calculate the specific gravity of milk sample if you know the lactometer reading is (31) and milk temperature is (14.5) ˚C?

**Solution:**

31 + **0.5** = 31.5 (adding surface tension deference)

15.5 – 14.5 = 1˚C

1* **0.2** = 0.2 (subtract from lactometer reading)

31.5 **-** 0.2 = 31.3 (corrected lactometer reading)

Specific gravity = corrected lactometer reading/ 1000 +1

= 31.3 / 1000 + 1

= 1.0 313 gm/ml.