Estimation of total protein in milk and egg using turbitmetric method

- Proteins in human diet are derived from two main sources, namely animal proteins (e.g. egg, milk, meat and fish.) and plant proteins (e.g. pulses, cereals, nuts, beans and soy products).

- Animal proteins are more “biologically complete” than vegetable proteins.

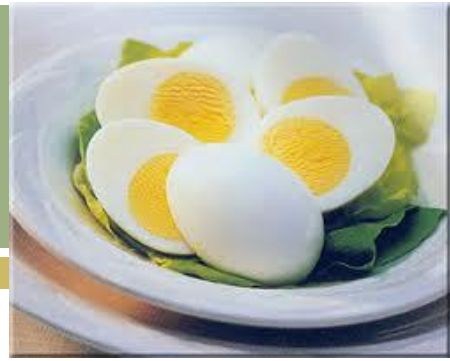
- **Food analysts** are interested in knowing the total concentration, type, molecular structure and functional properties of the proteins in foods

- Proteins are also the major structural components of many natural foods, often determining their overall texture

- Proteins are often used in foods as ingredients because of their unique functional properties, *i.e.,* their ability to provide desirable appearance, texture or stability.

- **Milk proteins:**
- Normal bovine milk contains 30–35 grams of protein per liter
- Primary group of milk proteins are the **caseins** 80%.

- All other proteins found in milk are grouped together under the name of **whey proteins**. The major whey proteins in cow milk are **beta-lactoglobulin** and **alpha-lactalbumin**.



- **Egg proteins:**
- They supply all essential amino acids for humans (a source of 'complete protein'),
- Egg white consists primarily of about 90% water into which is dissolved
  10% proteins (including albumins, mucoproteins, and globulins).
- Unlike the yolk, which is high in lipids (fats), egg white contains almost no fat, and the carbohydrate content is less than 1%.

- The protein content of foods can be determined by numerous methods.
- In this lab turbidimetric method (by sulfosalsalyic acid) will be used to determine the total protein content in milk and egg.
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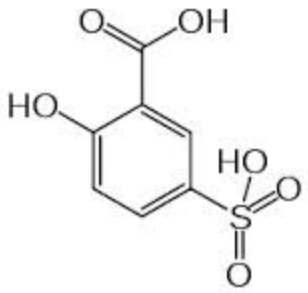
Turbidimetric method

- Determination of total protein by measurement of protein turbidity produce by mixed with an anionic organic acid such as sulfosalicylic acid , TCA , or benzethonium chloride.

- These methods are sensitive , but the reagent does not react equally with each protein fraction.

Principle

- Sulfosalsalyic acid is an anionic precipitant which neutralizes the protein cations leading to its precipitation (pH in highly acidic media, the protein will be positively changed, which is attracted to the acid anions that cause them to precipitate.)



- Then the radiation of a wavelength which is not absorbed by the solution is made to pass through the suspension and the apparent absorption will be solely because of the scattering by the particles.

Continue- principle

- So, the transmitted light will have lower intensity as compared to that of the incident light.

- As a result, if the intensity of the transmitted light is measured, it will give an idea of the number of particles in the suspension.

Method

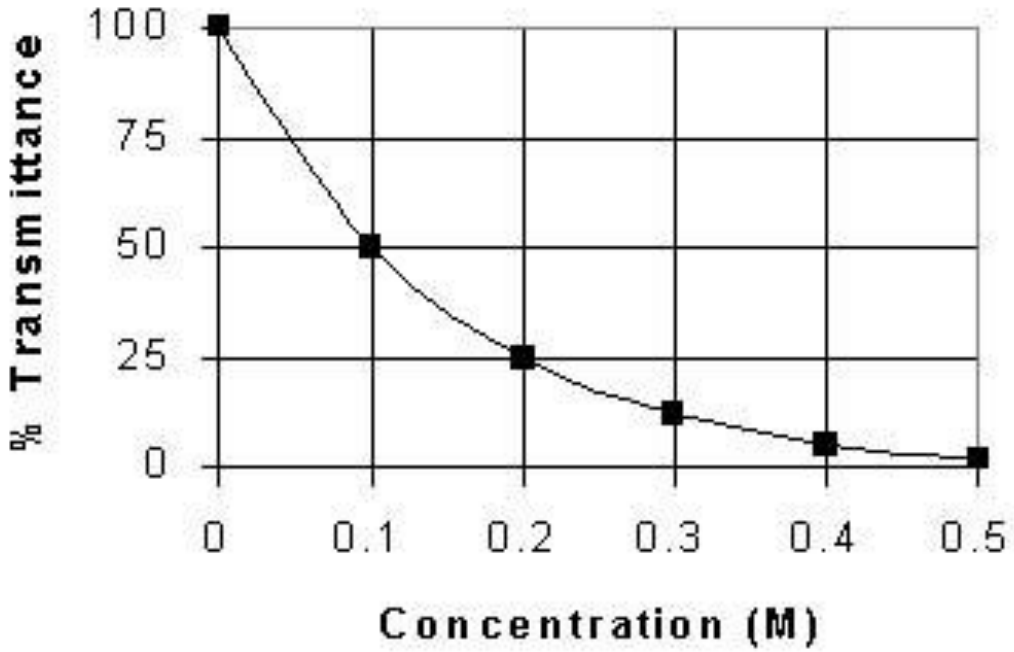
Tube No.	Protein Soln. (ml) 50 mg/dl	H_2O (ml)	sulphosalicylic acid
Blank(0)	**0**	**2**	**8ml**
1	2	0	
2	1.8	0.2	
3	1.5	0.5	
4	1.2	0.8	
5	1.0	1.0	
6	.8	1.2	
7	0.5	1.5	
Milk sample	2	0	
Milk sample	1	1	
Egg white	2	0	
Egg white	1	1	

- Mix the contents of each tube well and allow standing for 5 minutes.
- Using the spectrophotometer for the blank solution at 500 nm, set the transmittance at 100%.
- Record the tubes transmittance.
- Read the protein concentration of the “unknown sample” from the standard curve.

- Result:

Tube	Transmittance	Protein concentration (mg/dl)
B		
1		
2		
3		
4		
5		
6		
7		
Milk sample		
Egg sample		

Standard curve of known protein concentration



- Plot transmittance against protein concentration on semi-logarithm paper (standard curve).

-Read the protein concentration of the “unknown sample” from the standard curve.

- Calculate the concentration of protein in the original sample (g/100 ml)

Calculation

- The concentration from the standard curve (mg/dl) x dilution factor=---------- mg/dl
- ----------/1000= g/dl