B. Sc. (Hons) Part-II Practical
Course: Zool. H. 211
Experiment 2
Detection of albumin/protein in a test sample

Introduction

- Albumin is a family of water soluble, globular protein that is coagulated by heat.
- The presence of albumin in urine is called *albuminuria*. Normal range of albumin in urine is 3.5-5.5 g/dL, excess of which indicates *albuminuria*.
- *Albuminuria* is an important clinical marker in patients with diabetes, cardiovascular disease, defects in liver & kidney functions, shock, malnutrition etc.
- In diabetics, increased urine albumin indicates *nephropathy* or kidney damage.
- Albumin in normal persons is retained in the blood as serum albumin.

Note: Albumen is the egg white, which contains 92% water, 7.9% water soluble protein (albumin) and traces (0.1%) of minerals, vitamins, glucose and fatty substances.

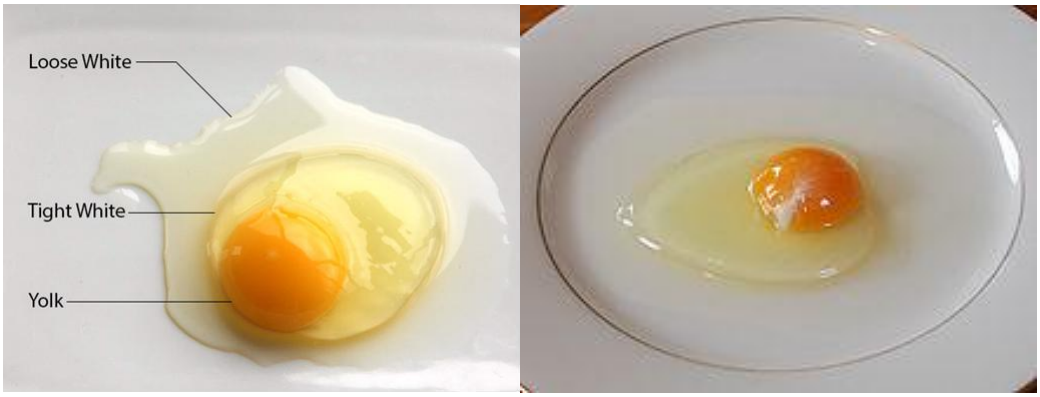

Fig. 1 Egg contents

Materials and Methods

The following apparatus and chemicals are required:

1. A test tube;
2. A test tube holder;
3. A dropper;
4. A spirit lamp;
5. Acetic acid (5%); and
6. Supplied test sample(s).

Several semi-quantitative methods are available for the detection of albumin in a test sample:

1. Boiling test;
2. Immunoturbidimetry;
3. Immunonephelometry;
4. Radoimmunoassay;
5. Antibody-based tests etc.

For its simplicity and convenience, the boiling test is a reliable one and is used in the present experiment.

Procedures for the boiling test

1. The supplied sample (4-5 mL) is taken in a test tube.
2. The tube is the heated over a spirit lamp for 2-3 min up to boiling.
3. Then 3-4 drops of 5% acetic acid is added to the solution.
4. The condition of the solution is then noted.

Results/Observations

Figure 6. Observing the turbidity.

Fig. 2 Turbidity of the test solution

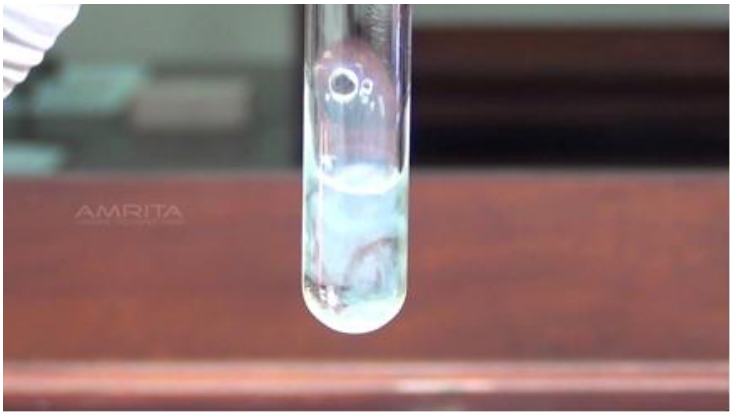

Fig. 3 Turbidity of the test solution shows the presence of albumin

1. If the solution remains **clear**, the absence of albumin is suggested.
2. If the test solution is **turbid** (which is due to coagulation of the protein in the albumen), the presence of albumin is indicated.

Conclusion/Inference

1. Absence of albumin is indicated by a clear solution (no precipitation) even after heating and addition of 5% acetic acid to the test solution.
2. Presence of albumin is indicated by the turbidity of the supplied test solution.

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