IDENTIFICATION OF NUTRIENTS IN SOME COMMON FOODS

PURPOSE

The purpose of this lab is to identify the kinds of nutrients in some common foods. You will gain two benefits from this lab. You will have an opportunity to consolidate some of your lab skills (mixing, labelling, timing, record keeping, etc.) and you will learn that some foods contain nutrients you were unaware of. The results of this lab will also lead to some interesting discussions on the nutrient content of prepared foods.

Note: The following tests are **QUALITATIVE**; that is, they will tell you whether a particular substance is present, but not how ***much of it*** is present. Also, they will ***not*** tell you if a particular food item is nutritious.

ADVANCE PREPARATION

1. Review the structures of proteins, starches, sugars and lipids.
2. Review your class notes on "hidden ingredients" and on "reading labels".
3. Prepare a flowchart of the Methods.
4. Prepare data tables as required.
5. Read Appendix B on Lab Safety, for details on handling caustic substances.

STANDARDS AND BLANKS

A **STANDARD** is a test material that contains a known substance. It should give a positive result. It thus serves as a basis for comparison. You see what a positive result should look like and you can also be sure that the reagent works. A **BLANK**, on the other hand, contains none of the test substance and should give a negative result. Thus, you can be sure that the reagent does not give false positive results.

This provides one form of **CONTROL**. A test material without the indicator reagent is another type of control.

MATERIALS

Collect the following items and take them to your table:

- 2 test tube racks
- test tubes, one for each substance to be tested
- 1 spot plate
- wax pencil
- 1 piece of paper towelling

The following items are obtained at work stations in the lab:

- 2% starch solution
- 2% glucose solution
- 2% sucrose solution
- 2% albumin solution
- corn oil
- several numbered samples
- Benedict's reagent
- Millon's reagent
- Iodine solution
- metal spatulas
- graduated pipettes
- Pasteur pipettes

Water baths for heating the test tubes are at the back of the lab. For safety reasons, do not move them. Label your test tubes clearly with your group symbol to avoid confusion.

METHOD

BENEDICT'S REAGENT — TEST FOR SIMPLE SUGAR

1. Measure 2mL of water into a labelled test tube. Do the same for the glucose and sucrose solutions, and for each of the numbered samples provided.

   Be sure you label each test tube correctly.

2. Add 2 mL of Benedict's reagent to each tube.

3. Place the test tubes in a boiling water bath and leave for 5 minutes. The water bath should boil gently during the 5 minute period. Do not leave for more than 5 minutes or the colour of any positive results will deteriorate.

4. Remove the test tubes. Then check the colour of the test substances and record your results in Table 1.

RESULTS

Table 1. Presence of Sugars in Foods

Substance	Colour	Interpretation
Water		
Glucose		
Sucrose		
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		

METHOD

IODINE SOLUTION — TEST FOR STARCH

1. Obtain a spot plate and, using a grease pencil, label the rims of the depressions for water, starch and the numbered samples.
2. Fill the spot plate depressions no more than half full with the appropriate substance.
3. Add a few drops of Iodine (I_2KI) solution to each depression.
4. Check the colour of the test substances and record your results in Table 2.

RESULTS

Table 2. Presence of Starch in Foods

Substance	Colour	Interpretation
Water		
Starch		
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		

METHOD

MILLON'S REAGENT — TEST FOR PROTEIN

1. Measure 2 mL of water into a labelled test tube. Do the same for albumin, and for each of the numbered samples.

   Be sure that you label each test tube correctly.

2. Add 2 mL of Millon's reagent to each test tube.

3. Place the tubes in a boiling water bath for 5 minutes. The water bath should boil gently during the 5 minute period. Do not over-boil or the colour of the positive results will deteriorate.

4. Remove the test tubes. Check the colour of any precipitate, then record your results in Table III.

Because Millon's reagent contains mercury, the test tubes must not be allowed to boil dry.

Because Millon's reagent contains mercury, special clean-up procedures must be followed. Fluids containing Millon's reagent must be poured into a ***designated*** receptacle. All glassware that came in contact with Millon's reagent must be placed in the designated container.

Because Millon's reagent also contains nitric acid, a caustic substance, care should be taken not to spill or splash any fluids containing Millon's reagent. Should a mishap occur, report it immediately to the instructor or to Lab Staff.

RESULTS

Table 3. Presence of Proteins in Foods

Substance	Colour	Interpretation
Water		
Albumin		
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		

METHOD

GREASE SPOT — TEST FOR LIPIDS

1. Obtain a piece of paper towelling. With a wax pencil, draw and label circles for water, corn oil and the numbered samples.
2. Place a **few** drops or a **small** dab of each substance in the appropriate circle.
3. Place the paper in the incubator to dry. Check the underside periodically to determine when all of the samples are dry.
4. Any water in the samples will evaporate, but oil (lipid) will leave a grease spot. Examine the paper and note which samples left grease spots. Record your results in Table 4.

RESULTS

Table 4. Presence of Lipids in Foods

Substance	Presence of Grease Spot	Interpretation
Water		
Corn oil		
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		

ANALYSIS

1. What do you think your unknown samples were?

2. Were you surprised at any of the results?