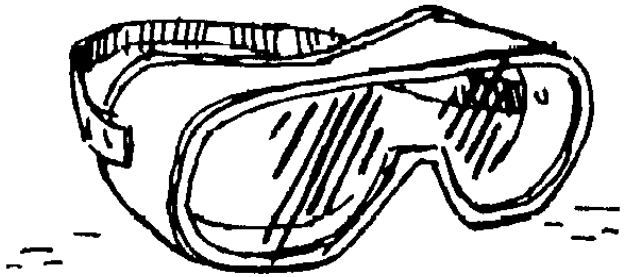
IDENTIFYING MACROMOLECULES IN FOOD LAB

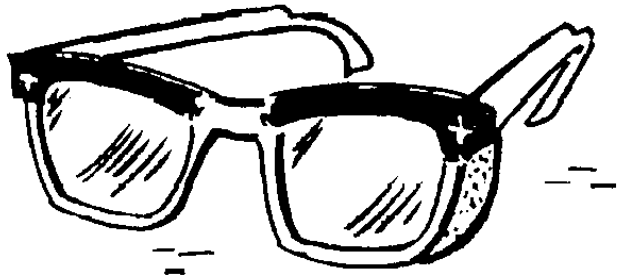
LAB SAFETY and CLEAN UP

WEAR safety goggles and apron at all times

NO EDIBLE products in lab

THOROUGHLY CLEAN lab area and equipment

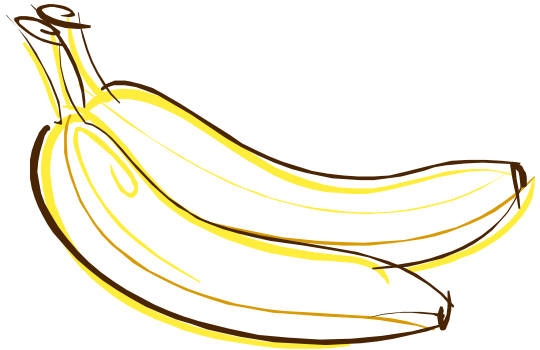




Purpose

write date of the lab

Identify the presence of major nutrients such as simple carbohydrates (glucose), complex carbohydrates (starch), protein and fat in common foods with the use of indicators as chemical detection tools.



What is an indicator?

- Indicators are chemical compounds used to detect the presence of other compounds.

Background Information

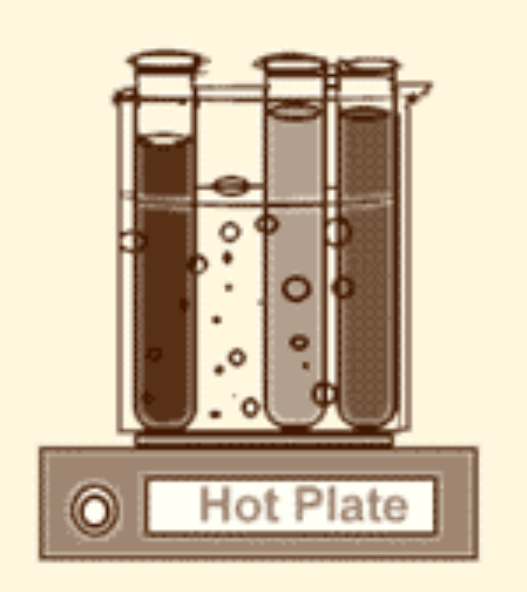
INDICATOR	MACRO-MOLECULE	NEGATIVE TEST	POSITIVE TEST
Benedict's solution	simple carbohydrate	**blue**	**orange**
IKI solution (iodine)	complex carbohydrate	**dark red**	**black** (dark navy blue)
Biuret solution	protein	**blue**	**violet**, **black**
Sudan IV Or (brown paper)	lipid	**dark red**	**reddish-orange**

Test for Simple Carbohydrates
Benedict's solution

- Benedict's solution is a chemical indicator for simple sugars such as glucose: $C_6H_{12}O_6$.
- Aqua blue: negative test; yellow/green/ brick red, etc.: positive test

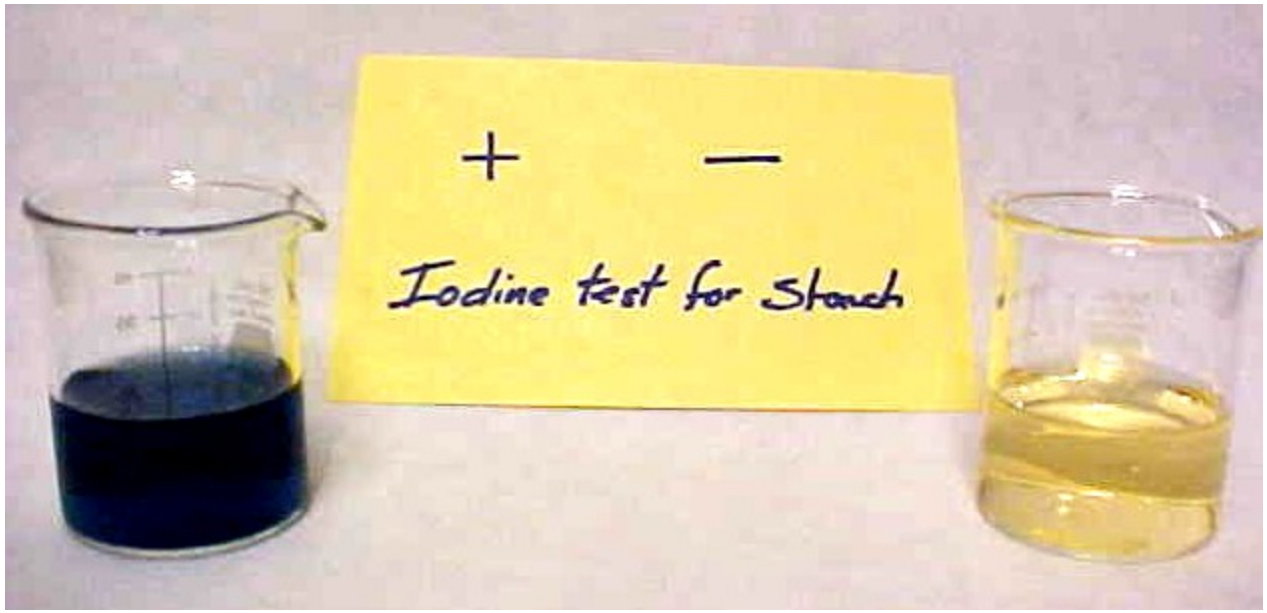
Test for Simple Carbohydrates
Benedict's solution

- Unlike some other indicators, Benedict's solution does not work at room temperature - ***it must be heated first***.



Test for Complex Carbohydrates IKI solution (Lugol's Iodine)

- IKI solution → (Iodine Potassium Iodine) color change = blue to black



Test for Complex Carbohydrates
IKI solution

- Iodine solution is an indicator for a molecule called starch.
- Starch is a huge molecule made up of hundreds of simple sugar molecules (such as glucose) connected to each other.

Test for Protein (amino acids)
Biuret solution

- Biuret solution → dark violet blue to pinkish purple

Test for Fats (lipids)
Sudan IV

- Like lipids, the chemical Sudan IV is not soluble in water; it is, however, soluble in lipids.

- In this test dark red Sudan IV is added to a solution along with ethanol to dissolve any possible lipids.

Test for Fats (lipids)
Sudan IV

- If lipids are present the Sudan IV will stain them reddish-orange (positive test).

Procedure

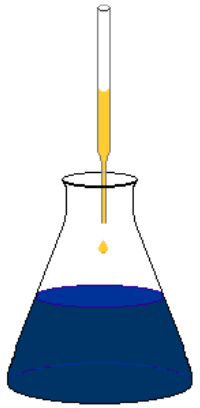
Simple carbohydrate

1. Add 5ml distilled H_2O pipette to test tube
2. Add 1ml of positive sample (glucose solution) to the test tube.
3. Add 1ml of food sample to test tube
4. Add 20 drops of Benedict solution
5. Place test tube in a hot water bath for 10 minutes.

Procedure

Complex carbohydrate

1. Add 5ml distilled H_2O using pipette to test tube
2. Add 1ml of positive sample (sta solution) to the test tube.
3. Add 1ml of food sample to test tube
4. Add 20 drops of IKI solution



Procedure

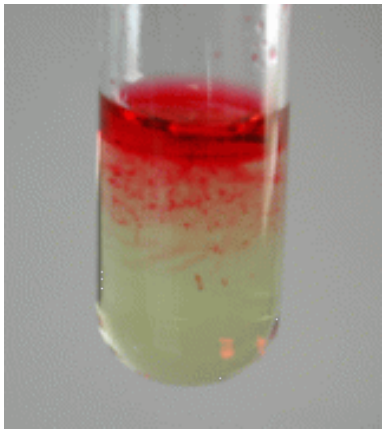
Protein (amino acids)

1. Add 5ml distilled H_2O using pipette to test tube
2. Add 1ml of positive sample (gelatin solution) to the test tube.
3. Add 1ml of food sample to test tube
4. Add 20 drops of Biuret solution

Procedure

Fats (lipids)

- Add 5ml distilled H_2O using pipette to test tube
- Add 1ml of positive sample (vegetable oil) to the test tube.
- Add 1ml of food sample to test tube
- Add 20 drops of Sudan IV



Data Table

Table 2. Data for Food sample _____

Indicator (Food Tested)	**Positive Test Color Result**	**Negative Test Color Result**	**Food Sample Color Result**
Benedict Solution (Simple Carbohydrate)			
Lugol's Iodine (Complex Carbohydrate)			
Biuret Solution (protein)			
Sudan IV (lipid) Brown Bag (lipid)			