Name

Biochemical Components of PeanutsExperiment #9Pre-Lab Exercise

The three major categories of macronutrients in the diet are carbohydrates, proteins and lipids (or fats).

1. Indicate what kind of storage carbohydrate (that humans could metabolize for energy) you would expect to find in a natural food such as a peanut and a chemical test you could do to identify this storage carbohydrate. Check Experiment 5 if you need to refresh your memory.

2. What is the product of hydrolysis of storage carbohydrates and indicate a simple chemical test that would indicate the presence of this hydrolysis product.

3. Describe the differences between saturated fatty acids and unsaturated fatty acids in terms of their chemical structures. What is a polyunsaturated fatty acid?

4. What kinds of chemical reactions might be observed with unsaturated fatty acids that would not be observed with saturated fatty acids? Show a chemical reaction that could take place with an unsaturated fatty acid. You may want to check Experiment 2 where chemical reactions were used to distinguish saturated from unsaturated hydrocarbons or check the text book.

5. Describe (you need not show the chemical reaction) at least two tests that could be used to show that proteins are present in peanuts. You may want to check Experiment 8, where tests were used for protein.

The Biochemical Components of Peanuts Experiment #9

Data & Report Sheet

A. Extraction of Storage Fats from Peanuts

Mass of Peanut Kernels	g
Mass of Flask and Extracted Lipid	g
Mass of Empty Erlenmeyer Flask	g
Mass of Lipid Extracted (Subtract mass of empty flask from mass of f	g lask + extracted lipid

What is the percent of fats in these peanuts: ______ percent (100% x mass of lipid extracted/mass of peanut kernels used for extraction)

Determine the number of kilocalories (kcal or Calories with a capital C) of energy derived from fat in 100 g of peanuts by multiplying 9 kcal/g fat times the answer for percent of fats obtained above. How does this compare with nutritional information for foods (peanuts)? You may need to check a nutrition book or the internet for this information.

B. Measuring Unsaturation of Fats in Peanuts

What was the result when testing peanut oil with potassium permanganate? Was there any color change in the permanganate solution when added to the oil? Describe it.

Would you say that peanuts contain unsaturated fatty acids?

C. Carbohydrates in Peanuts

What happened to the color of the iodine when it was added to the unhydrolyzed peanut meal suspension?

Describe the result after testing the peanut meal suspension (tube U) with Fehling's reagent. Was there any color change or precipitation? What does this indicate with respect to carbohydrates in peanuts?

Describe the result of testing the peanut meal suspension with Fehling's reagent after acid hydrolysis (tube H). Was there a color change or precipitate? What carbohydrates may be present?

What kind of carbohydrate is in a peanut, from the result of the iodine test and the two Fehling's tests on unhydrolyzed and hydrolyzed peanut meal suspension?

Describe the result of testing the peanut shell hydrolysate with Fehling's reagent after acid hydrolysis. Was there a color change or precipitate? What kind of carbohydrate would you expect to be in the peanut shell?

D. Protein in Peanuts

Describe the color of the alkaline copper solution after adding the peanut meal suspension to it, compared to alkaline copper solution in water. This is the biuret test. Would this indicate that protein is present in peanuts?

Describe the colors observed in the peanut meal suspension after heating it with nitric acid.

Describe the color after making the nitric acid solution alkaline with sodium hydroxide.

Does this indicate there is protein in the peanut kernels? Are there aromatic amino acids in the protein?