Names \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why are we paired together?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lipid Extraction Lab**

The fats that you see in raw beef, chicken, and pork are known as visible fats. These fats are in plain view and are solid at room temperature. Vegetable oils are also visible fats. The fats that are in snack foods, cookies, desserts, and candy are known as invisible fats. Although you cannot see them, they can add extra calories to your diet.

**Activity Objective**

In this experiment, we will be extracting and examining the fat in chocolate chips, potato chips, and sunflower seeds. In chocolate, sugar and cocoa are dispersed in a crystallized fat matrix. To keep the fat from separating out of the chocolate, an emulsifier called lecithin is used. The fat in the potato chip is mostly on the surface of the chip from the frying process. The fat in the sunflower seed is in the seed itself. The cooking oils that we use come primarily from nuts and seeds. Examples of these fat sources are corn, soybean, and peanut oils.

**Materials Required**

Chocolate chips (semi-sweet)

Balance or scale

Sunflower seeds

Microwave

Potato chips

Paper towels

Acetone

Foil

100-mm Petri dishes

Hammer

100-and 600-milliliter beakers

Graduated cylinder

**Experimental Procedure**

**Part A. Visual evidence of invisible fats from foods**

**Part 1. Chocolate Chips**

1. Measure out 2 grams of chocolate chips and place on a paper towel.

2. Microwave for 40 seconds on high.

3. Fold the paper towel over the chocolate chips and gently press the chocolate chips flat

with your fingers.

4. Allow it to sit for 5 minutes. Open up the paper towel. Record your results.

**Part 2. Potato Chips**

1. Measure out 2 grams of potato chips and place on a paper towel.

2. Microwave for 25 seconds on high.

3. Fold the paper towel over the potato chips and crush the chips.

4. Allow it to sit for 5 minutes. Open up the paper towel. Record your results.

**Part 3. Sunflower Seeds**

1. Measure out 2 grams of sunflower seeds and place on a paper towel.

2. Microwave for 25 seconds on high.

3. Fold the paper towel over the sunflower seeds and crush the seeds.

4. Allow it to sit for 5 minutes. Open up the paper towel. Record your results.

|  |  |
| --- | --- |
| **Date Table: Visual Observations of Fat** | |
| ***Food*** | ***Describe what you see on the towel*** |
| **Chocolate chips** |  |
| **Potato chips** |  |
| **Sunflower seeds** |  |

**Part B. Quantitative measurement of invisible fats from foods**

**Part 1. Extraction of Fat from Chocolate Chips**

1. Weigh out 5 grams (9 chips) of chocolate chips. Crush the chocolate between two

sheets of foil.

2. Label the beakers that you are using to put the food in, one each for chocolate chips,

potato chips, and sunflower seeds. *Record the weights of the labeled beakers.*

3. Using the beaker that is labeled for chocolate chips, place the crushed chocolate

chips in the beaker. *Record the weight with the crushed chocolate chips.*

4. Add 10 milliliters of acetone to the crushed chocolate chips in the beaker.

5. Swirl for 1 minute, or stir with a glass rod (in a well ventilated area).

6. Carefully pour the acetone into the Petri dish, making sure the chocolate remains in

the beaker.

7. Add 10 milliliters of acetone to the chocolate and **repeat steps 5 and 6.**

8. Allow the acetone in the Petri dish to dry overnight in a well ventilated area.

9. Allow the beaker with the chocolate to dry overnight. Weigh the beaker with the

chocolate.

**Part 2. Extraction of Fat from Potato Chips**

1. Weigh out 5 grams of potato chips. Break into dime-size pieces with your fingers.

2. Repeat steps 2−9 in Part 1.

**Part 3. Extraction of Fat from Sunflower Seeds**

1. Weigh out 5 grams of sunflower seeds. Crush the seeds between two pieces of foil

with a hammer.

2. Repeat steps 2−9 in Part 1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Data Table: Extraction of Lipids** | | | | | | |
| ***Food*** | ***Weight of beaker*** | ***Weight of beaker w/ raw food*** | ***Weight of raw food*** | ***Weight of beaker w/ dried food*** | ***Weight lost from food*** | ***% lipid extraction*** |
| **Chocolate chips** |  |  |  |  |  |  |
| **Potato chips** |  |  |  |  |  |  |
| **Sunflower seeds** |  |  |  |  |  |  |

**Calculation Help:**

(weight of beaker with raw food) – (weight of beaker) = weight of raw food

(weight of beaker with raw food) – (weight of beaker with dried food) = weight lost from food

weight lost from food x 100 = % lipid extracted

weight of raw food

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data Table: Description of Fats** | | | | |
| ***Food*** | ***Color*** | ***Texture*** | ***Odor*** | ***Viscosity*** |
| **Chocolate Chips** |  |  |  |  |
| **Potato Chips** |  |  |  |  |
| **Sunflower seeds** |  |  |  |  |

**Questions**

1. How can you tell that the dark wet spot on the paper towel is fat and not water?
2. Rank from most to least the percentage of lipid extracted from all three foods.
3. Look at the Nutrition Facts label on the packages of all three foods and rank them.
4. Did your ranking agree with the ranking of the product labels?
5. Determine which lipids contained saturated and unsaturated fatty acids in this experiment, based on your descriptions of the fats in the Petri dishes.