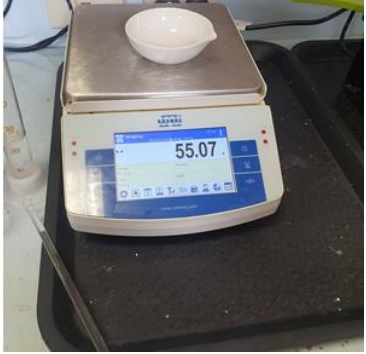




Solutions to the “Blue berry muffin investigation”

2. Calculate the percent, by mass, of oil in the muffin.

i. Construct a table of data.

Item	Mass (g)
Evaporating dish	 55.07
Evaporating dish + muffin sample	 59.84
Muffin sample tested.	$59.84 - 55.07 = 4.77$
Evaporating dish + oil	 55.548
Oil collected.	$55.548 - 55.07 = 0.478$

ii. Show all calculations

Percentage by mass of oil in the muffin

= (mass of oil / mass of muffin) X 100

= (0.478 / 4.77) X 100

= 10.0%

1. Identify the :

- Filtrate – **oil, acetone and food colouring mixture passing through the filter paper**

- Residue – **undissolved muffin left in the filter paper**

- Solvent used – **acetone**

3. Consider the image on the right. It is a pre-packed muffin sold at a convenience store. Calculate the mass, in grams, of oil present in the muffin shown on the right.

The total mass of muffin is 120 g (as stated on the label)

Mass of oil present is 10.0% of the total mass

=> (10.0 / 100) X 120 = 12.0 grams of oil

4. From your observations, what can you say about the food colouring that was found in the filtrate along with the oil?

- It is purple in colour.

- Just like oil it is soluble in acetone and can be separated from the muffin.

- Does not dissolve in oil, as can be seen in the video it separate from oil.

5. The procedure shown above attempted to isolate the oil from a given mass of muffin. Suggest two possible errors with the procedure given above and offer two ways to improve the procedure.

- Not only did oil come through but also the food colouring, albeit natural or artificial. The calculated mass of oil was not pure oil but a mixture of oil and food colouring. To overcome this error a second separating technique should be used to separate the oil from the food colouring before weight the oil.

- only a small amount of oil was collected. A larger amount of oil would allow for bigger and more accurate masses to measured. To overcome this error a larger sample of muffin is recommended.

- Different electronic balance was used for weighing the muffin sample and the oil sample.

To overcome errors that occur by using different measuring devices, in this case different scales, it is advised that the same electronic balance be used at all time.

6. Consider the label on the right.

- a. Identify 3 risks associated with the use of acetone.
- **flammable**
 - **Skin irritant**
 - **Eye irritant**
 - **Proper storage**
- Any of the above plus any other plausible safety risks.**
- b. For each safety risk, suggest one way to mitigate the risk.
- **Keep away from flame or heat sources (sparks, electrical)**
 - **Wear goggles**
 - **wear gloves**
 - **Work in a well ventilated laboratory or fume cupboard.**
 - **Store in a well ventilated, fireproof, locked cupboard.**

Acetone



DANGER

Highly flammable liquid and vapor. Causes serious eye irritation. May cause drowsiness or dizziness. Repeated exposure may cause skin dryness and cracking.

PREVENTION
Keep away from heat, sparks, and open flames. — No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment, and non-sparking tools. Take precautionary measures against static discharge.
Avoid breathing vapors. Use only outdoors or in a well-ventilated area. Wear eye protection.

RESPONSE
If on skin: Rinse skin with water.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a doctor if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.

STORAGE
Store locked up, in a cool, well-ventilated place.