**Fat and Protein Content in Milk**

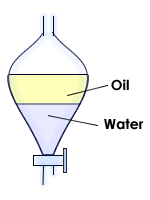
The fats and proteins in milk can be separated out from the water, vitamins and minerals. In this experiment, you will remove the fats and then separate the proteins from the remainder of the sample. Various milk samples will be tested and compared.

Materials

* Milk samples (Full cream milk, skim milk, soy milk)
* Hexane
* Separating funnel
* Vinegar (5% acetic acid)
* Measuring cylinder 100mL
* 2 x 250 mL beakers
* Electronic balance
* Stirring rod
* Filter funnel and paper

Using a separating funnel

By mixing hexane with milk, any fat in the milk will preferentially dissolve in the hexane. Because the fat/hexane mixture is less dense than milk, it floats above the milk as a separate layer. By turning the tap at the base of the funnel, the fat-free milk can be drained off into a beaker, thus separating the two mixtures.



Fat-free milk

Fat dissolved in hexane

Method

Determining the fat content

1. Weigh 50 mL of milk and place it in the separating funnel.
2. Add 20 mL of hexane to the funnel.
3. Stopper the funnel and gently mix the contents for about a minute.
4. Let the funnel stand until two layers separate out. The top layer will contain the fat dissolved in the hexane, whereas the bottom layer will consist of fat-free milk.
5. Take out the stopper and drain the fat-free milk into a pre-weighed beaker.
6. Record the weight of fat-free milk.
7. Calculate the fat content as a percentage of the original milk sample and record your results.

Write name of sample here

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sample 1 | Sample 2 | Sample 3 |
| Weight of 50 mL of milk (A) |  |  |  |
| Weight of beaker |  |  |  |
| Weight of beaker + fat-free milk |  |  |  |
| Weight of fat-free milk (B) |  |  |  |
| Percentage of fat  100 - (B/A x 100) |  |  |  |

Determining the protein content

1. Add 10 mL of vinegar to the fat-free milk and stir until it becomes lumpy. The solids that form are proteins in the milk sample.
2. Filter the sample and dry the residue overnight.
3. Record the weight of the protein
4. Calculate the protein content as a percentage of the original milk sample and record your results.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sample 1 | Sample 2 | Sample 3 |
| Weight of 50 mL of milk (A) |  |  |  |
| Weight of filter paper |  |  |  |
| Weight of filter paper + protein solids |  |  |  |
| Weight of protein solids (C) |  |  |  |
| Percentage of protein  (C/A x 100) |  |  |  |