

2.4: Separation of the precipitate

Decantation and aspiration

After centrifugation, a clear liquid, called supernatant, is floating over the sediment or precipitate. Figure 2.4.1 shows the separation of supernatant from the precipitate by decantation and by aspiration.

- The supernatant is removed by **decantation**, i.e., by pouring out the supernatant.
- A pasture pipette can also be used to draw out the supernatant -a process called **aspiration**.

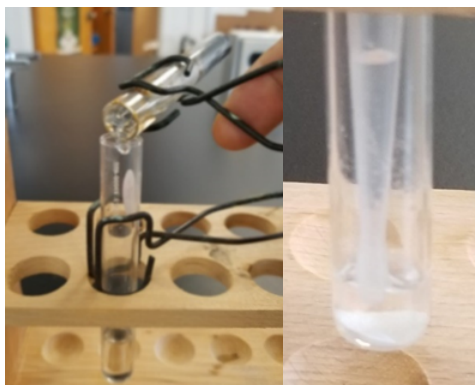


Figure 2.4.1: Decantation, i.e., pouring out the supernatant (left) and aspiration, i.e., carefully draw out the clear supernatant from a tightly packed precipitate using a pasture pipette (right).

Cotton-plug technique in aspiration

Sometimes the precipitate is not fully packed after centrifugation and tends to go into supernatant during the decantation or aspiration process. In these situations, a cotton-plug technique is used, i.e., a small tuft of cotton is twisted at one end between fingers to make it pointy at one end. Then the pointy end is plugged into the tip of a pasture pipette to act as a filter during aspiration. The loose precipitate is filtered by the cotton plug during aspiration as illustrated in Figure 2.4.2. The cotton plug is removed and then the clear supernatant is transferred to a clean test tube for further analysis.



Figure 2.4.2: Cotton plug technique, from left to right: i) a Pasteur pipette, ii) a cotton tuft made pointy at one end, iii) a Pasteur pipette with cotton-plug fitted in the tip, and iv) aspiration from a loosely packed precipitate using cotton plug technique.

Washing the precipitate

The precipitate is usually washed by re-suspending by stirring with a clean glass rod in a solvent that does not re-dissolve the product but dissolves any impurity in it, as shown in Figure 2.4.3. The suspension is centrifuged or gravity filtered and the supernatant or filtrate of the washing step is discarded as it is just the washing liquid with some impurities in it.



Figure 2.4.3: Precipitate re-suspended in a washing solvent.

Gravity filtration

Sometimes a precipitate in a suspension is separated by gravity filtration. A gravity filtration setup consists of a funnel placed in a test tube or an Erlenmeyer flask and a filter paper placed in the funnel as illustrated in Figure 2.4.4. Suspension is poured into the filter paper. The solution that passes through the filter paper and is collected in the test tube or Erlenmeyer flask is called the **filtrate**. The precipitate that is retained on the filter paper is called the **residue**.

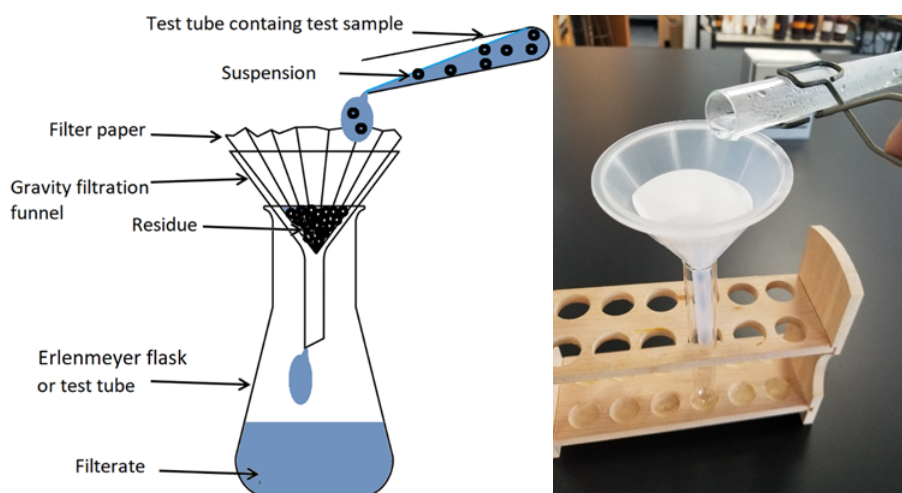


Figure 2.4.4: Illustration of a gravity filtration setup (left) and a gravity filtration setup being heated with hot water to prepare it for heated gravity filtration (right).

The precipitate is washed by adding a washing solution drop by drop while gently stirring the residue with a clean glass rod.

Caution

- Stir the residue very gently as otherwise the wet filter paper may rupture. The room temperature gravity setup is converted to a heated gravity filtration setup by pouring hot water into the filter paper and discarding the filtrate which is just the hot water.

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