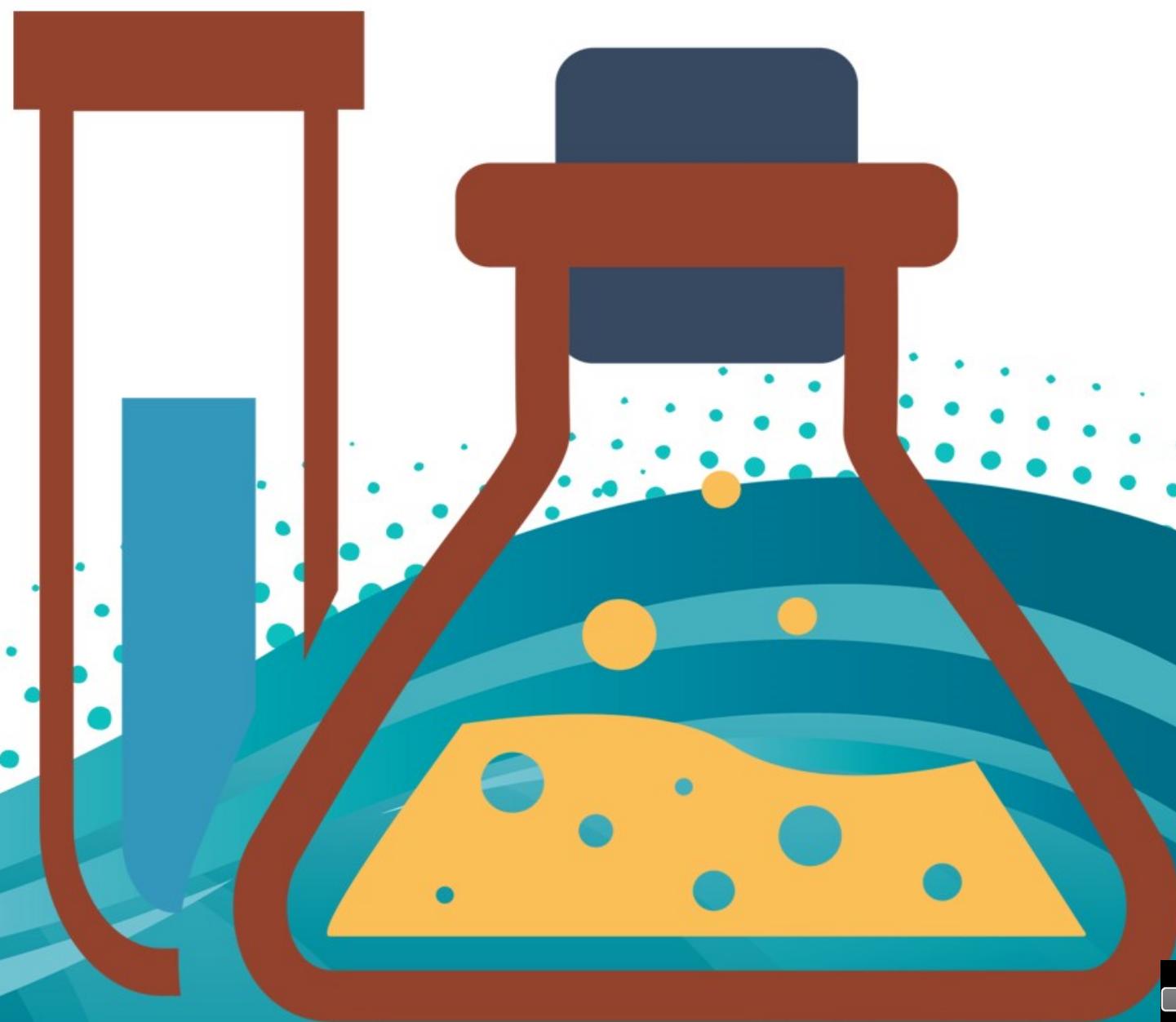


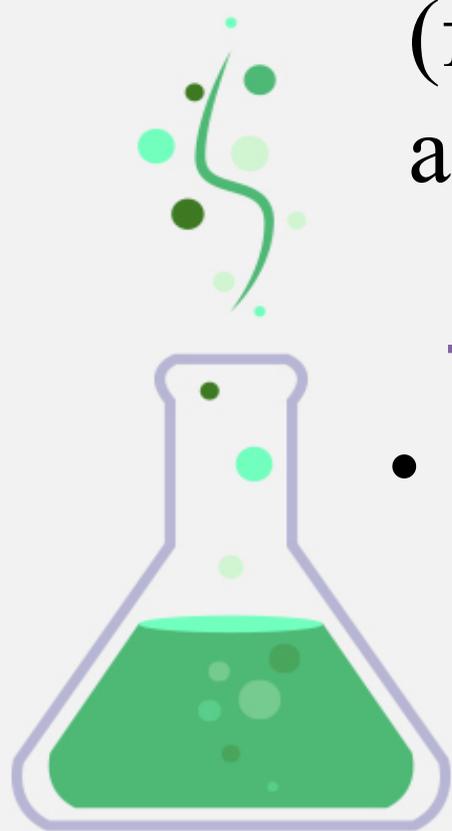
# SEPARATION AND PURIFICATION OF ORGANIC COMPOUNDS

Lab.5  
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# Separation and purification methods

- The separation and purification of organic compounds is an important way to get pure organic compounds.
- Products of organic reactions are seldom pure products as a result of side reactions. Pure compounds are also subject to partial decomposition on standing for some time or on exposure to light, air, heat, moisture, etc. (for example acetyl salicylic acid, commonly called aspirin, decomposes to salicylic acid).



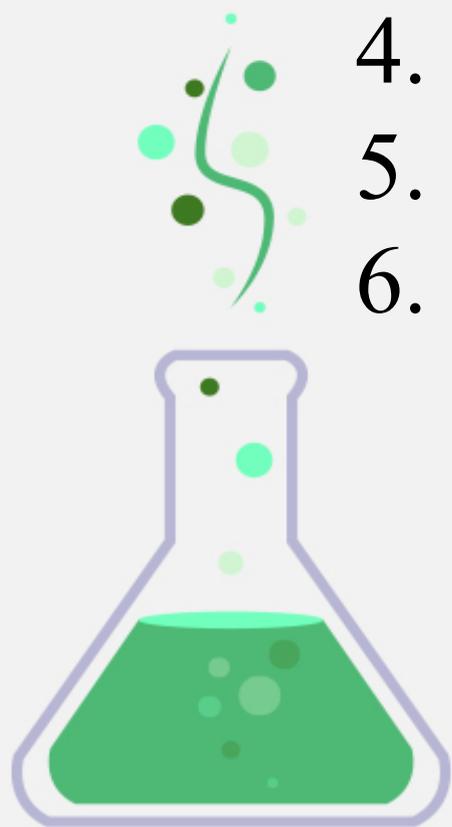
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- Therefore, the process of separation and purification of organic compounds becomes an important technique to get pure compounds.



# Separation and purification methods

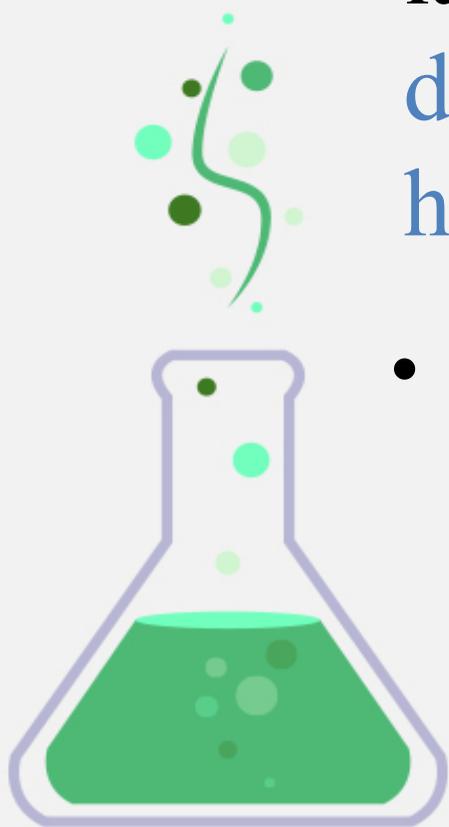
Generally, organic compounds are separated and purified by the following methods:

1. Filtration.
2. Crystallization.
3. Extraction.
4. Distillation.
5. Sublimation.
6. Chromatographic methods as TLC, GC.

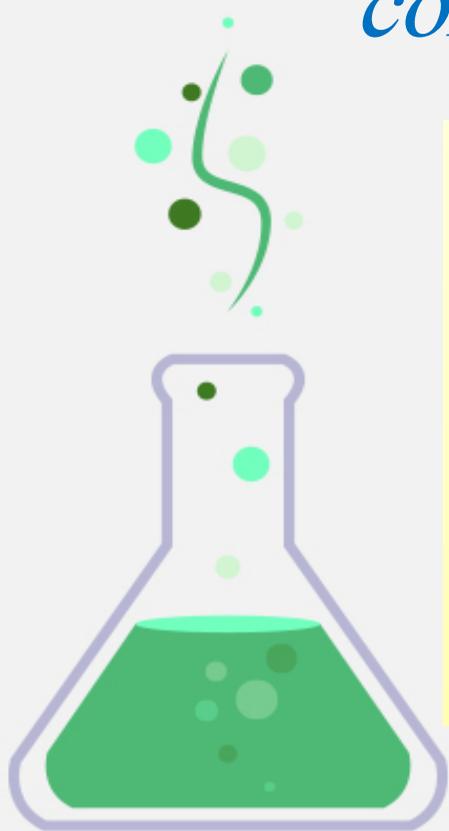


# Extraction partial solubility in immiscible solvents

- **Extraction** is a method of separation and purification of organic compounds that depends on the ability of the compound to dissolve in two immiscible solvents, e.g. water and chloroform.
- **Immiscible solvents** are mixtures of liquids that are insoluble in each other. Such solvents will form two layers; the upper layer is for the liquid with the lower density and the lower layer is for the liquid with the higher density.
- The process of extraction with immiscible solvents is generally employed for the isolation of dissolved compounds from solutions, isolation of solid compounds from mixtures, or removal of undesirable impurities from mixtures (washing).



- *Ether*, one of the most important organic solvents, is used extensively as an extracting solvent. It is very **slightly soluble in water** and its efficiency in use can be improved considerably by the addition of a small amount of an **ionizable salt**, such as **sodium chloride** or **potassium carbonate**, to the water layer. *This leads to an increase in the polar property of this solution that result in a decrease in the solubility of a non polar compound.*



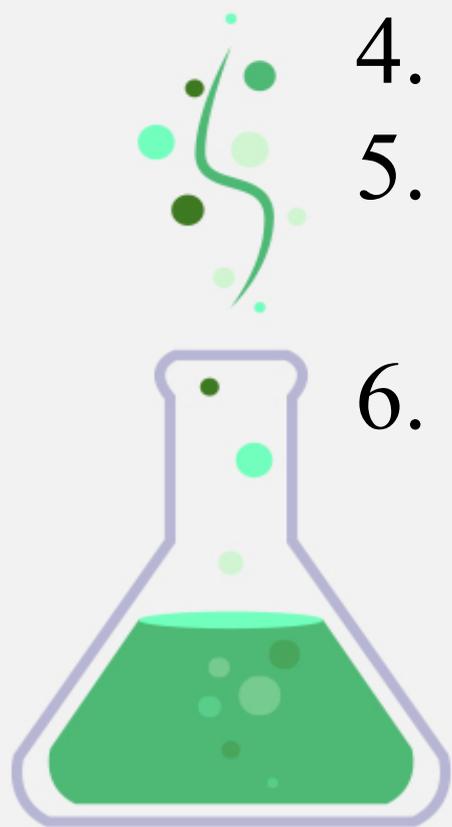
- Therefore, ethanol, which is completely miscible with water, becomes an immiscible liquid with respect to the water layer when the water is saturated with a salt such as sodium chloride. This is known as the “**salting out**” process.



# Choosing a solvent for extraction:

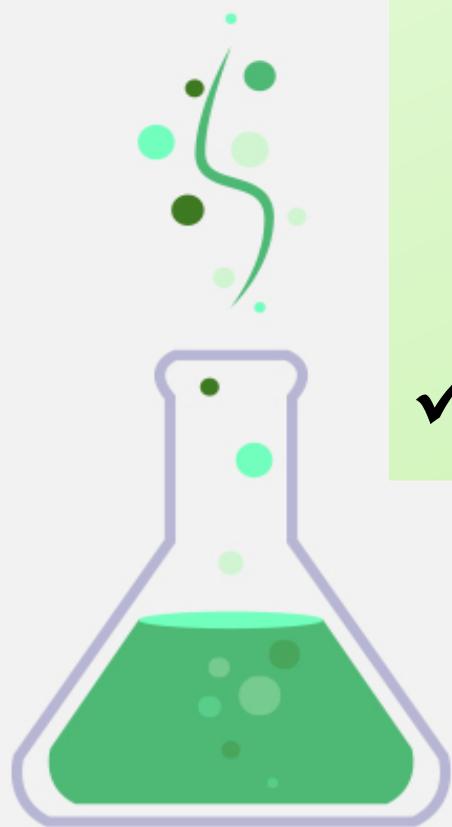
A good solvent for extraction should:

1. Readily dissolve the substance to be extraction.
2. Have a low boiling point so that it can be readily removed
3. Not react with the solute or the other solvent.
4. Not be flammable.
5. Show little or no water solubility (immiscible with water).
6. NOT expensive.



No solvent meets all these criteria. For example, ether is probably the most common solvent used for extraction but it is flammable. However, ether;

- ✓ Has a high solvating power for hydrocarbons and for oxygen containing compounds.
- ✓ Is highly volatile having a boiling point of 34.6 °C so that it can be easily removed from the extract at low temperatures, thus even highly sensitive compounds are not likely to decompose.
- ✓ Is very slightly soluble in water.



Thank  
you

