

## Separation and purification of organic compounds

Separation of organic compounds is an often encountered situation in industry or any chemistry laboratories. An unknown mixture of organic acid, base or neutral compounds can be easily separated from each other using aqueous solutions of inorganic acids or bases having different pH. Carboxylic acids are generally insoluble or slightly soluble in water but are readily soluble in basic solutions. Hence, these acids can be extracted using sodium hydroxide solution and later recovered by acidifying with hydrochloric acid solution. Similarly, organic bases such as amines can be extracted using acidic solutions which can be recovered using sodium hydroxide solution. Neutral compounds in general will not react either with any acidic or basic solutions. However, owing to their polar/non-polar nature, neutral compounds sometimes can exhibit solubility in aqueous solutions.

Generally, when the separation is done in colleges, a mixture of two organic compounds are given for separation. This mixture may be of the following type:

Acid + Phenol, Acid + Base, Acid + Neutral, Phenol + Base, Phenol + Neutral, Base + Neutral

Once given we have to determine the type of mixture by performing relevant tests. Based on the identification we have to devise a method to separate the mixture. (Show your result and action plan to the laboratory expert before you proceed).

### Separation experiments:

Any of the following mixtures of acids/bases/neutral can be given to the students.

Organic acids	Benzoic acid, 2-chlorobenzoic acid, Cinnamic acid
Organic bases	p-nitro aniline, acetanilide
Phenols	$\beta$ -naphthol, $\alpha$ -naphthol, 4-tert-butylphenol
Organic neutral compounds	1,4-dimethoxybenzene, fluorene, anthracene

The experiment can be done in the following way.

The activity will be performed in two parts. Two vials of the mixture are supplied on the table.

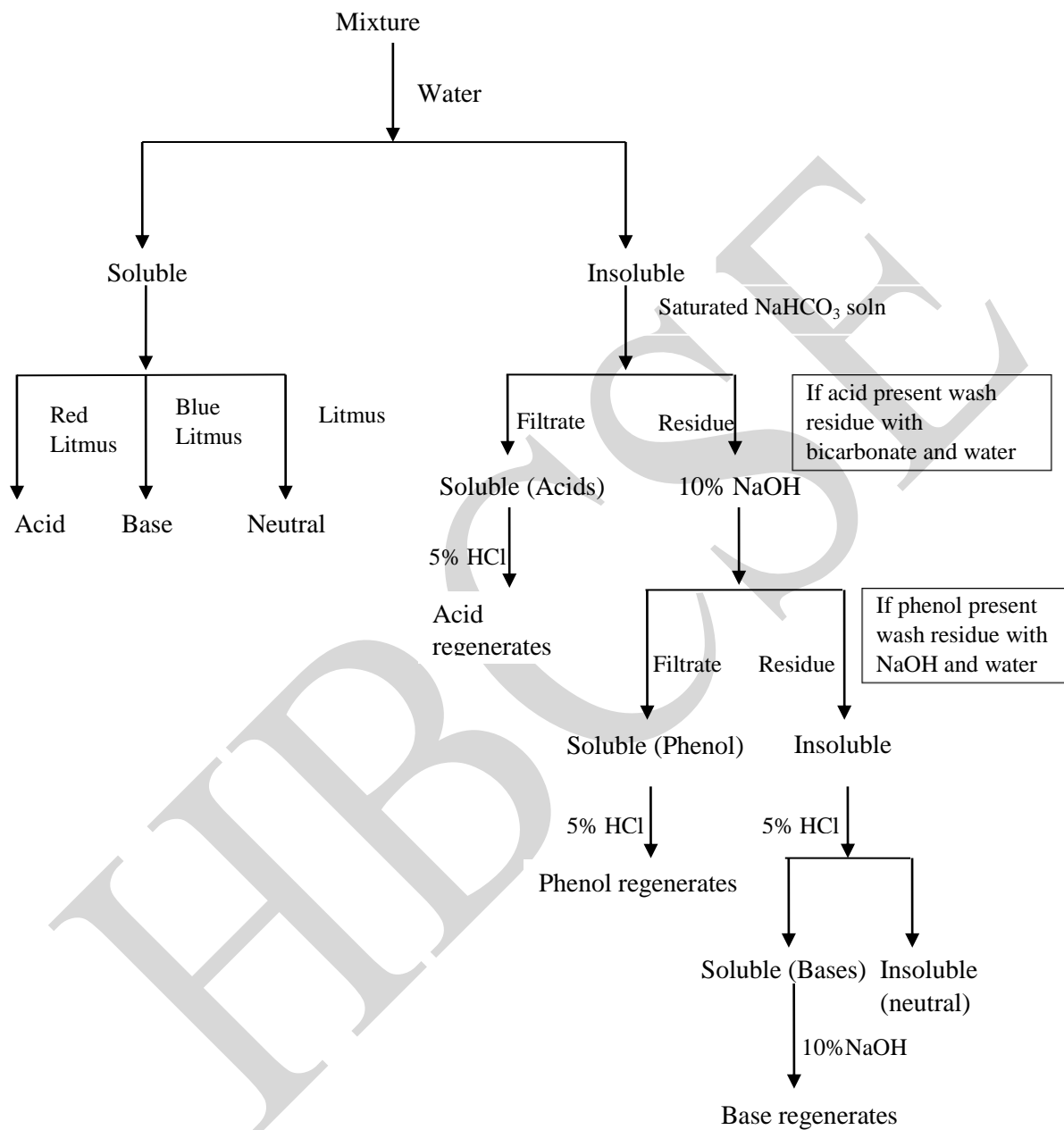
**Vial 1:** labeled for qualitative is to be used for the first part (determination of type of mixture)

**Vial 2:** contains 1g mixture of each of the two components which you will use for the separation.

The following is a general scheme of identification of the nature of the mixture.

**Part I:** Determination of the type of mixture **Part II:** Devise a method to obtain the compounds in pure form.

Flow Chart for identifying the nature of mixture



**Part I**

The type of the mixture is

**Part II**

Briefly indicate the steps that you will follow to separate the two component mixture

After you have separated the mixture, dry the compounds (the lab expert will help you in this regard) and Note down its weights

Mass of compound I

 g

Mass of compound II

 g**Determination of identity of the compounds**

The compounds can be identified by measuring their melting point and then referring to the literature values to confirm their identity. In order to get a sharp melting point, the compound should be in the pure form (refer to the note below).

	<b>Melting point</b>	<b>Name of the compound</b>
Compound A	Experimental value:  Literature value:	
Compound B	Experimental value:  Literature value:	

**Note:**

To obtain the compounds separated from the mixture in the pure form, please refer to activity on Recrystallization by HBCSE by visiting at:

<https://chem.hbcse.tifr.res.in/resources/resources-by-hbcse/experiments/>