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# Diploma in Pharmacy 1<sup>st</sup> Year

## Pharmaceutical Chemistry

### Experiment

To perform systematic qualitative analysis of organic compounds.

#### **Aim:**

To perform systematic qualitative analysis of organic compounds.

#### **Reference :**

‘ Dr. Gupta G.D. , Dr. Sharma Shailish , Kaur Baljeet ’ “Practical Manual of Pharmaceutical Chemistry” Published by Nirali Prakashan, Page no 84 - 87

#### **Procedure:**

##### **Major Separation**

##### **Sodium Hydroxide Separation**

Sample mixture should be treated with equal amount of sodium hydroxide and ethanol. Two layers of the solution should be separated using separating funnel. HCl should be added in sodium bicarbonate layer to get precipitate which is labelled as compound 1 and the ether layer is labelled as compound 2 and then the analysis of the individual compounds should be started.

##### **Sodium Bi-Carbonate Separation**

An equal amount of sodium bi-carbonate and ethanol should be treated with the sample mixture. Two layers of the solution should be separated using separating funnel. HCl should be added in sodium bicarbonate layer to get precipitate which is labelled as compound 1 and the ether layer is labelled as compound 2 and then the analysis of the individual compounds should be started.

## Ether Separation

Sample mixture should be treated with ethanol. It should be separated into two layers and filtered. The ether insoluble part should be taken as compound 1 and ether insoluble part should be evaporated in an electric water bath and taken as compound 2. The analysis of individual compounds should be started.

**Table 7: Pilot Separation**

S. No.	Experiments	Observations	Inferences
1)	<b>Sodium Hydroxide Separation:</b> Add NaOH to the small amount of sample and then add conc. HCl to this solution.	If HCl is added, a partially soluble precipitate is produced. No precipitate was formed	Sodium hydroxide separation is effective. Sodium hydroxide separation is ineffective.
2)	<b>Sodium Bi-Carbonate Separation:</b> Add NaHCO <sub>3</sub> to a small amount of sample mixture. And then add con. HCl to this solution.	Effervescence was seen. Then after adding HCl if precipitate was formed. No effervescence was seen/No precipitate was formed.	Sodium bi-carbonate separation is effective. Sodium bi-carbonate separation is ineffective.
3)	<b>Ether Separation:</b> Add solvent ether to a small amount of sample mixture.	Partially soluble. Completely soluble.	Ether separation is effective. Ether separation ineffective.



**Observation Table**

S.No.	Experiments	Observations	Inferences	
1)	<b>Nature of Sample</b>			
	<b>Solids</b>	Colourless solid	Colourless	May be carbohydrate, amide. Simple phenols and carboxylic acid.
		Coloured solids	Yellow to orange	Iodoform, nitro compounds.
			Pink	Naphthol.
			Red	Azo compounds.
			greenish	P- nitroso compounds.
			Brown	Amino Phenols, aromatic Primary, secondary and tertiary amine.
	<b>Liquid</b>	Colourless liquid	Colourless	May be aldehyde, ketone, ether, alcohol.
		Coloured liquid	Reddish brown	Amine.
			Yellow to orange	Nitro compound.
2)	<b>Odour</b>			
		Pleasant fruity odour	May be an ester, certain aromatic aldehyde, ketone, alcohol and aromatic hydrocarbon.	
		Fishy or ammoniated	May be an amines.	
		Characteristics	Lower alcohols, acids.	
		Phenolic	Phenols, Naphthols or cresols.	
		Mouse-like	Acetamide, acetonitrile	
		Pungent and irritating (Vapours attacking eyes)	Acid halides, formaldehyde and anhydride. acetic acid, acetic	
		Kerosene like smell	May be a hydrocarbon.	
		Bitter almond	May be benzaldehyde, nitrobenzene.	
		Carbolic pungent smell	May be aliphatic halogenated compound.	

3)	<b>Test For Saturation/Unsaturation</b>		
	i) <b>With Bromine Water:</b> In the presence of carbon tetra chloride, the material is thoroughly shaken with bromine water.	Bromine water decolourises without any ppt.	Presence of unsaturated compound.
		There is no decolourisation or ppt decolourisation.	Presence of saturated compound.
	ii) <b>Bayer's Test:</b> A small amount of material in water is treated with a few drops of 1% $\text{KMnO}_4$ solution.	Disappearance of pink Colour.	Presence of unsaturated compound
		There is no decolorization or ppt decolorization of pink colour	Presence of saturated compound.
4)	<b>Test For Aliphatic/Aromatic Compounds</b>		
	i) <b>Ignition Test:</b> In a nicked spatula, a small amount of substance or solution is taken and introduced into a non-luminous flame.	Smoky flame.	Presence of aromatic compound.
		Non-smoky flame	Presence of aliphatic compound.
	ii) <b>Nitration Test:</b> In the test tube, one ml of cone, one ml of $\text{HNO}_3$ , and one ml of $\text{H}_2\text{SO}_4$ are mixed and cooled.  A pinch of the sample is added and cooked for 30 minutes in a water bath. The heated solution is cooled and poured into a 50ml water containing beaker.	Formation of any yellow solution or ppt.	Presence of aromatic compound.
		Formation of colourless solution.	Presence of aliphatic compound.

**Result:** The systematic qualitative analysis of organic compounds was performed.



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