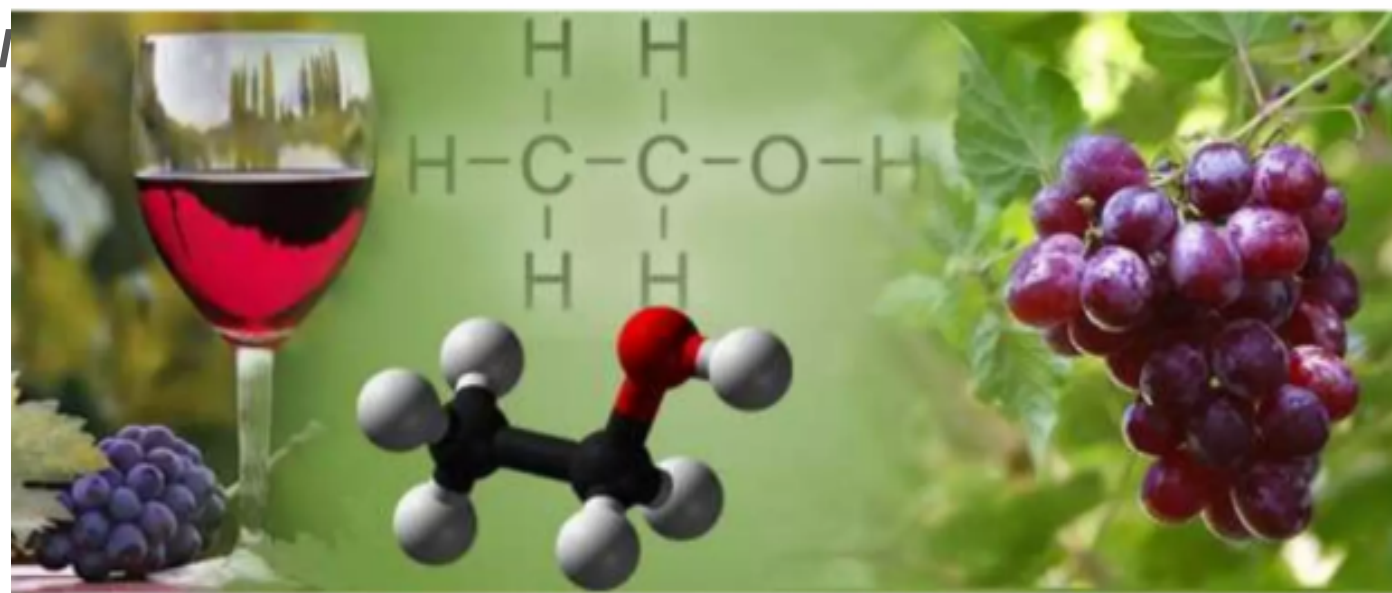


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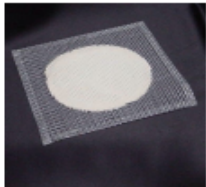
IDENTIFICATION OF PHENOLS

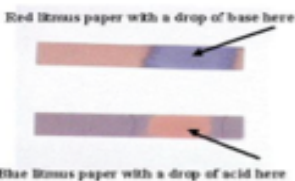


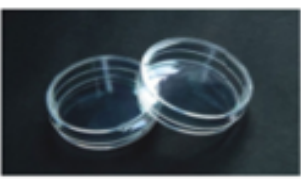
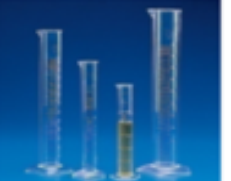







PRACTICAL ORGANIC CHEMISTRY I

2nd Class 2nd Semester



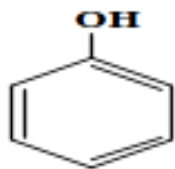
Tools and glassware:

		
reagent bottles	glass stoppers	dropper
		
Bunsen burner	washing bottle	beaker
		
test tubes	test tube holder	test tube holder
		
test tube rack	tripod stand	wire gauze

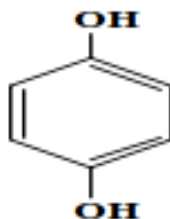
		
litmus paper	spatula	spatula
		
Petri dish	graduated cylinders	funnel
		
filter papers	graduated pipette	burette and funnel stands
		
glass rod (stirrer)	water bath	Hood

Theory:

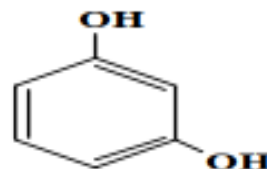
- Phenols are organic compounds with a hydroxyl group attached directly to an aromatic ring. They have the general formula Ar-OH. Examples of them include phenol, hydroquinone, resorcinol, *o*-cresol, *m*-cresol, *p*-cresol, *β*-naphthol, and catechol.



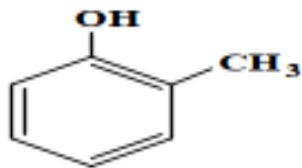
phenol



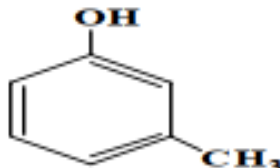
hydroquinone
(quinol, hydroquinol)



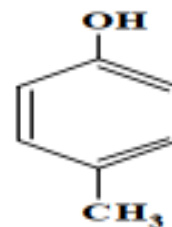
resorcinol



o-cresol



m-cresol



p-cresol

Physical Properties:



Chemical properties:

Types of phenol reactions:



Application of phenols in the pharmacy:

- ▶ Phenol 20% Topical Solution is a liquid formulation designed for external application to the skin. It serves as an effective treatment for various dermatological conditions such as Athlete's Foot, Fungal Infections, Warts, Psoriasis, and Eczema. This solution provides a convenient and versatile method of delivering therapeutic agents or active ingredients for targeted treatment.

Tools and glassware used in the experiment:

- ▶ 1)- Beakers
- ▶ 2)- Cylinders
- ▶ 3)-test tubes
- ▶ 4)- Stirrer
- ▶ 5)- Water Bath
- ▶ 6)- watch glass
- ▶ 7)- dropper

Chemical Reactions:

1. *Ferric chloride test.* ➡

Phenols react with ferric chloride to give colored compounds due to the presence of $[-C=C-OH]$ (enol) group. ➡ Indeed this reaction is considered as a test for any compound with enol group

Procedure:

To a very dilute aqueous solution of phenol or to a few crystals of the solid phenol (0.1 gm) dissolved in water add 1 drop of ferric chloride solution and observe the resulting color:

In the reaction of hydroquinone with ferric chloride as crystals may separate, and on further addition of ferric chloride solution a yellow solution of p-benzoquinone is produced:

2. *Bromine water test.*

Phenols are generally highly reactive towards electrophilic reagents and are readily brominated by bromine water. e.g.

3. Phthalein test:

Many phenols yield Phthalein which give special colors in alkaline solutions when reacting with Phthalic anhydride and a little amount of concentrated sulfuric acid. An example is the case with resorcinol:

The fluorescence is because of the oxygen linkage between the two phenolic nuclei (in basic medium).

Procedure:

In a dry test tube put about 0.1 gm of the compound and an equal amount of Phthalic anhydride or Phthalic acid, mix well, and add 1-2 drops of conc. H_2SO_4 . Heat on a direct flame for 1 minute until the crystals of the mixture melts. Then cool the test tube and add excess of 10% sodium hydroxide solution. Results should be as follows: If the resultant color is not so clear you can dilute with water

4. Riemer - Tiemann reaction:

Treatment of phenol with chloroform and aqueous sodium hydroxide solution introduces an aldehyde group (-CHO) into the aromatic ring at the *ortho*- or *para*-positions:

Procedure:

To about 0.2 gm of the phenol add 1 ml of 30% NaOH solution and 1 ml of chloroform, heat on water bath, and observe the color of the aqueous layer:

5-Reduction OF potassium permanganate:

