

C 142 (Expt. No. 4)

NAME : \_\_\_\_\_ BATCH : \_\_\_\_\_

ROLL No. : \_\_\_\_\_

SIGNATURE : \_\_\_\_\_ DATE : \_\_\_\_\_

## SYNTHESIS OF ASPIRIN

### AIM

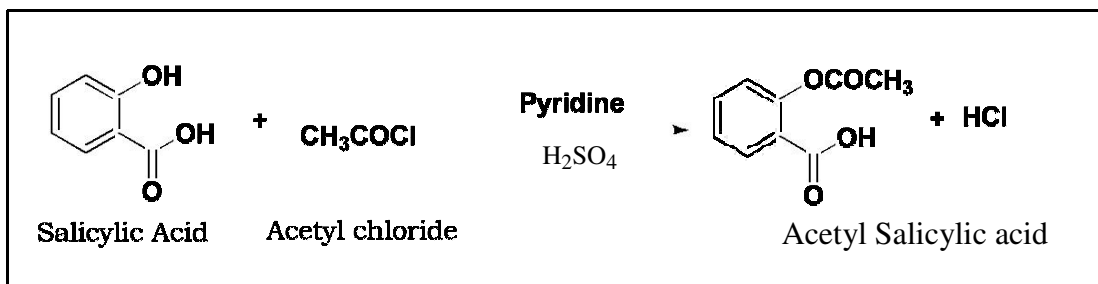
To prepare aspirin (acetylsalicylic acid) from salicylic acid.

### CHEMICALS REQUIRED

Salicylic acid, acetyl chloride, pyridine, concentrated sulfuric acid, ethanol.

### THEORY

Aspirin (acetylsalicylic acid) was first synthesized in 1893 by Felix Hofmann. This compound had the medicinal properties of salicylic acid (an extract of willow bark), without the unpleasant taste or the high degree of irritation of the mucous membranes lining the mouth, gullet and stomach.



Scheme

Aspirin is used extensively as a pain killer (analgesic) and as a fever-reducing drug (antipyretic). When ingested, acetylsalicylic acid remains intact in the acidic stomach, but in the basic medium of the upper intestinal tract, it hydrolyzes forming the salicylate and acetate ions.

## PROCEDURE

1. Place **1.0 g** of salicylic acid in a 100 ml beaker.
2. Add **2.0 ml** of pyridine (just sufficient to dissolve the salicylic acid), keeping the beaker in an ice-bath. **Keep the beaker in the hood while doing this addition.**  
**Use gloves so as to avoid any contact with your skin.**
3. Add **2.0 ml** of acetyl chloride and **0.1 ml** of concentrated  $\text{H}_2\text{SO}_4$  to the solution in the beaker. Stir the solution thoroughly using a glass rod.  
**Keep the mixture in the hood.**
4. Add **15 ml** of cold distilled water to the mixture and heat  $60^\circ\text{C}$  on a hot plate to ensure total dissolution.
5. **Cool to room temperature. Place in an ice-bath until crystals begin to form.**
6. Filter the mixture. Wash the crystals with **cold distilled water**, and dry between pieces of filter paper.
7. Transfer the crystals into a **50 ml** beaker. Add **10 ml** of ethanol and **10 ml** of water.
8. Heat the mixture until all the ethanol evaporates.
9. **Cool the solution to room temperature.**  
**Place this solution in an ice-bath so as to induce crystallization.**
10. Filter the solution. Wash the crystals with cold distilled water.  
Dry the crystals between pieces of filter paper and weigh.
11. **Report the yield and yield %.**

**Yield** = .....

**Yield %** = .....