

Experiment No. 04

AIM: To prepare and submit triphenyl imidazole (2,4,5-triphenyl imidazole).

REFERENCES:

1. Vogel's Textbook of Practical Organic Chemistry by Brian S. Furniss, Antony J. Hannaford, Peter W. G. Smith & Austin R. Tatchell; Fifth Edition; Page No. 1193.

REQUIREMENTS

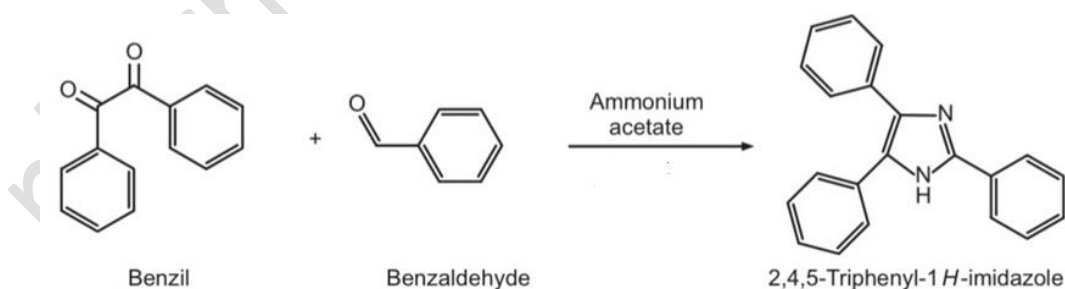
Chemicals: Benzil, Ammonium acetate, Benzaldehyde and Ethanol.

Apparatus: reflux condenser, round-bottom flask, Mechanical stirrer, Measuring cylinder, Funnel, and Glass rod.

PRINCIPLE:

Triphenyl imidazole was synthesized by condensing benzil, benzaldehyde, and ammonium acetate in an acetic medium. Imidazole ($C_3H_4N_2$) and its derivatives show various pharmacological activities like Antifungal and anti-bacterial, Anti-inflammatory, analgesic, Anti-tubercular, Anti-depressant, Anti-cancer, and Anti-viral activity. Imidazole is put into multiple essential organic molecules. The most significant is the amino acid histidine, which has an imidazole side chain. Histidine is present in many proteins and enzymes and is vital to hemoglobin structure and binding functions. Later, histidine would decarboxylate to histamine. Triphenyl imidazole was synthesized by condensing benzil, benzaldehyde, and ammonium acetate in an acetic medium.

REACTION:



Use:

Anti-cancer, anti-microbial, anti-inflammatory, anti-tubercular, and analgesic.

PROCEDURE:

1. Place 1.2 g of benzil, 20 ml of benzaldehyde, and 1.27 g of ammonium acetate into a 250 ml round-bottom flask equipped with a magnetic stirrer. Heat the mixture in a water bath at 100°C for 4 hours while stirring continuously.
2. Once the reaction is complete, wash the mixture with ice-cold water, then recrystallize the solid crude product from ethanol.
3. After recrystallization, dry the product thoroughly. Calculate the percentage yield and determine its melting point.

CALCULATION:

The limiting reagent is benzil; Hence, the yield should be calculated from the amount taken.

Molecular formula of benzil = $C_{14}H_{10}O_2$

The molecular formula of 2,4,5-triphenyl imidazole = $C_{21}H_{16}N_2$

Molecular weight of benzil = 210 g/mole

And molecular weight of 2,4,5-triphenyl imidazole = 296 g/mole

Theoretical yield:

210g benzil forms 296 g 2,4,5-triphenyl imidazole

Therefore, 1.2 g benzil will form? (X) g 2,4,5-triphenyl imidazole

$296 \times 1.2/210 = 1.69$ g

Theoretical yield = 1.69 g

Practical yield = _____ g

% Yield = (Practical Yield)/(Theoretical Yield) \times 100

RESULT:

2,4,5-triphenyl imidazole was synthesized from benzil and submitted.

Name of Compound	2,4,5-triphenyl imidazole
Theoretical yieldgm
Practical yieldgm
% Practical yield%
Melting point°C