

4. Experiment name: Preparation of phenytoin.

Aim: To prepare phenytoin from benzil and urea.

References: <https://labmonk.com/synthesis- from-benzil-and-urea>.

Requirements:

Chemicals: Benzil, Urea, sodium hydroxide, ethanol, concentrated hydrochloric acid

Apparatus: Round bottom flask, reflux condenser, crystallizing dish-500ml, heating mantle, stirrer,

Procedure:

Place 5.3gm of benzil, 3gm of urea, and 15ml of aqueous sodium hydroxide solution and 75ml of ethanol in round bottom flask of 100 ml capacity. Set up a reflux condenser with the flask and boil using an electric heating mantle for at least 2 hrs. Cool to room temperature, pour the reaction mixture into 125ml of water and mix carefully. Allow the reaction mixture to stand for 15 min and then filter the product under suction to remove an insoluble by-product. Render the filtrate strongly acidic with concentrated hydrochloric acid, cool in ice-water and immediately filter off precipitated product under suction. Recrystallise at least once from industrial spirit to obtain about 2.8gm of pure 5,5-diphenylhydantoin, m.p. 297-298°C.

Principle:

Base catalyzed reaction between benzil and urea is used for synthesis of phenytoin. The reaction is proceeding via intramolecular cyclization to form an intermediate heterocyclic pinacol, which on acidification yield hydantoin as a result of 1,2-diphenyl shift in pinacol rearrangement reaction.

Reaction:

