

# Report on synthesis of the 1,4- dihydropyridine

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## ABSTRACT

This is a scientific lab report prepared after an empirical observation. The main experiment is the synthesis of 1, 4-Dihydropyridine. A simple dihydropyridine from a simple reactant (formaldehyde, ammonium acetate and 2, 4-pentanedione ), is synthesized. The final part of this work deals with the determination of reasonable mechanisms for this synthesis.

## INTRODUCTION

1, 4-Dihydropyridine is an equivalent of nicotinamide adenine dinucleotide (NADH) coenzymes. It exhibits a wide range of biological activities such as calcium channel blocking. This explains their wide use today in pharmacology.

### Objective

The aim of this experiment is to synthesize a sample of dihydropyridine and determine the mechanisms for this synthesis.

### Requirements

1. Formaldehyde (1, 3. 0 mmol),
2. 2, 4-pentanedione (2, 9. 0 mmol),
3. Ammonium acetate (3, 12 mmol),
4. water,
5. Source of heat.

## METHODOLOGY

### Procedure

A mixture of formaldehyde (1, 3. 0 mmol), 2, 4-pentanedione (2, 9. 0 mmol), and ammonium acetate (3, 12 mmol) in approximately 12 mL of water was

heated at reflux for about 40 Minutes. The mixture was then cooled, filtered and washed with 10 – 15 mL of water. Washing was done for the second time with approximately equal amount of water as in the first case.

### **Results**

A pure solid product was obtained after washing. For confirmation on the purity of the solid substance, both IR and NMR spectrums, were obtained.

A melting point of approximately 220 °C was also obtained.

### **ANALYSIS**

A recrystallization from absolute ethanol is done if any findings point towards an impure product.

In the analysis, the formaldehyde comes from 37% by weight solution. MW = 30 g/mol

2, 4-pentanedione MW = 100 g/mol, Ammonium Acetate MW = 77 g/mol

### **CONCLUSION**

The dihydropyridine is probably not (read not) very soluble in CDCl<sub>3</sub> and therefore, use of DMSO/CDCl<sub>3</sub> mixture for the NMR is employed.