

**UNIVERSITI TEKNOLOGI MARA**

**SYNTHESIS AND ANALYTICAL STUDIES OF  
PHENACETIN**

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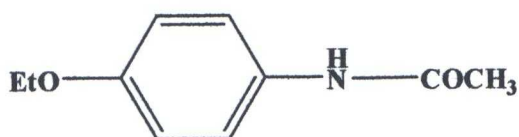
## ABSTRACT

Phenacetin, an analgesic, can be synthesized in 2 ways; either Williamson Ether Synthesis or Amide Synthesis as the final process. This is due to the *para* substitution between ether and amide group on benzene ring. For this project, the starting material is the phenol. This phenol will be protonated follow by nitration by electrophile aromatic substitution to yield nitrophenol. At this stage, the chemist can decide to follow Williamson Ether Synthesis first or amide synthesis. But in this projecct, the compound will transform first into nitrophenetole by Williamson ether synthesis, then reduced to nitro group and finally undergo amide synthesis to yield phenacetin. The final compound will be analyzed by Thin-Layer Chromatography, Nuclear Magnetic Resonance, UV-visible spectrometry and simple capillary melting point. Phenacetin is brown crystalline compound and has melting point in the range of 134-136 C. Although it is important to get the final product, however, the purpose for this project been done is to obtain and practice with the laboratory works. This purpose leads the student to adapt with the environment of chemistry. All the skills need to be integrated to accomplish the aim of this project.

## CHAPTER 1

### INTRODUCTION

Phenacetin,  $C_{10}H_{13}NO_2$ , also known as *p*-acetophenetidine or 1-acetamido-4-ethoxybenzene or acetophenetin or 4-ethoxyacetanilide or *p*-acetylphenetidin is a molecule with molecule weight of 179.22 g/mol. The structure contains ether and amide functional group that substituted to a benzene ring. It resembles pure cocaine structure.



Phenacetin 1

Table 1.1: Properties of 1

<i>Property</i>	<i>Characteristic and data</i>
Appearance	Fine, white crystalline powder.
Odor	Odorless.
Solubility	Soluble in 70 parts of hot water and 1400 parts of cold water.
Melting point	134 – 136 °C.
Stability	Stable under ordinary use and storage (dry and away from heat or moisture).