CHAPTER TWO

AIMS AND OBJECTIVES

The main goal of the project is to prepare α-quaternary amino acids through the Kolbe reaction with the aim to exploit electrochemical routes to assemble quaternary carbon centers. The study is based on recent developments in the field of electrochemical synthesis, specifically the achievements and progress made to overcome the shortcomings of Kolbe coupling.[27] It aims at streamlining the experimental conditions in order to maximize both yield and purity, bearing in mind issues of stereochemistry and scalability. The synthetic method is groundbreaking in that it attempts to create α-quaternary amino acids that can be used in pharmaceuticals.

Reaction set up (Electrasyn, 5ml vial)

Primary substrate: Methyl 2 acetamidoacrylate

Radical source: Propionic acid + KOH → Potassium proponate

Electrolyte: Tetra butyl ammonium tetrafluoroborate NBu4BF4

Solvent: Acetonitrile

Electrodes: Platinum (anode) and Cathode
Cell: Undivided; constant current

Reaction Scheme:

→(Anode) Ethyl radical

↓

Methyl 2 acetamidoacrylate

↓

Radical conjugate addition

↓

Alpha quaternary amino acid

The reaction pathway depends on the electrode, current density and nucleophile. Propionic acid act both as radical precursor and proton donor.