During the twentieth century, Kinetics has played vital role in the development of Chemistry. The society has come to depend on thus developed products of chemical industries to maintain the standards of living and improve the quality of life. However, it was only at the dawn of twenty first century, the society became aware of the hazardous substances that many chemical processes use and generate while producing the utility products and began thinking of chemicals in general and chemistry in particular as culprit. Therefore, those at the helm of affair are paying more attention towards the development of environmentally benign protocols for the chemical processes to erase this impression.

It is known fact that the science has always been in progress by following the teaching of Nature. The Nature is not only the mother of all chemical processes, but also an unending reservoir of chemicals and has its unique ways of syntheses, purification, separation and quantifications. Keeping in view these nature’s protocols, recently researchers all over the world are paying more and more attention towards the modifications of the traditional chemical processes for obtaining needful chemical products by the use of Nature’s catalyst, renewable energies and environmentally inert media.

For optimizing and standardizing the parameters of these protocols to make them not only eco-friendly but also economic, kinetics has to play significant role and, therefore, those working in this area, have immense scope. Hence, by considering the importance and scope of the kinetics and mechanistic studies of chemical reactions, we have selected the research topic. “Mechanisms of Some Redox Reactions - A Kinetic study”.
Most of our detailed experimental information concerning the mechanisms of oxidation processes has forthcoming only in the past recent years, during which new facts and new views have emerged rapidly and to many chemists knowledge of oxidation processes still may seem to require mastery of several sets of unrelated facts. In this thesis, we have attempted to view oxidation of α-amino acids and drug as a single subject selecting example of reagents and reactions so as to reveal the salient electronic, structural and mechanistic features of some common oxidative processes.

This thesis is mainly divided into four parts. The first part is a general introduction to chemical kinetics. In the second part oxidation of some α-amino acids like DL-Metionine and L-Valine with stable oxidant diperiodatocuprate(III) are studied. Third part is the oxidation of α-amino acids like L-Proline (Osmium (VIII) and Ruthenium(III) catalysed) and DL-Methionine by hexacyanoferrate(III) have been studied and explored the detailed mechanisms. The last part is the analysis of drug Fursemide by kinetic and catalytic method using hexacyanoferrate(III).

The study of mechanism of oxidation of α-amino acids and drug was a area of interest for me from past several years and we consider it to be a subject of major to all chemists, for not only does it require consideration of the properties and reactions of both organic and inorganic compounds, but above all, it has vast implications in connection with the understanding of the nature of life.

Smt. K. Sharanabasamama
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“Gratitude is not only the greatest of virtues, but also the parent of all others”.

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