PREFACE

Pervasiveness of instrumentation is ever present, in varying degree of sophistication and complexity, in work place, on the way to work, and in our homes. The concept that instruments are confined to the laboratory, of interest only to a small group of scientists and engineers, is outdated. We are surrounded by instruments and sensors, many of them embedded into the common products of our technology. The history of the cultural evaluation of human species, in general, is considered as the history of instrumentation. It is a central feature for all scientific and technological activities, which plays a pivotal role in all aspects of human Endeavour.

Determination of molecular forms in which an element exists becomes one of the basic requirements in many chemical investigations now-a-days. This information is particularly useful in studies related to chemical, agricultural, environmental, toxicological, and biomedical investigations. Most speciation schemes rely on element-specific detection. Speciation analysis refers to the determination of chemical forms of metals and metalloids including metallo-organic compounds.

These studies are possible through the measurement of ions like fluoride ion. The estimation of fluoride ion concentration in tooth pastes gives a valuable information to chemists, biochemists etc and also fluoride ion has its own significance in their relevant fields. No doubt, several investigators developed the techniques for the measurement of different ion concentrations in different samples and several manufacturers are producing a variety of instruments for different ion estimation. But these are conventional and suffer from many disadvantages. But the attempts to design and develop the computer based systems for the systems for the determination of fluoride ion are rather scarce particularly in India though they offer many advantages. Hence, in the present study, an attempt is made to design and fabricate the computer based systems for measurement of fluoride ion concentration individually in several tooth pastes.

The work presented in the thesis is broadly divided into the five chapters, each chapter being subdivided into several sections. A general introduction to PCs, experimental techniques, principle, the importance of fluoride ion, and types of tooth pastes are dealt within the chapter1. To acquire information on the work done already in this direction, literature survey was carried out. Chapter2 comprises of the review of the literature, namely the various experimental techniques developed by earlier workers in this direction.

The third chapter deals with the synthesis of tooth pastes samples. The fourth chapter explains the description of circuit diagram me, interfacing of main circuit with the PC.
through the DIOT card, hard ware and soft ware particulars of the computer are described. Studies made and the results obtained using the developed circuit is discussed in chapter 5. Finally the purpose and scope of present study is included at the end of thesis.

In essence, the thesis highlights the development of inexpensive hard ware and soft ware for the determination of fluoride ion concentrations made on certain tooth pastes.