Preface

The subject of organic chemistry is quite fascinating. The study of biomolecules becomes much more interesting because biomolecules constitute a large number of organic compounds with varying functional groups. We know biomolecules are involved in the maintenance and regulation of various metabolic processes of living systems. The study of these molecules becomes crucial because they are essential for sustaining life processes.

My aim in writing the second edition of "*Chemistry of Biomolecules*" has been the same as with the first edition, to make it an effective and up-to-date textbook to meet the needs of graduate students of chemistry, biochemistry and biology. In addition, the book will be an ideal reference book for the teachers of the same subjects. My experience of teaching these topics to undergraduate students at Delhi University for more than 37 years has prompted me to write this text.

The book retains many features of the first edition. In the first edition there were six chapters on biomolecules. However, in this second edition one more chapter on Akaloids has been added. Moreover, all the six chapters have been updated. Additions have been made in each chapter so as to make the book more comprehensive.

The **1st Chapter** on **Carbohydrates**, deals with the structures of glucose, fructose, disaccharides-maltose, lactose, cellobiose, and sucrose and polysaccharides – cellulose and starch. The new additions include epimers, reactions of monosaccharides, the polysaccharides – glycogen, chitin and heparin and biosynthesis of carbohydrates. At the end of the chapter some natural products derived from carbohydrates like ascorbic acid, anthocyanins, anthraquinone glycosides, cardiac glycosides, carbohydrate antibiotics *etc.* have been described.

The **2nd Chapter** is on **Amino acids, Peptides, and Proteins**. It describes the usual chemistry of these topics. In this book, the new additions are biosynthesis of amino acids; resolution of racemic mixture and stereoselective synthesis of amino acids, introduction to chromatographic methods of separation of amino acids, the Fmoc method of solid phase peptide synthesis, some interesting peptides like aspartame, glutathione, bradykinin, oxytocin and insulin. Lastly, molecular shape of proteins, factors that influence molecular shape, some features of fibrous and globular proteins are the new topics, which have been added in this 2nd chapter.

Chapter 3 is on "**Enzymes**. The new additions include cofactors-coenzyme the structures of important coenzymes like NAD^+, $NADP^+$, FMN and FAD, TP pyridoxal-5-phosphate, and Coenzyme A. Also introduction to Biocatalysis ar Green Chemistry is given in this chapter.

The **4th Chapter** deals with the study of **Pyrimidines, Purines, an Nucleic Acids**–DNA, RNA. In addition to a detailed chemistry of purine ar pyrimidine bases, an introduction to the genetic code, transcription, translatio and gene therapy is given here.

The additions in the **5th Chapter** on **Lipids-Oils and Fats** include a introduction to waxes and glycolipids, the biological role of fatty acids; th structure and importance of cholesterol and triglycerides, lipid membrane and liposomes.

The **6th Chapter** is on **Terpenoids**, which deals with the chemistry some monoterpenoids like citral, dipentene, geraniol, α-terpenol, mentho α-pinene and camphor. Now in this book the chemistry of selected diterpenoid triterpenoids and carotenoids has been discussed. In this chapter I have added th chemistry of phytol, squalene, β-carotene, α-carotene, γ-carotene and lycopen

The last **Chapter 7** on '**Alkaloids**' has been added in this edition. Alkaloi are important physiologically active biomolecules occurring in plants. Th chemistry of some typical alkaloids namely Coniine, Nicotine, Hygrin Atropine, Cocaine, Quinine and Morphine have been described.

I have made an attempt to present the topics in simple and lucid languag Mechanisms of the reactions have explained wherever required. A classroo touch has been given in developing each topic. I hope the book will fulfill th requirements of undergraduate/graduate students of almost all global universiti and colleges.

I express my sincere gratitude to my wife Komal, son Nikhil an daughter-in-law Pallavi for their moral support, patience and understanding

I wish to express my thanks to Lafoe Hilary, Senior Acquisitions Edit and Jessica Poile, Editorial Assistant, Chemistry for the help and cooperatio extended to me for the preparation of this book. I am especially grateful to Laf Hilary for getting the book reviewed by the concerned professors and for th useful suggestions made by them.

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I invite constructive comments and valued suggestions from the studen and learned teachers for improving the book in subsequent editions.

S.P. Bhuta

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