

Spectroscopy of Organic Compounds (second edition). P. S. Kalsi. Wiley Eastern Limited, 4835/24, Ansari Road, Daryaganj, New Delhi. 1995. Price Rs 145. 456 pp.

During the first half of this century and earlier, determination of the structures of organic compounds used to be a laborious and protracted process involving consumption of considerable amounts of the compounds and a large number of chemical reactions. The one positive aspect of these exercises was the generation of a large amount of new chemical data. While achieving a major objective of 'Himalayan' dimensions like solving a complex structure such as, for example, that of strychnine or morphine or camphor several minor 'peaks' were also simultaneously reached, thus covering a considerable area of organic chemistry. However, the time needed for finding out the structure of a comparatively small but quite complex molecule like morphine or strychnine was of the order of 130 to 150 years! Structures of these dimensions can now be solved in a matter of a few months if not days. The major factor responsible for this extraordinary progress is the extensive use of spectroscopic methods in structural studies.

There are several advantages which the physical methods offer as against the classical chemical approach. The generation of data is as objective as possible having been brought about by instrumentation. Subjectivity comes in only in the interpretation of the data. Except the mass spectroscopic method all the other spectroscopic techniques used in structure determination are non-destructive and precious compounds can be recovered after recording their spectra. Further, with a few milligrams of a pure compound, its spectral characteristics can be completely mapped out in contrast to the chemical approach which would require a great lot more of the compound before its structure could be delineated. The advances that have been made in instrumentation in recent years and in particular the availability of FT instruments have also made them more effective as tools for the generation of fine-tuned data which was not possible a few years ago. Spectacular advances

have been particularly made in nuclear magnetic resonance spectroscopy and mass spectroscopy. Increasing understanding of the underlying physical principles has made the application of spectral methods much less empirical than what they were at one time, thus considerably enhancing their intrinsic value in structural studies.

Textbooks on organic chemistry, including advanced texts, which were popular forty to fifty years ago such as the one by P. Karrer did not have any chapters on spectroscopy. But, the position is very different today and even books written for undergraduates discuss the application of spectral methods in organic chemistry at considerable length. There are, of course, a number of books exclusively devoted to spectroscopy and their applications in chemistry. The one branch of chemistry that has benefitted most by the advances in spectroscopy is organic chemistry and it is not, therefore, surprising that in recent years a number of books on organic spectroscopy have been published. When a new book appears one is naturally inclined to find out in what way it is an improvement on those already available. At the instructional level the subject can be most effectively taught through problem-solving. A number of books based on such an approach are, indeed, available. In a new book, therefore, one would expect new material based on the most recent advances on the one hand and problems which would give the students practical training in interpreting a wide range of spectral data relating to several combinations of organic skeletal structures and functional groups, on the other.

Viewed against the background delineated above, the book under review falls rather short of expectations. In the chapter on ultraviolet and visible spectroscopy a section on shift reagents in the study of polyphenolic compounds and the flavonoids, in particular, could have been included. The structures of these compounds are, to a large extent, determined on the basis of such data which can also be interpreted within a theoretical framework with extrapolations in mechanistic organic chemistry. The chapter on NMR spectroscopy, which is otherwise fairly comprehen-

sive, could have devoted a larger section to FT-NMR. Instruments operating on the CW mode are now more or less obsolete. A section on 2D NMR should have also been included as this technique has now become a routine tool in most structural studies. Similarly, the chapter on mass spectroscopy makes no mention of newer methods of generating mass spectral data and their advantages over the data obtained from electron bombardment.

In any book on spectroscopy, it is my view that the most interesting and instructionally most useful section should be the one on problems. A great amount of care is needed in selecting problems, arranging them in order of increasing difficulty and discussing them to bring out the scope and range of all the spectroscopic techniques, together as a collective tool, in unravelling a wide variety of organic structures. A certain amount of subjectivity in the selection of problems is inevitable but they should satisfy the criteria mentioned above. Some of the problems in the book are too very trivial though chapter 7 does contain some good ones. This section could have been expanded to include another ten to twenty problems.

The printing, structural formulae and other drawings and the general get-up of the book are pleasing to the eye. Though the style of narration is not exactly exciting there are no glaring factual aberrations. The price is extremely reasonable and this is a plus point for the average student. The major drawback is that it is a decade behind time.

If a third edition is to be brought out, it is to be hoped that the improvements would be more than cosmetic and the problem section in particular would be strengthened and made more interesting with the inclusion of examples of natural products. The subject, of course, should be brought up to date.

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