PREFACE

From time to time, we will publish thematic volumes within this series in order to emphasize developments in very important areas of alkaloid chemistry and biology from different perspectives presented by different authors. The present volume of *The Alkaloids* is such a thematic volume which is devoted to halogenated alkaloids and covers the subject in three chapters.

In the first chapter, Gordon W. Gribble from Dartmouth College in Hanover (New Hampshire, USA), one of the leading researchers in this field, describes the *Occurrence of Halogenated Alkaloids*. About a quarter of the more than 5000 halogenated natural compounds known today are alkaloids which have been mostly isolated from marine organisms. The present chapter represents the first comprehensive summary of this rapidly growing class of compounds which appears in *The Alkaloids*. In a highly systematic treatise the halogenated alkaloids are classified following their different heterocyclic frameworks: pyrrolizidines, indolizidines, pyrroles, indoles, carbazoles, indolocarbazoles, carbolines, quinolines, and other nitrogen heterocycles. Moreover, the final section summarizes the occurrence of halogenated tyrosines. Marine bromotyrosine derivatives have been discussed previously in this series by Peng, Li, and Hamann in volume 61 (published in 2005) covering the literature till 2003. Thus, bromotyrosines are presented as an update considering the work published since then.

The second chapter by Karl-Heinz van Pée from the Chemistry Department of the Technische Universität Dresden (Germany) provides a deep insight into the *Biosynthesis of Halogenated Alkaloids*. The first sections show how and at which stage of the heterocyclic framework formation (pyrroles, indoles, and indolocarbazoles) the halogen atoms are being introduced. In a further section, it is demonstrated that introduction of new halogenase genes into alkaloid producing bacterial strains leads to the formation of new halogenated alkaloids due to pathway modification. The final section takes a close look at the halogenating enzymes actually involved in the biosynthesis of alkaloids and describes their mode of action supported by protein crystal structure determination.

The third chapter by Walter Vetter from the Institute of Food Chemistry of the University of Hohenheim (Germany) shows the potential impact these compounds may have on our daily life by describing *Polyhalogenated Alkaloids in Environmental and Food Samples*. The classes of compounds

under discussion are: polyhalogenated 2,2′-bipyrroles, polyhalogenated 1,2′-bipyrroles, polybrominated pyrroles, and brominated indoles. Moreover, the problems and the techniques for identification and quantification of polyhalogenated alkaloids in the environment and in food samples are discussed in detail. Further sections briefly summarize physicochemical properties and biological activities of polyhalogenated alkaloids.

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