Structure, Function and Metabolism of Plant Lipids

Paul-André Siegenthaler
and Waldemar Eichenberger Editors

STRUCTURE, FUNCTION AND METABOLISM OF PLANT LIPIDS

Proceedings of the 6th International Symposium on the Structure, Function and Metabolism of Plant Lipids held in Neuchâtel, Switzerland, July 16–20, 1984.

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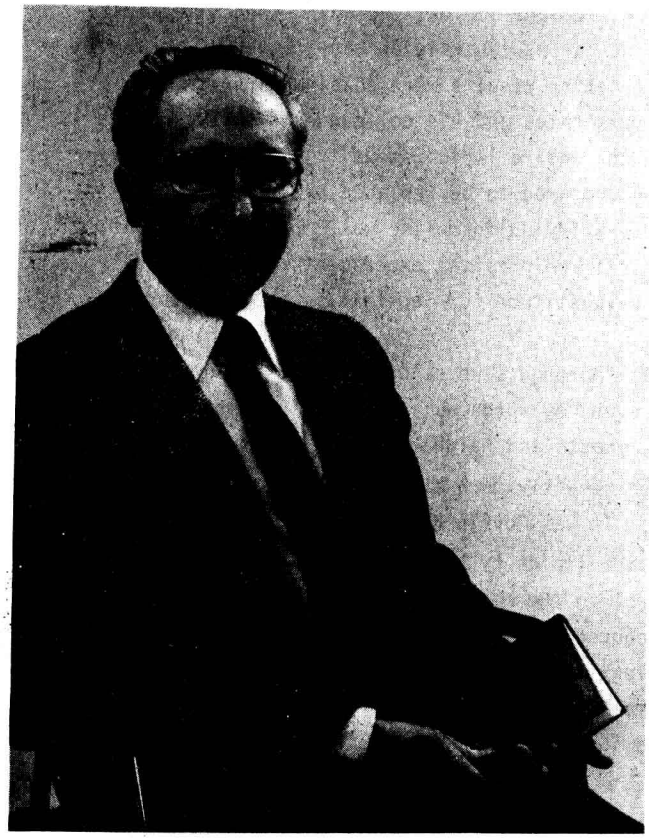
DEDICATION



The Proceedings of the Sixth International Symposium on the Structure, Function and Metabolism of Plant Lipids are dedicated to

PROFESSOR MORRIS KATES

In a period of 40 years of active experimental research, Morris Kates has made monumental contributions in many areas of lipid research. As a graduate student of the famous Professor Erich Baer (Banting Institute, Toronto), he achieved the first chemical synthesis of enantiomeric lecithins and the pioneering work of Kates and Baer finally established the stereochemical configuration and detailed structure of naturally occurring phosphoglycerides.

In 1951, he started his first job in the Plant Physiology section of the National Research Council (Ottawa) and initiated fundamental studies on the composition and metabolism of chloroplast lipids, including the characterization of phospholipases. The studies on plant lipids have continued to the present date and particularly exciting results were obtained in his investigations on diatoms. Morris Kates and his colleagues discovered to their surprise (and that of the entire lipid community), a lecithin-like component in which the nitrogen appeared to be replaced by sulfur. The chemical structure of this phosphatidylsulfocholine was confirmed by chemical synthesis, and biological and physical experiments demonstrated the capability of this lipid to substitute for lecithin in natural membranes.

Morris Kates also made numerous thorough studies outside the field of plant lipids and one can list such key-words as: microsomal membranes, erythrocytes, influenza virus, yeasts and halobacteria. The latter group of organisms has received recently much attention from a wide variety of biologists and biochemists. It was Morris Kates who elucidated the complex structure of the membrane lipids by proving the presence of the phytanyl diether of glycerol in the major polar lipids of extremely halophilic bacteria. In the course of his investigations, he often improved techniques of lipidology and despite his heavy editorial responsibilities, he found time to write a widely used book, offering instruction in the isolation, analysis and identification of lipids.

During the past decades, Morris Kates has played a vital role in the development of lipid biochemistry related to biomembranes. With his warm personality he has shared knowledge, technical expertise, and enthusiasm in a generous manner with students and colleagues all over the world. His many friends wish him continued success in his future adventures in the exciting land of lipids and membranes.

PREFACE

This Proceedings volume contains most of the invited and contributed papers presented at the 6th International Symposium on the Structure, Function and Metabolism of Plant Lipids, held in Neuchâtel (Switzerland), 16-20 July 1984. This symposium was organized by Drs P.A. Siegenthaler, W. Eichenberger, A. Rawyler and J.P. Schwitzguébel, with the assistance of Miss Ch. Bachmann and Mrs S. Kartaschoff.

When we were organizing the meeting, we started with the idea that all scientists involved in the field of plant lipids should be able to attend the symposium and be allocated the time necessary to present their contribution(s) in the form they wished. According to this principle and due to the numerous applicants (140 scientists and 25 companions), we decided to extend the symposium to five days. Thus we were able to preserve the desire, expressed at the last meeting in Groningen (1982), that the present symposium should consist of single sessions.

The program of the symposium included 12 lectures of 40 min, 41 lectures of 20 min and 80 posters, divided into 8 sessions. This is the proof that not only is plant lipid research growing fast and gaining more and more interest among biologists and biochemists, but also that covering all the current topics in a single meeting is getting more and more difficult.

The chapters of this book correspond to the sessions of the symposium. However, the contributions have been reorganized within each chapter. In addition to the now classical topics on biochemistry and biosynthesis of fatty acids, acyl lipids and isoprenoid compounds, we have paid special attention to the function of lipids as related to the biogenesis of plant cells and organelles, and to the role of lipids in the structure and function of membranes with an extra chapter on photosynthetic membranes. Finally, the last chapter covers plant lipids (including cuticular lipids) as related to environmental and physiological factors. The size of these two last chapters points to the growing importance of lipids in the organization and function of thylakoid membranes as well as to the numerous interactions between environmental conditions and plant lipids.

All papers presented in this volume were prepared, camera-ready, by the authors themselves and there was no proof-reading. The main reason for this was the need to ensure speedy publication.

We are indebted to several individuals, organizations and industries whose support made the preparation of this symposium possible. First, we sincerely thank the distinguished scientists who agreed to attend and present contributions during the symposium. Our deep appreciation goes to the Swiss National Science Foundation, the Swiss Academy of Sciences and the Federation of European Societies of Plant Physiology for their financial support. We also acknowledge with gratitude the support provided by both the University and City of Neuchâtel, private industries, banks and insurance companies. Finally, we would like to thank the collaborators of the Laboratory of Plant Physiology of the University of Neuchâtel and the Biochemistry Department of the University of Bern, who contributed their time and talent to make the symposium a success. But the success of our symposium in Neuchâtel lay essentially with the quality of the scientific presentations and with the spirit that went into the personal contacts that enriched our meeting.

Lastly, it is a pleasure and a privilege to dedicate this volume to Dr. Morris Kates in honour of his outstanding contributions over many years to the knowledge of plant lipid biochemistry.

P.A. Siegenthaler
W. Eichenberger

Neuchâtel (Switzerland)
September 1984

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