

**DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS  
AND MUTAGENICITY IN SOIL IN CHIANG MAI PROVINCE**

**BANGDONG WEI**

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL  
FULFILMENT OF THE REQUIREMENTS FOR  
THE DEGREE OF MASTER OF SCIENCE IN  
ENVIRONMENTAL RISK ASSESSMENT FOR TROPICAL ECOSYSTEMS**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved

**GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
APRIL 1995**

**DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS  
AND MUTAGENICITY IN SOIL IN CHIANG MAI PROVINCE**

**BANGDONG WEI**

**THIS THESIS HAS BEEN APPROVED TO BE A PARTIAL FULFILMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN  
ENVIRONMENTAL RISK ASSESSMENT FOR TROPICAL ECOSYSTEMS**

**EXAMINING COMMITTEE**

*M. Rayanakorn*  
..... **CHAIRMAN**  
(Dr. Mongkon Rayanakorn)

*M. Suttajit*  
..... **MEMBER**  
(Assoc. Prof. Dr. Maitree Suttajit)

*Usanee Vinitketkumnuen*  
..... **MEMBER**  
(Assoc. Prof. Dr. Usanee Vinitketkumnuen)

*Joachim Krueger*  
..... **MEMBER**  
(Dr. Joachim Krueger)

ลิขสิทธิ์ © โดย Chiang Mai University  
All rights reserved

4 APRIL 1995

**COPYRIGHT OF THE GRADUATE SCHOOL, CHIANG MAI UNIVERSITY**

## ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my thesis supervisor, Dr. Mongkon Rayanakorn of the Department of Chemistry, for his interest, kind supervision and successful coordination throughout the period of this research work, and to my thesis co-supervisor, Assoc. Prof. Dr. Maitree Suttajit of the Department of Biochemistry, who initiated this research project, for his constant encouragement, valuable suggestion and enormous help.

Special appreciation is expressed to my other two thesis co-supervisors, Dr. Joachim Krueger of the University of Saarland, Germany, and Assoc. Prof. Dr. Usanee Vinitketkumnuen of the Department of Biochemistry, for their excellent guidance and great assistance on the chemical analysis and mutagenicity bioassay of this research work, respectively.

I am grateful to Mr. Pisan Kitsawatpaiboon, Acharn Sunanta Wangkarn, and Acharn Somporn Chantara for their help in HPLC and other technical services. Thanks are extended to Dr. Jochea Kubiniok for his contribution in determining soil texture, and Dr. Araya Jatisatienn for her assistance in statistical analysis.

I wish to express my special gratitude to Nasima Akter, Yupin Peetragnorn, and other classmates for their help, encouragement and kindness. My deep appreciation goes to Miss Jiraporn Sukbunteng for her successful cooperation and Miss Rawiwan Puatanachokchai for her helpful suggestions.

Thanks are also due to Prof. Dr. Peter Nagel, University of Saarland, for his helpful advice and Prof. Liu Junzhuo, Beijing Medical University, for her constant encouragement and constructive suggestions. I am grateful to Dr. K.C. Donnelly, Texas A&M University, for his valuable suggestions in soil mutagenicity test.

I am deeply indebted to the Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) for the provision of a scholarship grant for the two-year study in this international postgraduate program for environmental risk assessment (ERA) at Chiang Mai University, and all the academic and administrative staff of the ERA Program from both the University of Saarland and Chiang Mai University for their impressive teaching and various types of contribution.

I wish to acknowledge the excellent laboratory facilities provided by the Department of Chemistry and Department of Biochemistry of Chiang Mai University, and also the partial support provided through Dr. Maitree's and Dr. Usanee's research grants.

Finally, I would like to express my profound indebtedness to my parents, for their love and understanding, and my wife, for her unfailing support.

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright© by Chiang Mai University

All rights reserved