

**FLOW INJECTION-BEAD INJECTION SYSTEMS FOR
DETERMINATION OF BONE ALKALINE
PHOSPHATASE**

DUANGPORN SOMPRAYOON

**MASTER OF SCIENCE
IN CHEMISTRY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright © by Chiang Mai University

All rights reserved
THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY

OCTOBER 2005

ISBN 974-9888-64-2

**FLOW INJECTION-BEAD INJECTION SYSTEM FOR DETERMINATION
OF BONE ALKALINE PHOSPHATASE**

DUANGPORN SOMPRAYOON

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE
IN CHEMISTRY**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright © by Chiang Mai University

All rights reserved

THE GRADUATE SCHOOL

CHIANG MAI UNIVERSITY

OCTOBER 2005

ISBN 974-9888-64-2

**FLOW INJECTION-BEAD INJECTION SYSTEM FOR DETERMINATION
OF BONE ALKALINE PHOSPHATASE**

DUANGPORN SOMPRAYOON

THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN CHEMISTRY

EXAMINING COMMITTEE

.....CHAIRPERSON
Asst. Prof. Dr. Supaporn Kradtap

.....MEMBER
Assoc. Prof. Dr. Prachya Kongtawelert

.....MEMBER
Asst. Prof. Dr. Yuthsak Vaneesorn

20 October 2005

© Copyright by Chiang Mai University

ACKNOWLEDGEMENTS

The author would like to express her sincere thanks and appreciation to her supervisor, Asst. Prof. Dr. Supaporn Kradtap, for her kind supervision, guidance, continual encouragement, assistance and financial support throughout this research work and for helping me succeed in writing this thesis.

The author is sincerely grateful to Assoc. Prof. Dr. Prachya Kongtaweelert, Assist. Prof. Dr. Siriwan Ong-chai, Prof. Dr. Kate Grudpan, Dr. Jaroon Jakmune and Dr. Somchai Lapanantnoppakhun, for their valuable comments, guidance and discussion.

The author gratefully acknowledges the Postgraduate Education and Research Program in Chemistry (PERCH) for granting and awarding her full scholarship throughout the study. The author thanks the Department of Chemistry, Faculty of Science, Chiang Mai University for supports and Maharaj Nakorn Chiang Mai Hospital, Chiang Mai University for blood samples.

Special thanks to my close-friends and colleagues, especially Dr. Narong Lenghor, Mr. Lucksagoon Ganranoo, Miss Boonraksa Srisawang and Dr. Rattikarn Chantiwas for their kind help and technical supports.

Finally, the author would like to express my deep gratitude to my parents and my brother for their continuous hearty encouragement and generous concern. The

sincere thanks extend to all her friends at the Flow Based Analysis Group for their suggestion and assistance.

Duangporn Somprayoon



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved