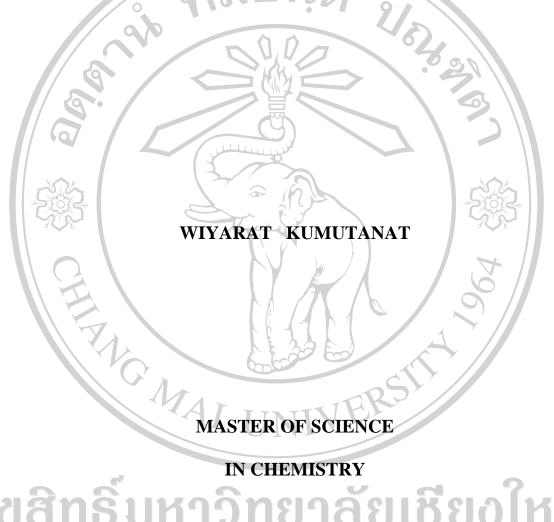
#### DEVELOPMENT OF A STOPPED-FLOW SYSTEM FOR

VITAMIN C DETERMINATION IN SOME FRUITS



### ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright<sup>©</sup> by Chiang Mai University All rights reserved

THE GRADUATE SCHOOL

CHIANG MAI UNIVERSITY

**FEBRUARY 2009** 

## DEVELOPMENT OF A STOPPED-FLOW SYSTEM FOR VITAMIN C DETERMINATION IN SOME FRUITS

WIYARAT KUMUTANAT

# A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SCIENCE

ลิปสิทธิ์มหาทิดตรรัชยเชียปีหม Copyright<sup>©</sup> by Chiang Mai University All rights reserved

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
FEBRUARY 2009

### DEVELOPMENT OF A STOPPED-FLOW SYSTEM FOR VITAMIN C DETERMINATION IN SOME FRUITS

WIYARAT KUMUTANAT

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
Dr. Ponlayuth Sooksamiti
Som drai Lapanantnoppall-MEMBER
Asst. Prof. Dr. Somchai Lapanantnoppakhun
Supapen brootly Hartwell MEMBER
Assoc. Prof. Dr. Supaporn Kradtap Hartwell

25 February 2009

#### **ACKNOWLEDGEMENTS**

I would like to express my profound gratitude and is greatly indebted to my advisor, Asst. Prof. Dr. Somchai Lapanantnoppakhun for his invaluable guidance; kind suggestions, encouragement and assistance throughout this work and helping me succeed in writing this thesis from the beginning to the end of this thesis work.

The author is sincerely grateful to expresses gratitude to Prof. Dr. Kate Grudpan and Assoc. Prof. Dr. Supaporn Kradtap Hartwell for comments and discussion.

The author would like sincerely thanks and appreciation to Mr. Wasin Wongwilai for his helpful and guidance, particularly advice on instrumentation.

The Center of Excellent for Innovation in Chemistry (PERCH-CIC) is acknowledged for the graduated scholarship grant. The Graduate School and Department of Chemistry, Faculty of Science, Chiang Mai University are also acknowledged for their supports to the author.

The author is profoundly grateful to the members of Flow Based Analysis Group, sister and brother for their continuous hearty encouragement and generous concern. The sincere thanks extend to all the friends whose names are not listed here, that contributed to the success of this work.

Finally, I would like to thank my family for their tender love, continual care and large encouragement during my study.