

**DESIGN AND SYNTHESIS OF SPIROCYCLOPENTANONE-  
ANTHRACENE ADDUCTS AND THEIR DERIVATIVES  
AS ANTIMALARIAL SUBSTANCES**

**RUANGRAT CHOOMMONGKOL**

**DOCTOR OF PHILOSOPHY  
IN CHEMISTRY**

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**THE GRADUATE SCHOOL**

**CHIANG MAI UNIVERSITY**

**DECEMBER 2011**

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**RUANGRAT CHOOMMONGKOL**

**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN  
PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
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THIS THESIS HAS BEEN APPROVED  
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS  
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IN CHEMISTRY

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