

**ENZYMATIC PRODUCTIONS OF  
XYLOOLIGOSACCHARIDE AND  
BIOETHANOL FROM CORNCOB**

**PINPANIT BOONCHUAY**

**DOCTOR OF PHILOSOPHY  
IN BIOTECHNOLOGY**

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**GRADUATE SCHOOL  
CHIANG MAI UNIVERSITY  
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AND BIOETHANOL FROM CORNCOB**

**PINPANIT BOONCHUAY**

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
IN BIOTECHNOLOGY**

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THE REQUIREMENTS FOR THE DEGREE OF  
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30 April 2018

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