

ความแตกต่างทางฤทธิ์เอสโตรเจนิกของกวาวเครือขาว *Pueraria mirifica*
จากแปลงปลูกในหนุ่ต้งไร่

นางสาวพัชรภรณ์ สุขสวัสดิ์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

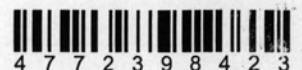
สาขาวิชาเทคโนโลยีชีวภาพ

คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2549

ISBN 974-14-2044-7

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย



406876861

**DIFFERENTIAL ESTROGENIC ACTIVITY OF CULTIVATED
WHITE KWAO KRUA *Pueraria mirifica*
IN OVARECTOMIZED RATS**

Miss Patcharaporn Sooksawat

**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science Program in Biotechnology**

Faculty of Science

Chulalongkorn University

Academic Year 2006

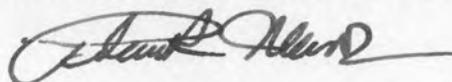
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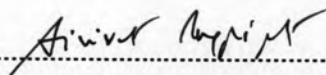
Thesis Title Differential estrogenic activity of cultivated White Kwao
Krua *Pueraria mirifica* in ovariectomized rats
By Miss Patcharaporn Sooksawat
Field of Study Biotechnology
Thesis Advisor Associate Professor Wichai Cherdshewasart, D.Sc.

Accepted by the Faculty of Science, Chulalongkorn University in
Partial Fulfillment of the Requirements for the Master's Degree

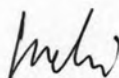


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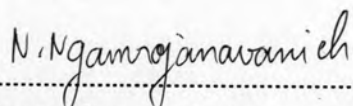
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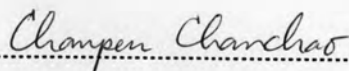
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พิชราภรณ์ สุขสวัสดิ์: ความแตกต่างทางฤทธิ์เอสโตรเจนิกของกวาวเครือขาว *Pueraria mirifica* จากแปลงปลูกในหนุ่ตัดครั้งไข่ (DIFFERENTIAL ESTROGENIC ACTIVITY OF CULTIVATED WHITE KWAO KRUA *Pueraria mirifica* IN OVARECTOMIZED RATS) อ.ที่ปรึกษา: รศ.ดร.วิชัย เชิดชูวิชาศาสตร์, 128 หน้า
ISBN 974-14-2044-7

การศึกษาผลของปัจจัยกายภาพและพันธุกรรมพืชต่อเอสโตรเจนิกแอกติวิตีของหัวกวาวเครือขาว 2 สายพันธุ์ เก็บตัวอย่างหัวทุกเดือนเป็นเวลา 1 ปี คือ สายพันธุ์ PM-III และสายพันธุ์ PM-IV จากแปลงปลูก จ.ราชบุรี ในหนุ่แรพศเมียบัดครั้งไข่ โดยให้สารแขวนลอยกวาวเครือขาว ขนาด 100 และ 1,000 มก./กก.นน.ตัว/วัน เปรียบเทียบกับกลุ่มที่ป้อนน้ำกลั่น 0.7 มล./วัน และกลุ่มที่ฉีด 17β -estradiol การทดลองแบ่งเป็น 3 ระยะคือ ระยะก่อนการทดลอง 14 วัน ระยะทดลอง 14 วัน และระยะหลังการทดลอง 7 วัน โดยใช้ดัชนีชี้วัด 5 อย่างคือ 1) วันแรกที่ปรากฏการเปลี่ยนแปลงของเซลล์ที่ผนังช่องคลอดเป็น cornified cell 2) จำนวนวันที่มี cornified cell ในระยะทดลองและระยะหลังการทดลอง 3) น้ำหนักมดลูก 4) พื้นที่หน้าตัดของชั้น endometrium myometrium และ lumen ของมดลูก และ 5) จำนวนต่อมในชั้น endometrium จากดัชนีชี้วัดที่ 1 และ 2 พบว่ากวาวเครือขาวแสดงฤทธิ์เอสโตรเจนิกตามขนาดที่ให้ นั่นคือ กวาวเครือขาวในขนาด 1,000 มก./กก./วัน สามารถกระตุ้นการเจริญของเซลล์ที่ผนังช่องคลอดได้เร็วและนานกว่าขนาด 100 มก./กก./วัน และการเจริญของเซลล์ผนังช่องคลอดสัมพันธ์กับการเพิ่มน้ำหนักของมดลูก จากดัชนีชี้วัดทั้ง 5 พบว่า กวาวเครือขาวสายพันธุ์ PM-IV มีฤทธิ์เอสโตรเจนิกสูงกว่าสายพันธุ์ PM-III โดยพบว่าปริมาณน้ำฝนที่พืชได้รับมีผลทำให้ฤทธิ์เอสโตรเจนิกของกวาวเครือขาวลดลงทั้ง 2 สายพันธุ์ ในขณะที่การเปลี่ยนแปลงของอุณหภูมิไม่มีผลต่อฤทธิ์เอสโตรเจนิก ผลการทดลองสรุปได้ว่าพันธุกรรมพืช และปัจจัยกายภาพมีผลต่อฤทธิ์เอสโตรเจนิกแอกของหัวกวาวเครือขาว งานวิจัยนี้สามารถประยุกต์ใช้เป็นดัชนีชี้วัดระยะเวลาการเก็บเกี่ยวที่เหมาะสมและการคัดเลือกสายพันธุ์กวาวเครือขาวที่มีฤทธิ์เอสโตรเจนิกสูง เพื่อใช้ผลิตวัตถุดิบคุณภาพดีในระดับอุตสาหกรรมต่อไป

สาขาวิชา..... เทคโนโลยีชีวภาพ..... ลายมือชื่อนิติศ..... พิศราภรณ์ สุขสวัสดิ์
ปีการศึกษา..... 2549..... ลายมือชื่ออาจารย์ที่ปรึกษา.....

4772398423: MAJOR BIOTECHNOLOGY

KEYWORD: *Pueraria mirifica* / ESTROGENIC ACTIVITY/ OVARIECTOMY/
PHYTOESTROGEN

PATCHARAPORN SOOKSAWAT: DIFFERENTIAL ESTROGENIC
ACTIVITY OF CULTIVATED WHITE KWAO KRUA *Pueraria mirifica* IN
OVARIECTOMIZED RATS. THESIS ADVISOR: ASSOC. PROF. WICHAI
CHERDSHEWASART, D.Sc., 128 pp. ISBN 974-14-2044-7

The 1 year studies of the influence of physical factors and plant genetics on plant estrogenic activity was done in the monthly collected tubers of 2 clones of *Pueraria mirifica*, PM-III and PM-IV in a field trial at Ratchaburi province, in ovariectomized rats treated with 100 and 1,000 mg/kg BW/day plant powder dissolve in 0.7 ml of distilled water, and compared to rats fed with 0.7 ml of distilled only and injected with a single dose of 17 β -estradiol. The experiments were set into 3 phases, pre-treatment period for 14 days, treatment period for 14 days and post-treatment period for 7 days, with 5 parameters including 1) the first day of appearance of vaginal cornified cell in the treatment period 2) the total day of appearance of cornified cells in the treatment period and post-treatment period 3) uterus weight 4) cross-section area of endometrium, myometrium and lumen of uterus and 5) gland numbers in uterus. From the 1st and 2nd parameters, it was found that the estrogenic activity of *P. mirifica* was a dose dependent. The vaginal cornification in rats treated with 1,000 mg/kg BW/day of *P. mirifica* was occurred faster and longer than that of rat treated with 100 mg/kg BW/day. Changes of vaginal cell after *P. mirifica* treatment were agreed with the increase of uterine weight. From the 5 analyzed parameters, PM-IV showed stronger estrogenic activity than PM-III. The obtained rain amount resulted in decreasing estrogenic activity in both clones while the temperature change exhibited no effect on estrogenic activity. The conclusion from this study is the plant genetics and physical factors exhibits influences on the plant estrogenic activity. The results from this study could be applied as parameters to determine the right harvest period and plant clonal selection for high estrogenic activity to serve the good quality raw materials to industry.

Field of study Biotechnology Student's signature *S. Patcharaporn*
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ACKNOWLEDGEMENTS

I would like to express my deepest appreciation and grateful thanks to my advisor, Associate Professor Dr. Wichai Cherdshewasart for his excellent instruction, encouragement, guidance and support throughout this thesis. Without his kindness and understanding, this work would not have been accomplished. Especially I would like to really thank the thesis committee; Assistant Professor Dr. Kamthorn Teerakup, Assoc. Prof. Dr. Nattaya Ngamrojanavanich and Assist. Prof. Dr. Chanpen Chanchao for serving as chairman and members of the thesis committee, respectively, whose comments are especially helpful.

Special thanks for Department of Biology for laboratory facilities, Program of Biotechnology, Faculty of Science, Chulalongkorn University for access to use the necessary instruments for my thesis.

My acknowledgement is expressed to all staff members of the Primate Laboratory and Department of Biology for their help in laboratory and discussion. I also thank them for their sincerity and friendships. Special thanks are also extended to P'Ta for his practical help.

Sincere thanks to all my laboratory; P'Bour, P'Na, P'Gade, P'Tong, and all members in Kwoa Krua Laboratory especially P'Nong (Miss Yossaporn Kitsamai) for her useful suggestions. Special thanks for Assistance Professor Dr. Orwan Sathayalai, P' Yim and P' John for histochemistry stuffs

I really express my wholeheartedly appreciation to my parents, my family members and all of friends; Kook, Si, Pu, Chay, Tor, Trin, Nigy, Node, Jo and Jack who have never left me alone.

Finally, I would like to dedicate all worth of this research to all life of rats

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LIST OF ABBREVIATIONS

BW	Body weight
Co	Cornified cell
DW	Distilled water
Day	Day of study period
D	Day of treatment period
D'	Day of posttreatment
E ₂	17 β -estradiol
FSH	Follicle stimulating hormone
g	Gram
kg	Kilogram
l	Litre
L	Leucocyte cell
LH	Lutinizing hormone
M	Molar
mg	Milligram
ml	Millilitre
O	Nucleated cell
OVX	Ovariectomy
PM	<i>Pueraria mirifica</i>
μ g	Microgram
μ l	Microlitre
$^{\circ}$ C	Degree Celcius