

การศึกษาปริมาณน้ำมันหอมระเหยและไปเปอรินในพริกไทยที่ปลูกในประเทศไทย



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STUDIES ON VOLATILE OIL AND PIPERINE CONTENTS IN PEPPER  
CULTIVATED IN THAILAND



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พริกไทยที่นิยมปลูกในประเทศไทยโดยทั่วไปได้แก่พันธุ์ชาราวักและพันธุ์ศรีสังกา วัตถุประสงค์ของการศึกษานี้มุ่งเน้นที่ การเปรียบเทียบคุณภาพของพริกไทยดำทั้งสองพันธุ์จากแหล่งปลูกหลักในประเทศที่ส่งหัตถ์พันธุ์ในแง่ของปริมาณน้ำมันหอมระเหยและไปเปอรินซึ่งพบว่าปริมาณน้ำมันหอมระเหยและไปเปอรินจากพริกไทยพันธุ์ศรีสังกา (2.73%, 4.96%) มากกว่าพริกไทยพันธุ์ชาราวัก (1.78%, 3.82%) อย่างมีนัยสำคัญ ( $\alpha=0.05$ ) เมื่อศึกษาถึงปริมาณและชนิดขององค์ประกอบในน้ำมันหอมระเหยของพริกไทยที่ได้จากทั้งสองพันธุ์โดยใช้ GC และ GC-MS พบว่ามีองค์ประกอบอย่างน้อย 30 ชนิด โดยองค์ประกอบหลักที่พบได้แก่  $\alpha$ -pinene,  $\beta$ -pinene, sabinene,  $\Delta^3$ -carene, limonene และ  $\beta$ -caryophyllene องค์ประกอบอื่นที่พบประกอบด้วย monoterpene hydrocarbons 7 ชนิด, sesquiterpene hydrocarbons 11 ชนิดและ oxygenated terpene compounds 6 ชนิด จากการศึกษาสรุปได้ว่าพริกไทยพันธุ์ศรีสังกามีคุณภาพดีกว่าพันธุ์ชาราวักทั้งในแง่ปริมาณน้ำมันหอมระเหยและไปเปอริน เมื่อเปรียบเทียบกับพริกไทยดำจากประเทศอื่นพบว่าพริกไทยดำจากประเทศไทย (ทั้งพันธุ์ศรีสังกาและพันธุ์ชาราวัก) มีปริมาณไปเปอรินสูงกว่าแต่มีปริมาณน้ำมันหอมระเหยต่ำกว่าพริกไทยดำจากประเทศอินเดีย, บราซิล และมาเลเซีย เมื่อศึกษาถึงอายุของเมล็ดพริกไทยพบว่าปริมาณน้ำมันหอมระเหยและไปเปอรินพบสูงสุดเมื่อเมล็ดพริกไทยมีอายุได้ 3 เดือนหลังจากนั้นจะมีปริมาณลดลง เมล็ดพริกไทยที่มีอายุ 5 เดือนจะเหมาะสมในการเก็บเกี่ยวเพื่อนำไปทำพริกไทยดำ และพบว่าเมล็ดพริกไทยที่มีอายุ 2 ถึง 6 เดือนจะไม่มี ความแตกต่างในแง่ปริมาณและชนิดขององค์ประกอบในน้ำมันหอมระเหย ( $\alpha=0.05$ ) พริกไทยดำสามารถเก็บที่อุณหภูมิห้องในภาชนะปิดสนิทได้ไม่ต่ำกว่า 8 เดือนโดยที่ปริมาณและองค์ประกอบในน้ำมันหอมระเหยไม่มีการเปลี่ยนแปลง

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สาขาวิชา..... เกษศาสตร์  
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ลายมือชื่อนิติ.....  
ลายมือชื่ออาจารย์ที่ปรึกษา.....  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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WARAPORN PUTALUN : STUDIES ON VOLATILE OIL AND PIPERINE CONTENTS IN PEPPER CULTURED IN THAILAND. THESIS ADVISER : ASST. PROF. WANCHAI DE-EKNAMKUL, Ph.D. 132 pp. ISBN 974-582-581-6

Thai pepper is normally obtained from two cultivars, the Sarawak and Sri Lankan which are grown locally in Thailand. This study aims to evaluate the quality of black pepper from two cultivars grown at Chantaburi, the major site of pepper plantation in Thailand by determination of pepper oil and piperine contents. Quantitative analysis of total pepper oil and piperine contents showed that the Sri Lankan cultivar (2.73%, 4.96%) contained significant higher levels of the pepper oil and piperine ( $\alpha=0.05$ ) than the Sarawak cultivar (1.78%, 3.82%). In terms of pepper oil composition, the analysis by GC and GC-MS revealed that both cultivars contained approximately 30 similar components. Among these,  $\alpha$ -pinene,  $\beta$ -pinene, sabinene,  $\Delta^3$ -carene, limonene and  $\beta$ -caryophyllene appeared to be the major ones. For the minor components, these could be identified and grouped as seven monoterpene hydrocarbons, eleven sesquiterpene hydrocarbons and six oxygenated terpene compounds. From these results, it is concluded that the black pepper from the Sri Lankan cultivar contains better quantity and quality of its volatile oil and piperine than that from the Sarawak cultivar. In comparison with some black pepper products from other countries, the black pepper cultivated in Thailand (both Sri Lankan and Sarawak cultivars) shows more piperine but less volatile than those from India, Brasil and Malaysia. In the maturation of pepper berries, the volatile oil and piperine contents reached their maximum at 3 month old of pepper berries and thereafter decreased. However, the optimum age of the berries to be harvested for black pepper product is 5 month old. During 2 to 6 months of pepper berries maturity, there is no significant variation ( $\alpha=0.05$ ) of the volatile oil composition. After harvesting, the black pepper can be stored at room temperature at least eight months without affecting the volatile oil content and composition.



ภาควิชา..... เกษัช เวท.....

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## ABBREVIATIONS



cm	=	centimeter
FID	=	Flame Ionization Detector
g	=	gram
GC	=	Gas Chromatography
GC-MS	=	Gas Chromatography-Mass Spectrometry
HPLC	=	High-Performance Liquid Chromatography
i.d.	=	internal diameter
IR	=	Infrared
kg	=	kilogram
l	=	liter
mg	=	milligram
ml	=	milliliter
min	=	minute
MW	=	Molecular Weight
nm	=	nanometer
NMR	=	Nuclear Magnetic Resonance
SD	=	Standard Deviation
UV	=	Ultraviolet
v/v	=	volume by volume
v/w	=	volume by weight
wt	=	weight
w/w	=	weight by weight
°C	=	Degree Celsius
μg	=	microgram
μl	=	microliter