

ผลของเลซีทินที่มีกรดไขมันโอเมก้า-3 ต่อการเพิ่มผลผลิต  
กุ้งกุลาดำ *Penaeus monodon* วัยอ่อน

นางสาว พิมพ์พร อินนพคุณ



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**EFFECT OF OMEGA-3 FATTY ACID CONTAINING LECITHINS ON  
PRODUCTION OF LARVAE BLACK TIGER PRAWN *Penaeus monodon***

**Miss Pimporn Innopakun**

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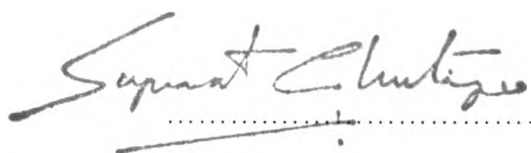
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Thesis Co-advisor      Associate Professor Winai Dahlan, Ph.D.

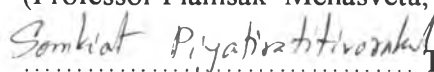
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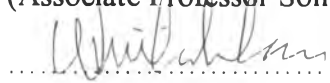
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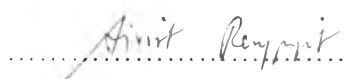
  
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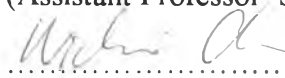
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..... Chairman  
(Professor Piamsak Menasveta, Ph.D.)

  
..... Thesis Advisor  
(Associate Professor Somkiat Piyatiratitivorakul, Ph.D.)

  
..... Thesis Co-advisor  
(Associate Professor Winai Dahlan, Ph.D.)

  
..... Member  
(Assistant Professor Sirirat Rengpipat, Ph.D.)

  
..... Member  
(Associate Professor Wichai Cherdshewasart, Ph.D.)

พิมพ์พร อินนพคุณ : ผลของเลซิทินที่มีกรดไขมันโอเมก้า-3 ต่อการเพิ่มผลผลิตกุ้งกุลาดำ *Penaeus monodon* ว่ายอ่อน (EFFECT OF OMEGA-3 FATTY ACID CONTAINING LECITHINS ON PRODUCTION OF LARVAE BLACK TIGER PRAWN *Penaeus monodon*) อาจารย์ที่ปรึกษา : รศ.ดร. สมเกียรติ ปิยธีรธิตวิรุฑ, อาจารย์ที่ปรึกษาร่วม : รศ.ดร. วินัย ตะห์ลัน, 117 หน้า. ISBN 974-639-753-2

การศึกษานี้มีวัตถุประสงค์เพื่อผลิตเลซิทินจากปลาปนนอกและปลาปนไทยซึ่งมีกรดไขมันไม่อิ่มตัวโอเมก้า-3 สูง และเปรียบเทียบผลของเลซิทินจากถั่วเหลือง, เลซิทินจากปลาปนนอก, เลซิทินจากปลาปนไทยและไม่มีเลซิทินต่อการเติบโต, อัตราการรอด, และความทนทานต่อการเปลี่ยนแปลงความเค็มอย่างฉับพลันของกุ้งกุลาดำวัยอ่อน เลซิทินที่สกัดจากปลาปนนอกและปลาปนไทยมีกรดไขมัน 20:5 n-3 ปริมาณ 7.51 และ 6.40 กรัม/100 กรัม และมีกรดไขมัน 22:6 n-3 ปริมาณ 21.68, และ 19.25 กรัม/100กรัม ตามลำดับ ขณะที่เลซิทินสกัดจากถั่วเหลืองมีกรดไขมัน 18:2 n-6 และ 18:3 n-3 ปริมาณสูงคือ 55.59 และ 7.81 กรัม ปริมาณของฟอสโฟลิปิดที่พบในเลซิทินที่สกัดจากถั่วเหลือง, ปลาปนนอกและปลาปนไทย คือ 50, 25 และ 20 กรัม/100 กรัม ตามลำดับ นำเลซิทินที่สกัดไปผสมลงในอาหารเลี้ยงกุ้งกุลาดำวัยอ่อน 1.5 % ของอาหาร ศึกษาผลของเลซิทินที่มีต่อกุ้งกุลาดำวัยอ่อน โดยเลี้ยงกุ้งด้วยอาหาร 4 ชนิด คือ อาหารที่เติมเลซิทินจากถั่วเหลือง, อาหารที่เติมเลซิทินจากปลาปนนอก, อาหารที่เติมเลซิทินจากปลาปนไทยและอาหารไม่เติมเลซิทิน พบว่า กุ้งกลุ่มที่เลี้ยงด้วยอาหารที่เติมเลซิทินจากถั่วเหลืองมีอัตราการเจริญสูงกว่าทุกกลุ่ม กุ้งกุลาดำที่เลี้ยงความเค็ม 25 ppt มีอัตราการเจริญสูงสุดในกลุ่มที่เลี้ยงด้วยอาหารที่เติมเลซิทินจากถั่วเหลือง ขณะที่กุ้งกุลาดำที่เลี้ยงความเค็ม 30 ppt พบอัตราการเจริญสูงในกุ้งกลุ่มที่เลี้ยงด้วยอาหารที่เติมเลซิทินจากถั่วเหลืองและกุ้งกลุ่มที่เลี้ยงด้วยอาหารที่เติมเลซิทินจากปลาปนไทย แต่ในผลของอัตราการรอดของกุ้งกุลาดำวัยอ่อนไม่มีความแตกต่างกันในกลุ่มที่เลี้ยงด้วยอาหารสูตรต่างๆ แต่พบว่ากุ้งกลุ่มที่ได้รับเลซิทินมีความสามารถทนทานต่อการเปลี่ยนแปลงความเค็มได้ดีกว่ากุ้งกลุ่มที่ไม่ได้รับเลซิทิน และกุ้งกลุ่มที่เลี้ยงด้วยอาหารที่เติมเลซิทินจากปลาปนไทยสะสมกรดไขมันไม่อิ่มตัวสูงชนิด HUFA ไว้ในตัวกุ้งมากที่สุด

ภาควิชา.....  
สาขาวิชา สาขาวิชาเทคโนโลยีทางชีวภาพ.....  
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The aims of the present study are to produce n-3 fatty acids-lecithins and to evaluate their effects on growth, survival and low salinity stress of *Penaeus monodon* larvae. Lecithins extracted from Danish fish meal, Thai local fish meal and soybean shows different composition of fatty acids. Danish and local fish meal lecithin had higher EPA and DHA, whereas soybean lecithin had higher linoleic and alpha-linolenic acids. Phospholipid content in lecithins derived from soybean, Danish fish meal and local fish meal were 50, 25 and 20 g/100 g. Four diets; soybean lecithin-added diet (SAD), Danish fish meal lecithin-added diet (DAD), local fish meal lecithin-added diet (LAD) and free lecithin-added diet (control diet, CD) formulated from purified diets were used to feed shrimp larvae at different stages (zoea, mysis, and postlarvae). The amount of lecithin in lecithin added diets was 1.5% of the total ingredient. Shrimp larvae fed SAD showed the highest growth rate in both salinity 25 and 30 ppt. Shrimp larvae fed CD also showed the high growth rate without significant difference at 25 ppt. The shrimp larvae survival rate in all diets was not significant different. Regarding stress test, shrimp postlarvae fed all lecithin added diets showed more tolerance to low salinity compared to that of lecithin-free diet (CD). Moreover, the larvae fed LAD accumulated HUFA in tissue higher than the those fed other diets.

ภาควิชา.....  
สาขาวิชา สาขาวิชาเทคโนโลยีทางชีวภาพ.....  
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ลายมือชื่ออาจารย์ที่ปรึกษา.....  
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## ABBREVIATIONS

IS	=	internal standard
PL	=	phospholipids
PC	=	phosphatidylcholine
PI	=	phosphatidylinositol
EFA	=	essential fatty acid
DHA	=	docosahexaenoic acid ( C 22:6 n-3)
SE	=	sterol esters
FS	=	free sterol
EPA	=	eicosapentaenoic acid ( C 20:5 n-3)
FAMEs	=	fatty acid methyl esters
TG	=	triglycerols or triglycerides
BHT	=	2,6-di-tert-butyl-4-methylphenol
FOKC	=	Fats and Oils Research Center, Chulalongkorn University
SL	=	soybean lecithin
DL	=	Danish fish meal lecithin
LL	=	local fish meal lecithin
HUFA	=	High unsaturated fatty acid
SAD	=	soybean lecithin - added diet
DAD	=	Danish fish meal lecithin - added diet
LAD	=	local fish meal lecithin -added diet
CD	=	free lecithin - added diet

$\omega$ 3, n-3	=	omega3
$\omega$ 6, n-6	=	omega6
TG-FA	=	triglyceride fatty acids
PL-FA	=	phospholipid fatty acids
$^{\circ}$ C	=	degree Celcius
mg	=	milligram
min	=	minute
ml	=	millitre
$\mu$ l	=	microlitre
h	=	hour
g	=	gram
$\mu$ g	=	microgram
dl	=	decilitre (100 ml)