

การเปลี่ยนแปลงของสังคมแบบคทีเรียและคุณลักษณะดินตะกอนในบ่อเลี้ยงกุ้ง



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**CHANGES IN BACTERIAL COMMUNITY AND SEDIMENT  
CHARACTERISTICS IN SHRIMP PONDS**

**Mrs. Pariya Nuphasant**


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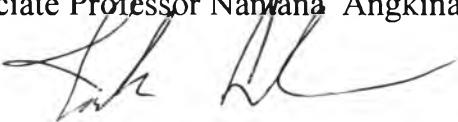
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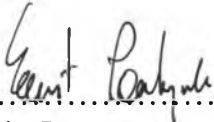
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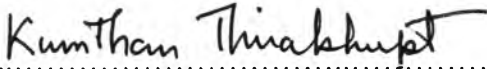
  
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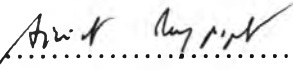
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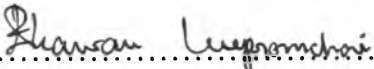
  
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ปริยา นุพาสันต์ : การเปลี่ยนแปลงของสังคมแบคทีเรียและคุณลักษณะดินตะกอนในบ่อเลี้ยงกุ้ง  
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งานวิจัยนี้เป็นการศึกษาการเปลี่ยนแปลงขององค์ประกอบชนิดของแบคทีเรียในดินตะกอน ของบ่อเลี้ยง  
กุ้งตลอดระยะเวลาการเลี้ยงกุ้ง โดยการเก็บตัวอย่างดินตะกอนจากบ่อเลี้ยงกุ้งในอำเภอหนองเสือ จ.ปทุมธานี  
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เลี้ยงกุ้งในเขตบางขุนเทียน จ.กรุงเทพมหานคร จำนวน 3 บ่อ โดยมีการวิเคราะห์คุณสมบัติทางเคมีของดินตะกอน  
การศึกษาสังคมของแบคทีเรียโดยวิธีเลี้ยงเชื้อ และ 16S rDNA PCR-DGGE และจำแนกชนิดของแบคทีเรียโดย  
เปรียบเทียบลำดับเบสของชิ้นส่วน 16S rDNA กับฐานข้อมูล

ผลการศึกษาพบว่า ในระหว่างการเลี้ยงกุ้งจะพบการสะสมของสารอินทรีย์ในดินตะกอนอย่างชัดเจน  
ในขณะที่ปริมาณสารประกอบไนโตรเจนมีการเปลี่ยนแปลงขึ้นลงอยู่ตลอดเวลา พบว่าปริมาณของแอมโมเนียและ  
ไนไตรต์มีแนวโน้มเพิ่มขึ้นตามระยะเวลาการเลี้ยงกุ้ง ซึ่งสัมพันธ์กับจำนวนแบคทีเรียที่เพิ่มขึ้น ผลการติดตามการ  
เปลี่ยนแปลงของประชากรแบคทีเรียในดินตะกอนพบว่ามีศึกษาโดยการนับจำนวนโคโลนีแบคทีเรียบนอาหาร  
เพาะเชื้อ พบว่าแบคทีเรียมีจำนวนเพิ่มขึ้นตามระยะเวลาการเลี้ยง ซึ่งสอดคล้องกับผลการศึกษาด้วย DGGE และจาก  
การโคลน 16S rDNA ของกลุ่มแบคทีเรียที่พบเด่นชัดบนเจลพบว่า เป็นกลุ่ม *Pseudomonas*, *Serratia*, *Vibrio*,  
*Marinobacter*, *Halomonas*, *Desulfovibrio* และ *Bacillus* นอกจากนี้ยังพบว่าแบคทีเรียหลายชนิดที่พบเป็นชนิด  
เด่นจากการศึกษาด้วยเทคนิค DGGE เป็นแบคทีเรียที่ไม่สามารถแยกเพาะเลี้ยงในห้องปฏิบัติการได้ (uncultured  
bacteria)

การนำตัวอย่างดินตะกอนจากบ่อเลี้ยงกุ้งมาทดสอบการย่อยสลาย และการเปลี่ยนรูปแบบของ  
สารประกอบไนโตรเจนในห้องปฏิบัติการ พบว่าแบคทีเรียในดินตะกอนจากบ่อเลี้ยงกุ้งสามารถย่อยสลาย  
สารอินทรีย์ในโตรเจนให้อยู่ในรูปของสารอนินทรีย์ โดยกระบวนการแอมโมนิฟิเคชัน ไนตริฟิเคชัน และดีไนตริ  
ฟิเคชัน ตามลำดับ ซึ่งปฏิกิริยาไนตริฟิเคชันสามารถเกิดขึ้นได้อย่างรวดเร็ว แม้ว่าแบคทีเรียกลุ่มไนตริฟายอิงจะ  
ไม่ใช่แบคทีเรียที่พบมากในตัวอย่างดินตะกอนก็ตาม

สาขา.....วิทยาศาสตร์ชีวภาพ.....ลายมือชื่อนิสิต.....  
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KEY WORDS : SHRIMP POND/ SEDIMENT/ BACTERIAL COMMUNITY  
DENATURING GRADIENT GEL ELECTROPHORESIS

PARIYA NUPHASANT : CHANGES IN BACTERIAL COMMUNITY  
AND SEDIMENT CHARACTERISTICS IN SHRIMP PONDS THESIS  
ADVISOR: TOSAK SEELANAN, Ph.D., THESIS CO-ADVISOR:  
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This study investigated the change of bacterial communities and sediment characteristics in the shrimp pond during cultivation period. Sediment samples were collected from 2 shrimp ponds at Nong Suea, Pathum Thani Province, 2 ponds at Ban Pho, Chachoengsao Province, 1 pond at Bang Khla, Chachoengsao Province and 3 ponds in Bang Khun Thian, Bangkok. Sediment characteristics were analyzed using chemical analysis. Bacterial community was examined using a combination of cultured and 16S rDNA PCR-DGGE technique. The identity of bacterial populations was identified by comparing isolated 16S rDNA sequences with the database.

The results showed that organic matter was accumulated in all shrimp pond sediment while nitrogen compounds were fluctuated during cultivation. Meanwhile, the concentrations of ammonia and nitrite in several ponds tended to increased with the increasing of bacterial number. Total bacteria count showed that the number of bacteria increased with culture period. The PCR-DGGE results indicated the shifts of bacterial populations with increasing species diversity at the end of cultivation. After cloning, sequencing and comparing 16S rDNA with the database, it was found that the dominant bacteria in the sediment were *Pseudomonas*, *Serratia*, *Vibrio*, *Marinobacter*, *Halomonas*, *Desulfovibrio* and *Bacillus*. Moreover, many dominant bacteria appeared on DGGE gel were uncultured bacteria.

An investigation of nitrogen decomposition and transformation under laboratory condition showed that bacteria in sediment from shrimp pond could decompose organic nitrogen and convert to inorganic nitrogen. This was according to ammonification, nitrification and denitrification processes, respectively. Nitrification process, however, could rapidly occur even the nitrifying bacteria were not the dominant group.

Field of study ...Biological Science.... Student's signature.....  
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