

ลักษณะสมบัติของ *Aspergillus spp.* สายพันธุ์ที่สร้างและไม่สร้างสารพิษที่คัดแยกจากไวรัส
ข่าวโดยในประเทศไทย



นายบรรค์ชัย ดันเนม

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรดุษฎีบัณฑิต
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CHARACTERIZATION OF TOXIGENIC AND ATOXIGENIC *Aspergillus* spp.
STRAINS ISOLATED FROM CORN FIELDS IN THAILAND

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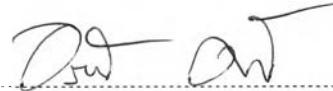
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บรรค์ชัย ดันเมฆ : ลักษณะสมบัติของ *Aspergillus* spp. สายพันธุ์ที่สร้างและไม่สร้างสารพิษที่คัดแยกจากไร่ข้าวโพดในประเทศไทย. (CHARACTERIZATION OF TOXIGENIC AND ATOXIGENIC *Aspergillus* spp. STRAINS ISOLATED FROM CORN FIELDS IN THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก : รศ. ดร. บรรยา ปุณณะพยัคฆ์ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม PROF. Kenneth E. Damann, Jr.Ph.D. 179 หน้า.

Aspergillus flavus มีลักษณะทางสัณฐานวิทยาคล้ายกับเชื้อรานิดอื่นๆ ใน section Flavi เชื้อรานี้สามารถจำแนกออกจากตัวอื่นๆ โดยอาศัยลักษณะทางสัณฐานวิทยา จากการศึกษา *A. flavus* สายพันธุ์ต่างๆ เช่น *A. flavus* NRRL 3357, NRRL 21882, TX9-8, F3W4, Af53 และ *A. flavus* ที่คัดแยกจากดินบริเวณที่ปลูกข้าวโพดในประเทศไทย และชนิดอื่นๆ ใน section Flavi เช่น *A. parasiticus* *A. tamarii* และ *A. nomius* พนว่ามีเพียง *A. flavus* ที่สามารถผลิต synnema เมื่อเลี้ยงในอาหารสูตร Czapek Dox ที่มีการเติม Avid® ซึ่งวิธีการนี้สามารถช่วยในการจำแนกเชื้อราน *A. flavus* ออกจากสายพันธุ์อื่นๆ ที่มีลักษณะคล้ายกันใน section Flavi ได้ เช่น *A. parasiticus* *A. tamarii* และ *A. nomius* เชื้อราน *A. flavus* และสายพันธุ์อื่นๆ ใน section Flavi ได้ถูกคัดแยก และศึกษาลักษณะสมบัติจากดินบริเวณที่มีการปลูกข้าวโพดในประเทศไทยจากการศึกษาพบว่า *Aspergillus* section Flavi มีการสร้างสีที่ด้านล่างโคลโนนเมื่อเลี้ยงบนอาหารสูตร Aspergillus Flavus and Parasiticus Agar (AFPA) ที่อุณหภูมิ 30°C เป็นระยะเวลา 7 วันในที่มีด เช่น สีเหลืองส้ม (*A. flavus* *A. parasiticus* และ *A. oryzae*) สีเหลืองจาง (*A. parasiticus* และ *A. nomius*) และสีน้ำตาลจางถึงเข้ม (*A. tamarii* และ *A. pseudotamarii*) มีเพียง *A. flavus* ที่สร้าง conidial head ที่มีการเรียงของ conidium เป็นรูปกระสายในอาหารสูตร V8 medium อย่างไรก็ตาม *Aspergillus* section Flavi ทุกสายพันธุ์มีการผลิต Kojic acid ในอาหารสูตร modified rice medium และเมื่อศึกษาถึงการผลิต aflatoxin พนว่าเชื้อรานี้สามารถผลิตได้คือ *A. flavus* *A. parasiticus* และ *A. nomius* แต่จะมีปริมาณต่างกัน เช่น *A. parasiticus* ผลิต aflatoxin B มากกว่า ในขณะที่ *A. nomius* ผลิต aflatoxin G มากกว่า B และ *A. flavus* สามารถพนได้ตั้งแต่สายพันธุ์ที่ไม่ผลิต จนถึงสายพันธุ์ที่ผลิต aflatoxin ในปริมาณมาก ในการศึกษานี้สามารถพนเชื้อราน *A. flavus* ที่ไม่ผลิต aflatoxin จำนวน 33 สายพันธุ์

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ลายมือชื่อนิสิต 
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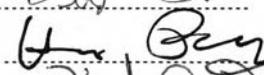
KHANCHAI DANMEK : CHARACTERIZATION OF TOXIGENIC AND ATOXIGENIC *Aspergillus* spp. STRAINS ISOLATED FROM CORN FIELDS IN THAILAND. ADVISOR : ASSOC. PROF. Hunsa Punnapayak, Ph.D., CO-ADVISOR : PROF. Kenneth E. Damann, Jr, Ph.D., 179 pp.

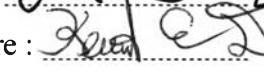
Aspergillus flavus is morphologically similar to other species of the section *Flavi*. A facile method to distinguish these species based on cultural characteristics is reported. Several *A. flavus* and some related strains in section *Flavi* including *A. parasiticus*, *A. nomius*, and *A. tamarii* were isolated, and characterized from corn fields in different areas of Thailand. *Aspergillus* section *Flavi* produced a wide range of color in reverse on *Aspergillus* *flavus* and *parasiticus* agar (AFPA) at 30 °C for 7 days in the dark including dark yellow orange (*A. flavus*, *A. parasiticus*, and *A. oryzae*), pale yellow (*A. parasiticus*, and *A. nomius*), and pale or dark brown (*A. tamarii*, and *A. pseudotamarii*). Only *A. flavus* produced columnar shape of conidiophores in V8 medium. All isolated strains in *Aspergillus* section *Flavi* produced kojic acid in modified rice medium. Only *A. flavus* produced synnemata on modified Czapek medium containing (20-1,000 l/L) Avid®. This novel, yet readily prepared, culture medium permits differentiation of *A. flavus* from related species in section *Flavi*. Aflatoxins producing strains were identified to be *A. flavus*, *A. parasiticus*, and *A. nomius*. Isolated fungi in *Aspergillus* section *Flavi* differently produced aflatoxins including *A. parasiticus* produced aflatoxin B more than G, *A. nomius* produced aflatoxin G more than B, and *A. flavus* widely produced range of aflatoxins. Twenty three stains of atoxigenic strains of *A. flavus* were observed in the isolates. Some aflatoxin producing strains of *A. flavus* were obtained from some areas without more corn cultivation, produced high quantity of aflatoxin yields. So high level of corn cultivation areas did not specific to find aflatoxin producing strains of *A. flavus* in Thailand. Inhibition of aflatoxins production from toxigenic strains *A. flavus* by the same strain of atoxigenic involves solution factors more than living cell of fungi (mycelial network, or touching).

Field of Study : Biotechnology.....

Student's Signature : 

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