

Fungal Biotechnology Laboratory

ÉéÍ§»@Ô°ÑμÔ;ÔÃà·âáâÁÃÖªÖÇÀÒ¼'éÔ'ÁÒ

(Fungal Biotechnology Laboratory)

»ÃÐÇÑμÔ

ÉéÍ§»Ô°ÑμÔ;ÔÃà·âáâÁÃÖªÖÇÀÒ¼'éÔ'ÁÒ ä'éÁØè§à'é'ÉÔ;ÉÔ;ÔÃãªé»ÃÐãÁª¹;Ô;·ØÁÔ¹.ÃÖÁìª¹;ÃØèÁÃÖÊμìáÃÐÃÒ.Ôè/compound) ä'éá;è ÊÖÃã¹;ÃØèÁ polyketides non-ribosomal peptides áÃÐ;Ã'ãÇÁÑ¹·Óà»Ç¹ã¹;ÃØèÁáìá;éÔ 3 áÃÐ 6 á'ÁÍÖËÑÃË (Systems Biology) «Ôè§à»Ç¹;ÔÃ·Ô§Ô¹ÁèÇÁ;Ñ¹ÃÐËÇèÔ§ÍÔ·ÔÃÁìáÃÐ¹Ñ;ÇÔ¹ÑÁ·ÔèÁÔÇÔÁªªÔèÃÇªÔ-ã¹ÉÔÇÔμèÔ§æ·Ñé§à à¼xèìà¼ÔèÃÇÔ ÇÇÔÁËÔÁÔÁª¹;ÔÃáè§çÑ¹çÍ§»ÃÐà·É'éÔ'á·âáâÁÃÖªÖÇÀÒ¼áÃÐμ¹É¹Í§ÇÔÁμéÍ§;ÔÃçÍ§ÀÔμÉÔË;Ã

ÇÑμ¶Ø»ÃÐË§ªì

à¼xèìÉÖ;ÉÔ;ÃÐÇ¹;ÔÃ;ÔÃËÑ§àªÃÐËËÉÔÁÍ;Ã·Ô;Ô§ªÖÇÀÒ¼'Ô;ÁÒ ä'éá;èÊÖÃã¹;ÃØèÁ microbial oils , polyketide áÃÐ ã'ÁÍÖËÑÃË·âáâÁÃÖ·Ô§'éÔ'ÍªÖÇÇÔ·ÃÔªÑé¹ÉÚ§ àªé¹ Systems biology, Bioinformatics, Metabolic engineering áÃÐ Combina à¼xèì»ÃÑº»ÃØ§ËÔÁª¹Ñ¹,ØìáÃÐ;ÔÃ¼ÁÔμÉÔÃ·ÔèÁÔ»ÃÐãÁª¹·Ô§'éÔ'á·âáâÁÃÖªÖÇÀÒ¼ á'Á·ØÁÔ¹.ÃÖÁì·Ôè¹ÓÁÔ·Ô;ÔÃ áÃÐÃÖÊμì Saccharomyces cereiviae , Hansenula polymorpha

à¼xèì¼Ñ²¹ÔÃÔáÃÐÃÖÊμìà»Ç¹à«ÃÁìà"éÔ"éÔ'ã¹;ÔÃËÑ§àªÃÐËËË Heterologous protein, Unnatural áÃÐ Natural product

¶èÔÁ·Í'á·âáâÁÃÖ;ÔÃËÑ§àªÃÐËËËÉÔÁÍ;Ã·Ô;ÔªÖÇÀÒ¼çÍ§ÃÔ¹Ô;ÉéÍ§»Ô°ÑμÔ;ÔÃËÙèÀÔμÉÔË;ÃÃÁ·Ôèà;ÔèÃÇçéÍ§

§Ô¹ÇÔ¹ÑÁ·Ôè'Óà¹Ô¹;ÔÃ

1. Microbial fatty acid and lipid metabolisms

-
;ÒÃÈÖ;ÉÒÇÒÃÈÑÁ¼Ñ¹; ÌÄÈÈÇèÒ§àµÃ§ÈÃéÒ§áÁÐÈ¹éÒ·ÕèÇÍ§Áí¹à «Àì fatty acid desaturase áÁÐ elongases ÇÍ§ÃÒ M. rouxii

-
;ÒÃ·Ó;ÁÒÁ¼Ñ¹;ØiÃÒ M. rouxii à¼xèÍ»ÃÐâÁ¹µèÍ;ÒÃÈÖ;ÉÒ;ÒÃÇºµØÁ;ÒÃÈÑ§àµÃÒÐÈi;Ã´àÇÁÑ¹áÁÐÁÒ»Ò´ã¹ÃÒ M. rouxii

-
;ÒÃ¼Ñ²¹ÒÃÐº;ÒÃÈè§¶èÒÃÁÒ¹ (transformation) ã¹ÃÒ M. rouxii

-
;ÒÃ¼Ñ²¹Ò;ÒÃà¼ÒÐàÁÒéÁ§ÃÒ M. rouxii à¼xèÍ¼ÁÒµ;Ã´á;ÁÁèÒÃÒá¹àÁ¹Òµ

-
;ÒÃÈÖ;ÉÒ;ÒÃÇºµØÁ;ÒÃÈÑ§àµÃÒÐÈi;Ã´àÇÁÑ¹áÁÐÁÒ»Ò´ã¹ÃÒÈµi Hansenula polymorpha

2. Bioactive compounds

-
;ÒÃÈÖ;ÉÒÈ¹éÒ·ÕèÇÍ§ÁÒ¹·Õèà;ÕèÁÇÇéÍ§;Ñº;ÒÃÈÑ§àµÃÒÐÈiÇÍ§ÈÒÁÁÙ;¼ÉÁ PKS/NRPS ã¹ÃÒ Xylaria sp. BCC1067

-
;ÒÃè¹ÈÒÃÒ¹·Õèã¹éÈÑ§àµÃÒÐÈiÈÒÃµéÒ¹ÁÐàÃÇ§´Ò;ÃÒ Xylaria sp. â´ÁÍÒÈÑÁà·µ¹Òµ·Ò§Í³ÙªÒÇÇÒ·ÁÒáÁÐªÒÇÈÒÃ È¹à·È

-
;ÒÃè¹ÈÒÃÒ¹·ÕèÁÒÈÑ;ÁÒÒ¼ã¹;ÒÃÈÑ§àµÃÒÐÈiÈÒÃÁ´ÃÐ´ÑºµÁáÁÈµÍÁÍÁã¹áÁ×´ã¹;ÁØèÁ polyketide ´Ò;ÃÒã¹;ÁØèÁ Xylaria sp.

-
;ÒÃÈÖ;ÉÒ;ÒÃáÈ´§Í;ÇÍ§ÁÒ¹áÁÐ;ÒÃ¼Ñ²¹Ò;ÒÃ¼ÁÒµÈÒÃã¹;ÁØèÁ polyketide ´Ò;ÃÒ Xylaria sp . ã¹ÃÒÈµi

Aspergillus Xylaria sp .

Aspergillus

- Aspergillus
- Aspergillus
- Aspergillus
- Aspergillus
- Aspergillus
- Aspergillus
- Aspergillus
- Aspergillus

Aspergillus

- Institute of Food Research, Norwich Research Park , UK .
- Department of Biology, Institute for Experimental Pathology, University of Iceland, Iceland
- Biochemie/Fachbereich Chemie, Philipps University of Marburg, Germany
- School of Biosciences , University of Westminster , UK
- Center of Microbial Biotechnology , Technical University of Denmark , Denmark
- University of Salerno, Italy

Aspergillus

- Aspergillus
- Aspergillus

๙ÇÒÁÁèÇÁÁ×í·ÒŞÇÒªÒ;ÒÃ·ÒŞ´éÒ¹à·๙¹Ò๙ÁĐà·๙¹áÁÁÕ´éÒ¹ÁÕ¹ÃèÇÁ;Ñ°ÉéÍŞ»·Ò°ÑµÒ;ÒÃÇÒ·ÑÁ´éÒ¹à·๙¹áÁÁÕ;ÒÃ¾ÒĐ
 é»ÁĐáÁ¹;Ò;ÇÍŞàÉÒÁàÉÁ×íáªé·Ò;ÍØµÉÖÉ;ÁÁÁ

- ๙ÇÒÁÁèÇÁÁ×íá¹ŞÒ¹ÇÒ·ÑÁ ;Ñ°ÉÙ¹ÁàªÖèÁÇªÒ-à©¾ÒĐ·ÒŞ´éÒ¹à·๙¹áÁÁÕªÒÇÀÒ¾·ÒŞ-ĐàÁ ๙ĐÇÒ·ÁÖÈÒÉµÁi ·ØÌÒÁŞ;Á
 ā¹;ÒÃ¾Ñ²¹ÒÍÖÈÒÁ¾éÍáÁè¾Ñ¹,Ø;ÍØéŞ-ĐàÁÉÙµÁ;Á´äÇÁÑ¹áÁéÍÒèÁµÑÇÉÙŞàªÒŞ¾ÒªÁi

- ๙ÇÒÁÁèÇÁÁ×íá¹ŞÒ¹ÇÒ·ÑÁ´éÒ¹;ÒÃÉÖ;ÉÒ·ÒŞÍ³Ù¾Ñ¹,ØÈÒÉµÁ;ÇÍŞ;ÒÁÈÑŞàªÖĐÉ;Á´äÇÁÑ¹áÁĐäÇÁÑ¹ā¹ÁÖÉµi Hansenu

¼ÁŞÒ¹à¼Áá¾Áèā¹ÇÒÁÉÒÁÁĐ·Ñ°¹Ò¹ÒªÒµÒ

- Cheevadhanarak, S., Saunders, G., Renno, D.V., Holt, G. and Flegel, T.W. 1991. Transformation of *Aspergillus oryzae* with a dominant selectable marker. *J. Biotech.* 19:117-122.

- Cheevadhanarak, S., Renno, D.V., Saunders, G., Holt, G. and Flegel, T.W. 1991. Cloning and overexpression of an alkaline protease-encoding gene from *Aspergillus oryzae* with a dominant selectable marker. *Gene* 108:151-155.

- Laoteng, K., Anjard, C., Rachadawong, S., Tanticharoen, M., Maresca, B. and Cheevadhanarak, S. 1999. *Mucor rouxii* D 9 -desaturase gene is transcriptionally regulated during cell growth and by low temperature. *Mol. Cell Biol. Res. Commun.* 1: 36-43.

- Passorn, S., Laoteng, K., Rachadawong, S., Tanticharoen, M., and Cheevadhanarak, S. 1999. Heterologous expression of *Mucor rouxii* D 12 -desaturase gene in *Saccharomyces cerevisiae* . *Biochem. Biophys. Res. Commun.* 263: 47-51.

- Samarntarn, W., Cheevadhanarak, S. and Tanticharoen, M. 1999. Production of alkaline protease by a genetically engineered *Aspergillus oryzae* U1521. *J. Gen. Appl. Microbiol.* 45: 99-103.

- Laoteng, K., Mannontarat, R., Tanticharoen, M. and Cheevadhanarak, S. 2000. D 6 -desaturase gene of *Mucor rouxii* with high similarity to plant D 6 -desaturase and its heterologous expression in *Saccharomyces cerevisiae* , *Biochem. Biophys. Res. Commun.* 279:17-22.

- Thammarongtham, C., Turner, G., Moir, A.J., Tanticharoen, M. and Cheevadhanarak, S. 2001, A new class of glutaminase from *Aspergillus oryzae* , *Journal of Molecular Microbiology and Biotechnology*, Vol. 3 no. 4: pp.611-617.

- 8. Khunyoshyeng, S., Rachadawong, S., Cheevadhanarak, S. and Tanticharoen, M. 2002. Differential expression of desaturases and changes in fatty acid composition during sporangiospore germination and development in *Mucor rouxii* . *Fungal Genetics and Biology*, 37, (1): 13-21.

- Laoteng, K. Pongchuchidthai, R., Rueksomtawin, K., Dandusitapunth, Y., Tanticharoen, M. and Cheevadhanarak, S., 2003. A *Mucor rouxii* mutant with high accumulation of an unusual trans-linoleic acid (9c, 12t-C18:2). *FEMS Microbiology Letters*, 223: 159-165.

- Laoteng, K, Ruenwai, R., Tanticharoen, M. and Cheevadhanarak, S. 2005. Genetic modification of essential fatty acids biosynthesis in *Hansenula polymorpha* . *FEMS Microbiol. Lett.* 245: 169-178.

- Na-Ranong, S., Laoteng, K., Kittakoop, P., Tantichareon, M. and Cheevadhanarak, S. 2005. Substrate specificity and preference of Delta6-desaturase of *Mucor rouxii* . *FEBS Lett.* 579: 2744-2748.

- Laoteng, K., Cheevadhanarak, S., Tanticharoen, M. and Maresca, B. 2005. Promoter analysis of *Mucor rouxii* delta9-desaturase: its implication for transcriptional regulation in *Saccharomyces cerevisiae* . *Biochem. Biophys. Res. Commun.* 335: 400-405.

- Amnuaykanjanasin, A, Punya, J, Pongmuang, P, Rungrid, A, Tachaleat, A, Pongpattanakitsote, S, Cheevadhanarak, S, and Tanticharoen, M. 2005. Diversity of type I polyketide synthase genes in the wood-decay fungus *Xylaria* sp. BCC 1067. *FEMS Microbiol Lett.* 251: 125-136.

- Na-Ranong, S., Laoteng, K., Kittakoop, P., Tanticharoen, M. and Cheevadhanarak, S. (2006) Targeted mutagenesis of a fatty acid delta-6 desaturase from *Mucor rouxii* : Role of amino acid residues adjacent to histidine-rich motif II. *Biochem. Biophys. Res. Commun.* 339: 1029-1034.

- Jeennor S., Laoteng, K., Tanticharoen, M., and Cheevadhanarak, S. (2006) Comparative fatty acid profiling of *Mucor rouxii* under different stress conditions. *FEMS Microbiol. Lett.*, 259: 60-66.

- Pongmuang, P., Punya, J., Pongpattanakitsote, S., Jeamton, W., Vichisoonthonkul, T., Bhumiratana, S., Tanticharoen, M., Linne, U., Marahiel, M., Cheevadhanarak, S. (2007) Detection of non-ribosomal peptide synthetase (NRPS) genes in *Xylaria* sp. BCC1067 and cloning of XyNRPSA . , *FEMS Microbiol Lett*, 274:260–268

- Laoteng, K., Jitsue, S., Dandusitapunth, Y. and Cheevadhanarak, S., 2007. Ethanol-induced changes in expression profiles of cell growth, fatty acid and desaturase genes of *Mucor rouxii* . *Fungal Genet. Biol.* (In press)

- Nookaew, I. , Meechai, A., Thammarongtham, C., Laoteng, K., Ruanglek, V., Cheevadhanarak, S., Nielsen, J. and Bhumiratana, S., 2007. Identification of flux regulation coefficients from elementary flux modes: A systems biology tool for analysis of metabolic networks. *Biotechnol. Bioeng.* 97(6): 1535-1549.

Patents

- Nucleotide and amino acid sequence of D 12 -desaturase of *Mucor rouxii* ATCC24905, Thai Patent (Filed: June 1999), Thai Patent

- Nucleotide and amino acid sequences of D 6 -desaturase gene of *Mucor rouxii* ATCC24905, Thai Patent (Filed: September, 2000), Thai Patent

- Nucleotide and amino acid sequences of D 6 -desaturase isoform II of *Mucor rouxii* ATCC 24905, (Filed: January, (2004), Thai Patent

- Development of D 6 -desaturase isoform II enzyme of *Mucor rouxii* involved in synthesis of essential fatty acids, gamma-linolenic and stearidonic acids by site-directed mutagenesis, Thai Patent

Address

83 Ekkamai 8 Rd, Sukhumvit 83, Bangkok 10150
Tel: 02-470-7503 Fax: 02-452-3455