บรรณานุกรม

จิตติมา เจริญพานิช. (2551). อะคริลาไมด์ : ก่อตัวได้ง่ายกำจัดไม่ยาก (Acrylamide: its formation and degradation). "Veridian E-Journal Silpakorn University" ปีที่ 1 ฉบับที่ 1 เดือนกันยายน หน้า 68-79.

APHA (American Public Health Association), AWWA (American Water Works Association), WPCF (Water Pollution Control Federation) (1985). Standard methods for the examination of water and wastewater (16th ed.). American Public Health Association, Washington DC.

Asano, Y., T. Yasuda, Y. Tani, and H. Yamada. (1982). A new enzymatic method of acrylamide production." Agricultural and Biological Chemistry 46: 1183-1189.

Brown, L., M.M. Rhead, D. Hill, K.C.C. Bancroft. (1982). Qualitative and quantitative studies on the insite-adsorption, degradation and toxicity of acrylamide by spiking waters of two sewage works and a river. Water Research 16: 579-591.

Buranasilp, K., and J. Charoenpanich. (2011). Biodegradation of acrylamide by *Enterobacter aerogenes* isolated from wastewater in Thailand. Journal of Environmental Sciences. 23 (3) 23 (3): 396-403.

Buranasilp, K., N. Yamsri, U. Thanyacharoen, V. Phuangthong, and J. Charoenpanich. (2009) Screening and identification of the acidophilic-thermotolerant acrylamide-degrading bacteria from wastewaters in Chonburi. In Proceedings of the 6th International Congress on Chemistry for Innovation (PERCH-CIC Congress VI), May 3-6, Jomtien Palm Beach Resort Pattaya, Chonburi, Thailand.

Cavins, J. F., and M. Friedman. (1968). Specific modification of sulfhydryl groups with β-unsaturated compounds. Journal of Biological Chemistry 243: 3357-3360.

Cheong, T. Y., P. J. Oriel. (2000). Cloning of a wide-spectrum amidase from *Bacillus stearothermophilus* BR388 in *Escherichia coli* and marked enhancement of amidase expression using direct evolution. Enzyme and Microbial Technology 26: 152-158.

Cherry, A. B., A. F. Gabaccia, and H. W. Senn. (1956). The assimilation behaviour of certain toxic organic compounds in natural waters. Sewage Industrial Water 28: 1137.

Chin, K. H., Y. D. Tsai, N. L. Chan, K. F. Huang, A. H. J. Wang, and S. H. Chou. (2007). The crystal structure of XC1258 from Xanthomonas camprestis: A putative prokaryotic Nit protein with an arsenic adduct in the active site. Proteins 665-671.

Croll, B. T., G. H. Arkell, and R. P. J. Hodge. (1974). Residues of acrylamide in water. Water Research 8: 989-993.

Danner, H., M. Urmos, M. Gartner, R. Braun. (1998). Biotechnological production of acrylic acid from biomass. Applied Biochemistry and Biotechnology 70: 887-894.

Dearfield, K. L., C. O. Abernathy, M. S. Ottley, J. H. Brantner, and P. F. Hayes. (1988). Acrylamide: its metabolism, developmental and reproductive effects, genotoxicity and carcinogenicity. Mutational Research 195: 45-77.

Dixit, R., H. Mukhtar, P. K. Seth, and C. R. Krishna Murti. (1980). Binding of acrylamide with glutathione-s-transferase." Chemical Biolical Interaction 32: 353-359.

Fournand, D., F. Bigey, and A. Arnaud. (1998). Acyl transfer activity of an amidase from *Rhodococcus* sp. strain R312: Formation of a wide range of hydroxamic acids. Applied and Environmental Microbiology 64: 2844-2852.

Friedrick, G. C., and G. Mitrenga. (1981). Utilization of aliphatic amides and formation of two different amidases by *Alcaligenes eutrophus*." Journal of Genetics Microbiology 125: 367-374.

Grant, D. J. W., and J. Wilson. (1973). Degradation and hydrolysis of amides by *Corynebacterium pseudodiptheriticum* NCIB 10803. Microbios 8: 15-22.

Hirrlinger, B., A. Stolz, and H. J. Knackmuss. (1996). Purification and properties of an amidase from *Rhodococcus erythropolis* MP50 which enantioselectively hydrolyzes 2-arylpropionamides. Journal of Bacteriology 178: 3501-3507.

Howard, P.H. (1989). Large production and priority pollutants. In Handbook of environmental fate and exposure data for organic chemicals vol.1, 13-19. Chelsea, MI : Lewis Publishers.

Hughes, J., Y. C. Armitage, and K. C. Symes. (1998). Application of whole cell rhodococcal biocatalysts in acrylic polymer manufacture. Antonie Van Leeuwenhoek 74: 107-118.

Hynes, M. J., J. A. and Pateman. (1970). The use of amides as nitrogen source by *Aspergillus nidulans*. Journal of Genetics Microbiology 63: 317-324.

IARC. (1986). Some Chemicals Used in Plastics and Elastomers. In IARC Monographs on the evaluation of carcinogenic risk of chemicals to human vol. 39, 403. Lyon, France: International Agency for Research on Cancer.

IARC. (1994). IARC Monographs on the evaluation of carcinogenic risks to humans. 60, 389.

Igisu, H., I. Goto, Y. Kawamura, M. Kato, K. Izmui, and Y. Kuroiwa. (1975). Acrylamide encephaloneuropathy due to well water pollution. Journal of Neurological Neurosurgive Psychiatry 38: 581-584.

Kagayama, T., and T.Ohe. (1990). Purification and properties of an aromatic amidase from *Pseudomonas* sp. GDI211." Agricultural Biological Chemistry 54: 2565-2571.

Kirk-Othmer. (1978). Kirk-Othmer Encyclopedia of Chemical Technology. 3rd edition, vol. 1. New York : Jon Eiley and Sons.

Kirk-Othmer. (1979). Kirk-Othmer Encyclopedia of Chemical Technology. 3rd edition, vol. 6. New York : Jon Eiley and Sons.

Klaasen, C.A.M., and J. Doull. (1986). Casaret and Doull's toxicology: The basic science of poisons. New York : Macmillan.

Lande, S. S., S. J. Bosch, and P. H. Howard. (1979). Degradation and leaching of acrylamide in soil. Journal of Environmental Quality 8: 133-137.

Merck. (1989).The Merck Index. 11th edition. Rahway, NJ : Merck and Company, Inc.

Nagasawa, T., and H. Yamada. (1989). Microbial transformation of nitriles." Trends Biotechnology 7: 153-158.

Nawaz, M. S., S. M. Billedeau, and C. E. Cerniglia. (1998). Influence of selected physical parameters on the bidegradation of acrylamide by immobilized cells of *Rhodococcus* sp. Biodegradation 9: 381-387.

Nawaz, M. S., W. Franklin, and C. E. Cerniglia. (1993). Degradation of acrylamide by immobilized cells of a *Pseudomonas* sp. and *Xanthomonas maltophilia*. Canada Journal of Microbiology 39: 207-212.

Nawaz, M. S., A. A. Khan, D. Bhattacharayya, P. H. Siitonen, C. E. Cerniglia. (1996). Physical, biochemical, and immunological characterization of a thermostable amidase from *Klebsiella pneumonia* NCTR1. Journal of Bacteriology, 178: 2397-2401.

Nawaz, M. S., A. A. Khan, J. E. Seng, J. E. Leakey, P. H. Siitonen, and C. E. Cerniglia. (1994). Purification and characterization of an amidase from an acrylamide-degrading *Rhodococcus* sp. Applied and Environmental Microbiology, 60: 3343-3348.

Prabu, C. S., and A. J. Thatheyus. (2007). Biodegradation of acrylamide employing free and immobilized cells of *Pseudomonas aeruginosa*. International Biodeterioration and Biodegradation 30: 69-73.

Prasad, D. Y. (1982). Polyacrylamide as a coagulant aid in water treatment. Chem Age India. 34: 387-391.

Ryabchenko, L. E., D. A. Podchernyaev, E. K. Kotlova, and A. S. Yanenko. (2006). Cloning the amidase gene from *Rhodococcus rhodochrous* M8 and its expression in *Escherichia coli*. 42: 886-892.

Sambrook, J., E. F. Fritsch, and T. Maniatis. (1989). Molecular cloning: a laboratory manual (2nd ed). NY: Cold Spring Harbor Laboratory. Cold spring Harbor.

Sax, N. I., and R. J. Lewis. (1987). Hawley's Condensed Chemical Dictionary. 11th edition. New York: Van Nostrand Reinhold Co.

Segerback, D., C. J. Calleman, J. L. Schreoder, L. G. Costa, and E. M. Faustman. (1995). Formation of N-7-(2-carbamoyl-2-hydroxyethyl) guanine in DNA of the mouse and the rat following intraperitoneal administration of [^{14}C]acrylamide. Carcinogenesis 16: 1161-1165.

Shairashi, Y. (1978). Chromosome aberrations induced by monomeric acrylamide in bone marrow and germ cells of mice. Mutation Research 57: 313-324.

Shanker, R., L. K. S. Chauhan, and P. K Seth. (1987). The toxic effects of acrylamide on root tip cells of *Allium cepa*. Cytologia 52: 895-899.

Shanker, R., C. Ramakrishna, and P. K. Seth. (1990). Microbial degradation of acrylamide monomer. Achieved Microbiology, 154: 192-198.

Shanker, R., and P. K. Seth. (1986). Toxic effects of acrylamide in a fresh water fish, *Heteropneustes fossilis*. Bull Environmental Contamination Toxicology, 37: 274-280.

Sittig, M. (1985). Handbook of Toxic and Hazardous Chemicals and Carcinogens. 2nd edition. Park Ridge, NJ : Noyes Publications.

Sluis, M. K., R. A. Larsen, J. G. Krum, R. Anderson, W. W. Metcalf, and S. A. Ensign. (2002). Biochemical, molecular, and genetic analysis of the acetone carboxylases from *Xanthobacter autotrophicus* strain Py2 and *Rhodobacter capsulatus* strain B10. Journal of Bacteriology, 184: 2969-2977.

Smith, E. A., S. L. Prues, and F. W. Oehme. (1996). Environmental degradation of polyacrylamides. 1. effects of artificial environmental conditions: temperature, light, and pH. Ecotoxicological and Environmental Safety. 35: 121-135.

Svesson, K., L. Abramsson, W. Becker, A. Glymm, K. E. Hellenas, Y. Lind, and R. J. Rosen. (2003). Dietary intake of acrylamide in Sweden. Food Chemical Toxicology 41: 1581-1586.

Tareke, E., P. Rydberg, P. Karlsson, S. Eriksson, and M. Tornqvist. (2000). Acrylamide: a cooking carcinogen?" Chemical Research Toxicology 13: 517-522.

Thanyacharoen, U., K. Buranasilp, V. Phuangtong, A. Tani, and J. Charoenpanich. (2011). Isolation and characterization of *Kluyvera ascorbata* from wastewater in Thailand and its potential for acrylamide biodegradation. In Proceedings of the 3rd Biochemistry and Molecular Biology (BMB) international conference: From basic to translational researches for a better life, The Science Society of Thailand, April 6-8, The Empress Convention Centre, Chiangmai, Thailand.

Tilson, H. A. (1981). The neurotoxicity of acrylamide. An overview." Neurobehavior Toxicological Teratology 3: 455-461.

Tilson, H. A., and P. A. Cabe. (1979). The effects of acrylamide given acutely or in repeated doses on fore- and hindlimb functions of rats. Toxicological Applied Pharmacology 47: 253-260.

Verschueren, K. (1977). Handbook of environmental data on organic chemicals. New York : Van Nostrand Reinhold.

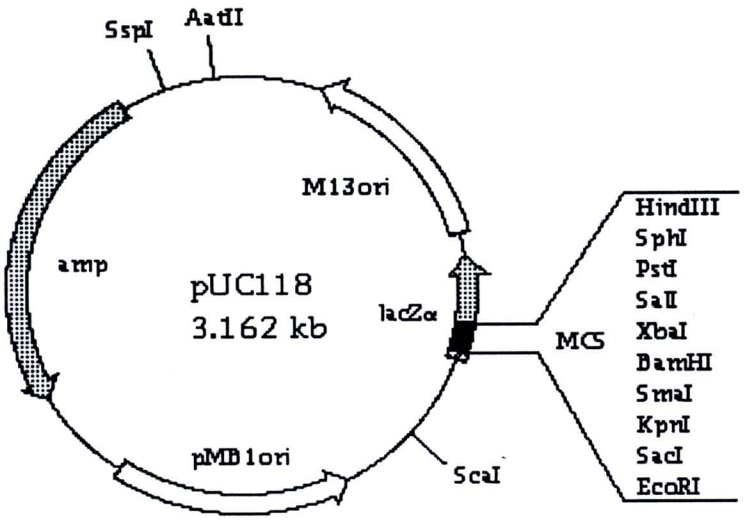
Wampler, D. A., and S. A. Ensign. (2005). Photoheterotrophic metabolism of acrylamide by a newly isolated strain of *Rhodopseudomonas palustris*. Applied and Environmetal Microbiology, 71: 5850-5857.

Wang, C., and C. Lee. (2001). Denitrification with acrylamide by pure culture of bacteria isolated from acrylonitrile-butadiene-styrene resin manufactured wastewater treatment system. Chemosphere 44: 1047-1053.

Zabaznaya, E. V., S. V. Kozulin, and S. P. Voronin. (1998). Selection of strains transforming acrylonitrile and acrylamide into acrylic acid. Applied Biochemical Microbiology 34: 341-345.

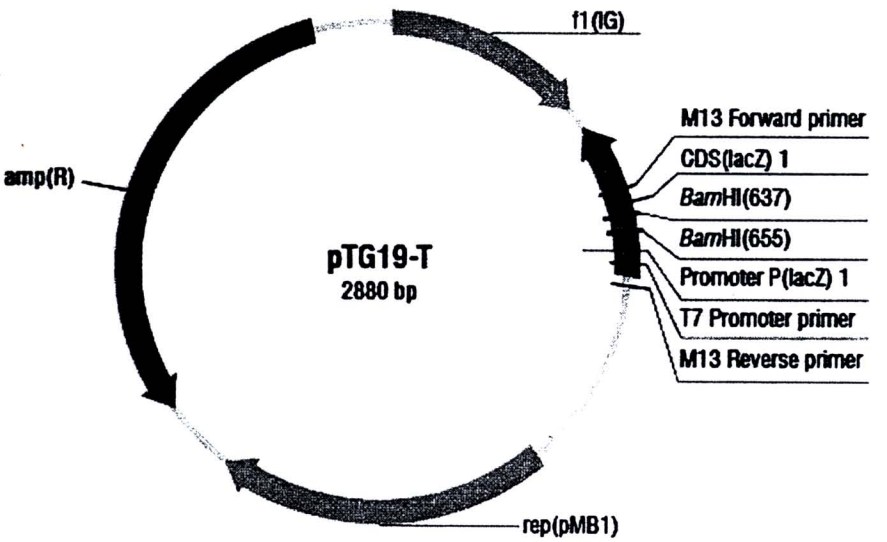
ภาคผนวก 1

แผนที่ตัดจำเพาะและบริเวณโคลนของ pUC118



ภาคผนวก 2

แผนที่ตัดจำเพาะและบริเวณโคลนของ pTG19-T



M13 Forware primer

CAG CTG GCG AAA GGG GGA TGT GCT GCA AGG CGA TTA AGT TGG GTA ACG CCA GGG TTT TCC CAG TCA CGA CGT TGT AAA ACG ACG GCC AGT
GTC GAC CGC TTT CCC CCT ACA CGA CGT TCC GCT AAT TCA ACC CAT TGC GGT CCC AAA AGG GTC AGT GCT GCA ACA TTT TGC TGC CGG TCA

EcoR I *Sac* I *Kpn* I *Sma* I *BamH* I *BamH* I *Xba* I *Sal* I *Pst* I *Hind* III

GAA TTC GAG CTC GGT ACC CGG GGA TCC AAG AT T PCR product A AT CTT GGG GAT CCT CTA GAG TCG ACC TGC AGG CAT GCA AGC TTT
CTT AAG CTC GAG CCA TGG GCC CCT AGG TTC TA A T TA GAA CCC CTA GGA GAT CTC AGC TGG ACG TCC GTA CGT TCG AAA

T7 promoter primer

M13 Reverse primer

CCC TAT AGT GAG TCG TAT TAG AGC TTG GCG TAA TCA TGG TCA TAG CTG TTT CCT GTG TGA AAT TGT TAT CCG CTC ACA ATT CCA CAC AAC
GGG ATA TCA CTC AGC ATA ATC TCG AAC CGC ATT AGT ACC AGT ATC GAC AAA GGA CAC ACT TTA ACA ATA GGC GAG TGT TAA GGT GTG TTG

Lac Z promoter

ประวัติและผลงานของผู้วิจัย

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(อังกฤษ) Assistant Professor Dr. Jittima Charoenpanich

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- Proteome analysis and enzyme technology
- Transcriptomics and metabolic regulation

ผลงานทางวิชาการ

- *หนังสือ(Book)*

จิตติมา เจริญพานิช. 2553. *เอนไซม์วิทยา*. โอ. เอส. พริ้นติ้ง เฮ้าส์. กรุงเทพฯ. 378 หน้า. ISBN 978-974-433-165-6.

- *บทความวิชาการ (Review articles)*

1. **จิตติมา เจริญพานิช**. 2551. การตอบสนองต่อสิ่งเร้าภายนอกของแบคทีเรียผ่านระบบส่งสัญญาณชีวภาพแบบสององค์ประกอบ (Two-component signal transduction system: A responsive system for external stimuli in bacteria). *วารสารวิทยาศาสตร์บูรพา*, ปีที่ 13 ฉบับที่ 2 เดือนกรกฎาคม-ธันวาคม. หน้า 75-82.

2. **จิตติมา เจริญพานิช**. 2551. อะคริลาไมด์ : ก่อตัวได้ง่ายกำจัดไม่ยาก (Acrylamide: its formation and degradation). *วารสารอิเล็กทรอนิกส์ บัณฑิตวิทยาลัย มหาวิทยาลัยศิลปากร (Veridian E-Journal Silpakorn University)*, ปีที่ 1 ฉบับที่ 1 เดือนกันยายน หน้า 68-79.

3. **จิตติมา เจริญพานิช.** 2552. หลักการและสภาวการณ์ปัจจุบันของการสังเคราะห์เพปไทด์ (Principles and current status of peptide synthesis). *วารสารวิทยาศาสตร์บูรพา*, ปีที่ 14 ฉบับที่ 2 เดือนกรกฎาคม-ธันวาคม. หน้า 128-137.

- *บทความวิจัย (Research articles)*

วารสารวิจัยระดับชาติ

1. อรสา สุริยาพันธ์, พิทักษ์ สูตรอนันต์, **จิตติมา เจริญพานิช** และบุญรัตน์ ประทุมชาติ. 2548. คุณภาพของเนื้อกุ้งกุลาดำที่เลี้ยงภายใต้น้ำความเค็มต่ำและให้อาหารที่เสริมแร่ธาตุ. *วารสารประมง*, ปีที่ 58 ฉบับที่ 6 เดือนพฤศจิกายน-ธันวาคม. หน้า 550 – 558.

2. **Charoenpanich, J.**, W. Chulalaksananukul, and T. Yongvanich. 2005. Synthesis of amyl acetate by immobilized lipases from *Mucor miehei* and *Aspergillus niger* in n-hexane. *Journal of Science Research Chulalongkorn University*. 30 (2): 153-159.

วารสารวิจัยระดับนานาชาติ

1. **Charoenpanich, J.**, A. Tani, N. Moriwaki, K. Kimbara, and F. Kawai. 2006. Dual regulation of a polyethylene glycol degradative operon by AraC-type and GalR-type regulators in *Sphingopyxis macrogoltabida* strain 103. *Microbiology-SGM*. 152: 3025-3034. (Impact factor (2006) 3.14).

2. Tani, A., **J. Charoenpanich (co-first author)**, T. Mori, M. Takeichi, K. Kimbara, and F. Kawai. 2007. Structure and conservation of a polyethylene glycol-degradative operon in Sphingomonads. *Microbiology-SGM*. 153: 338-346. (Impact factor (2006) 3.14).

3. Somyoonsap, P., A. Tani, **J. Charoenpanich**, T. Minami, K. Kimbara, and F. Kawai. 2008. Involvement of PEG-carboxylate dehydrogenase and glutathione *S*-transferase in PEG metabolism by *Sphingopyxis macrogoltabida* strain 103. *Applied Microbiology and Biotechnology* 81: 473-484. (Impact factor (2007) 2.48).

4. **Charoenpanich, J.**, A. Tani, and F. Kawai. 2010. Identification of the PEG-induced proteins by 2D-gel electrophoresis and mass spectrometry in *Sphingopyxis macrogoltabida* strain 103. *CMU Journal of Natural Science*. 9 (1): 111-124.

5. Uttatree, S., P. Winayanuwattikun, and **J. Charoenpanich.** 2010. Isolation and characterization of a novel thermophilic-organic solvent stable lipase from *Acinetobacter baylyi. Applied Biochemistry and Biotechnology*. 162 (5): 1362-1376. (Impact factor (2009) 1.42).

6. Buranasilp, K. and **J. Charoenpanich**. 2011. Biodegradation of acrylamide by *Enterobacter aerogenes* isolated from wastewater in Thailand. *Journal of Environmental Sciences*. 23 (3): 396-403. (Impact factor (2010) 1.51).

7. Uttatree, S. and **J. Charoenpanich.** 2011. Nutritional requirements and physical factors affecting the production of organic solvent-stable lipase by *Acinetobacter baylyi. CMU Journal of Natural Science*. 10 (1): 115-131.

8. **Charoenpanich J.**, S. Suktanarag, and N. Toobbucha. 2011. Production of a thermostable lipase by *Aeromonas* sp. EBB1 isolated from marine sludge in Angsila, Thailand. *Science Asia*. 37 (2): 105-114.