



## Curriculum Vitae

Institute of Nutrition, Mahidol University (INMU)

999 Phutthamonthon 4 Rd., Salaya, Phutthamonthon

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**Name:** Chawanphat Muangnoi

**E-mail address:** chawanphat.mua@mahidol.ac.th  
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**Current position:** Assistant Professor  
Assistant Director for Academic Services and Laboratory Standards

### Education:

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| 2019 | Ph.D. (Pharmaceutical chemistry and Natural products),<br>Chulalongkorn University, Thailand                            |
| 2007 | M.Sc. (Nutrition), Faculty of Medicine Ramathibodi Hospital and<br>Institute of Nutrition, Mahidol University, Thailand |
| 2004 | B.Sc. (Medical Science), Burapha University, Thailand   |

### Research Interest and Expertise:

1. Effects and mechanisms of dietary bioactive compounds on ageing and chronic diseases
2. Effects and mechanisms of dietary bioactive compounds on age-related macular degeneration
3. Evaluation of biological activities and mechanisms of dietary bioactive compounds using various cell culture models as tools
4. Bioaccessibility and bioavailability of dietary bioactive compounds



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### Research Experiences:

1. Evaluation of bioaccessibility and anti-inflammatory effects of phytochemicals from *Coccinia grandis* (L.) Voigt and *Sesbania grandiflora* Desv in Caco-2 intestinal cells.
2. Evaluation the effect of *Carica papaya*, *Magifera indica*, *Citrus maxima*, and *Musa sapientum* extract on anti-inflammatory and antioxidant activity in Caco-2 human intestinal cells
3. Evaluation of curcumin and curcumin prodrugs on enhancement of anti-proliferative effect against HepG2 cells via apoptosis induction in vitro and in vivo
4. Evaluation of curcumin and curcumin prodrugs against H<sub>2</sub>O<sub>2</sub>-induced oxidative stress in human retinal pigment epithelial cells

### Training:

- 2015 Training of approval for animal care and use for scientific research license, Institute for Animals for Scientific Purpose Development (IAD), Thailand. (Animal use license no. U1-01075-2558)
- 2018 Research training for the evaluation of the effects of bioactive compounds on age-related macular degeneration (AMD) using cell culture model at Institute of Ageing and Chronic Diseases, Liverpool University, United Kingdom.
- 2020 การอบรมเรื่อง แนวทางปฏิบัติเพื่อความปลอดภัยทางชีวภาพสำหรับการดำเนินงานด้านเทคโนโลยีชีวภาพสมัยใหม่ version 1.0 จากศูนย์พันธุวิศวกรรมและเทคโนโลยีชีวภาพแห่งชาติ สำนักพัฒนาวิทยาศาสตร์และเทคโนโลยีแห่งชาติ กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม ร่วมกับสำนักงานการวิจัยแห่งชาติ
- 2020 การอบรม “โครงการติดอาวุธให้นักวิจัยรุ่นใหม่ ผ่าน Multi Mentoring System” รุ่นที่ 6 จากมหาวิทยาลัยมหิดล



### Book Chapter:

1. Pornchai Rojsitthisak, Wisut Wichitnithad, **Chawanphat Muangnoi**, Asma El-Magboub, Rebecca M. Romero and Ian S Haworth. Design, synthesis and biological activities of curcumin prodrugs. In Curcumin: Synthesis, Emerging Role in Pain Management and Health Implications (ISBN: 978-1-63321-319-7), edited by Daniel L. Pouliquen, Nova Science Publishers, Inc., p. 103-133 (2014).
2. Asma El-Magboub, Pornchai Rojsitthisak, **Chawanphat Muangnoi**, Wisut Wichitnithad, Rebecca M. Romero, Ian S Haworth. Biological targets and pharmacology of curcumin. In Curcumin: Synthesis, Emerging Role in Pain Management and Health Implications (ISBN: 978-1-63321-319-7), edited by Daniel L. Pouliquen, Nova Science Publishers, Inc., p. 135-175 (2014).

### Publications

#### National

1. Praengam K, Tuntipopipat S, **Muangnoi C**. Protective effects of ethanol extract and bioaccessible Fraction of *Centella asiatica* against IL-1 $\beta$ -induced inflammation and oxidative stress in human intestinal Caco-2 cells. Thai Journal of Toxicology. 2021; 36(2): 71-85.
2. **Muangnoi C**, Koraneeyakijkulchai I, Praengam K, Tuntipopipat S. Protective effects of sweet corn extract against H<sub>2</sub>O<sub>2</sub>-induced oxidative stress in human retinal pigment epithelial (ARPE-19) cells. Thai Journal of Toxicology. 2022; 37(2); 41-56.



## International

1. Panritdum P, **Muangnoi C**, Tuntipopipat S, Charoenkiatkul S, Sukprasansap M. *Cleistocalyx nervosum var. paniala* berry extract and cyanidin-3-glucoside inhibit hepatotoxicity and apoptosis. *Food Science & Nutrition*. 2024, 1-16. (Q1, IF = 3.55)
2. Praengam P, Tuntipopipat S, Jangwankorn C, Piamkulvanich O, **Muangnoi C**. Efficacy of a dietary supplement derived from five edible plants on telomere length in Thai adults: A randomized, double-blind, placebo-controlled trial. *Food Science & Nutrition*. 2023, 1-13. (Q1, IF = 3.55)
3. Mahamud N, Songvut P, **Muangnoi C**. et al. Untargeted metabolomics reveal pathways associated with neuroprotective effect of oxyresveratrol in SH-SY5Y cells. *Sci Rep*. 2023, 13, 20385. (Q1, IF = 4.6)
4. Limcharoen T, Dasuni Wasana PW, Hasriadi, Angsuwattana P, **Muangnoi C**, Warinhomhoun S, Ongtanasup T, Sritularak B, Vajragupta O, Rojsitthisak P, Towiwat P. An integrative approach to investigate the mode of action of (-)-dendroparishirol in bacterial meningitis: computer-aided estimation of biological activity and network pharmacology. *International Journal of Molecular Sciences*. 2023; 24(9):8072. (Q1, IF = 6.208)
5. Panuthai P, Phumsuay R, **Muangnoi C**, Maitreesophone P, Kongkatitham V, Mekboonsonglarp W, Rojsitthisak P, Likhitwitayawuid K, Sritularak B. Isolation and identification of dihydrophenanthrene derivatives from *dendrobium virgineum* with protective effects against hydrogen-peroxide-induced oxidative stress of human retinal pigment epithelium ARPE-19 cells. *Antioxidants*. 2023; 12(3):624. (Q1, IF = 7.675)
6. Sorasitthiyankarn FN, **Muangnoi C**, Gomez CB, Suksamrarn A, Rojsitthisak P, Rojsitthisak P. Potential oral anticancer therapeutic agents of hexahydrocurcumin-encapsulated chitosan nanoparticles against MDA-MB-231 breast cancer cells. 2023; 15; 472. (Q1, IF = 6.525)
7. Phucharoenrak P, **Muangnoi C**, Trachootham D. Metabolomic analysis of phytochemical compounds from ethanolic extract of Lime (*Citrus aurantifolia*) peel and its anti-cancer effects against human hepatocellular carcinoma cells. *Molecules*. 2023; 28(7); 2965. (Q1, IF = 4.927)
8. Koraneeyakijkulchai I, Phumsuay R, Thiyajai P, Tuntipopipat S, **Muangnoi C**. Anti-inflammatory activity and mechanism of sweet corn extract on IL-1 $\beta$ -induced inflammation in a human retinal pigment epithelial cell line (ARPE-19). *International Journal of Molecular Sciences*. 2023; 24(3); 2462. (Q1, IF = 6.208)



9. Phucharoenrak P, **Muangnoi C**, Trachootham D. A green extraction method to achieve the highest yield of limonin and hesperidin from lime peel powder (*Citrus aurantifolia*). *Molecules*. 2022; 27; 820. (Q1, IF = 4.927)
10. Tajasuwan L, Kettawan A, Rungruang T, Wunjuntuk K, Prombutara P, **Muangnoi C**, Kettawan AK. Inhibitory effect of dietary defatted rice bran in an AOM/DSS-induced colitis-associated colorectal cancer experimental animal model. *Foods*. 2022; 11(21):3488. Q1, IF = 5.561)
11. Buranasudja V, **Muangnoi C**, Sanookpan K, Halim H, Sritularak B and Rojsitthisak P. Eriodictyol attenuates H<sub>2</sub>O<sub>2</sub>-induced oxidative damage in human dermal fibroblasts through an enhanced capacity of the antioxidant machinery. *Nutrients*. 2022, 14(12), 2553; <https://doi.org/10.3390/nu14122553>.
12. Thaweeseat W, Buranasudja V, Phumsuay R, **Muangnoi C**, Vajragupta O, Sritularak B, Rashatasakhon P and Rojsitthisak P. Anti-inflammatory activity of oxyresveratrol tetraacetate, an ester product of oxyresveratrol, on lipopolysaccharide-stimulated RAW264.7 macrophage cells. *Molecules*. 2022, 27(12), 3922; <https://doi.org/10.3390/molecules27123922>.
13. Dasuni Wasana, P.W., Hasriadi, **Muangnoi C**, Vajragupta O, Rojsitthisak P, Rojsitthisak P and Towiwat P. Curcumin and metformin synergistically modulate peripheral and central immune mechanisms of pain. *Sci Rep*. 2022, 12, 9713. <https://doi.org/10.1038/s41598-022-13647-7>
14. Jongjitphisut N, Phumsuay R, Thitikornpong W, Rashatasakhon P, **Muangnoi C**, Vajragupta O and Rojsitthisak P. Synthesis, physicochemical properties, and protective effects of a novel water-soluble tetrahydrocurcumin-diglutamic acid prodrug on ethanol-induced toxicity in HepG2 cells. *J. Pharm. Investig.* 2022, 1-11. <https://doi.org/10.1007/s40005-022-00576-w>
15. Truong TH, Alcantara KP, Bryan Paul I Bulatao, Sorasitthyanukarn FN, **Muangnoi C**, Nalinratana N, Vajragupta O, Rojsitthisak P and Rojsitthisak P. Chitosan-coated nanostructured lipid carriers for transdermal delivery of tetrahydrocurcumin for breast cancer therapy. *Carbohydr. Polym.*, 2022, 288, 119401, 1-14.
16. Jithavech P, Suwattananuruk P, Hasriadi, **Muangnoi C**, Thitikornpong W, Towiwat P, Vajragupta O and Rojsitthisak P. Physicochemical investigation of a novel curcumin diethyl  $\gamma$ -aminobutyrate, a carbamate ester prodrug of curcumin with enhanced anti-neuroinflammatory activity. *PLoS One*, 2022, 17(3), e0265689, 1-19
17. Sorasitthyanukarn FN, **Muangnoi C**, Rojsitthisak P and Rojsitthisak P. Chitosan Oligosaccharide/Alginate Nanoparticles as an Effective Carrier for Astaxanthin with Improving Stability, In Vitro Oral Bioaccessibility, and Bioavailability. *Food Hydrocolloids*. 2022, 124, 107246, 1-14



18. Phucharoenrak P, **Muangnoi C**, Trachootham D. A green extraction method to achieve the highest yield of limonin and hesperidin from lime peel powder (*Citrus aurantifolia*). *Molecules*. 2022; 27: 820. (Q1, IF = 4.412)
19. Yuyun Y, Ratnatilaka Na Bhuket P, Supasena W, Suwattananurak P, Praengam K, Vajragupta O, **Muangnoi C**, Rojsitthisak P. A novel curcumin-mycophenolic acid conjugate inhibited hyperproliferation of tumor necrosis factor-alpha-induced human keratinocyte cells. *Pharmaceutics*. 2021; 13(7): 956: 1-16. (Q1, IF = 6.321)
20. **Muangnoi C**, Phumsuay R, Jongjitphisut N, Waikasikorn P, Sangsawat M, Rashatasakhon P, Paraoan L and Rojsitthisak P. Protective effects of a lutein ester prodrug, lutein diglutaric acid, against H<sub>2</sub>O<sub>2</sub>-induced oxidative stress in human retinal pigment epithelial cells. *International Journal of Molecular Sciences*. 2021; 22: 4722: 1-16. (Q1, IF = 4.556)
21. Limcharoen T, **Muangnoi C**, Dasuni Wasana PW, Hasriadi, Vajragupta O, Rojsitthisak P and Towiwat P. Improved antiallodynic, antihyperalgesic and anti-inflammatory response achieved through potential prodrug of curcumin, curcumin diethyl diglutarate in a mouse model of neuropathic pain. *European Journal of Pharmacology*. 2021; 899: 174008: 1-10. (Q1, IF = 3.17)
22. Warinhomhoun S, **Muangnoi C**, Buranasudja V, Mekboonsonglarp W, Rojsitthisak P, Likhitwitayawuid K and Sritularak B. Antioxidant activities and protective effects of dendropachol, a new bisbibenzyl compound from *dendrobium pachyglossum*, on hydrogen peroxide-induced oxidative stress in HaCaT keratinocytes. *Antioxidants*. 2021; 10(2): 252: 1-16. (Q1, IF = 4.520)
23. Luckanagul JA, Ratnatilaka Na Bhuket P, **Muangnoi C**, Rojsitthisak P, Wang Q, and Rojsitthisak P. Self-assembled thermoresponsive nanogel from grafted hyaluronic acid as a biocompatible delivery platform for curcumin with enhanced drug loading and biological activities. *Polymers*. 2021; 13(2): 194: 1-14. (Q1, IF = 3.426)
24. Sorasitthiyankarn FN, **Muangnoi C**, Rojsitthisak P and Rojsitthisak P. Chitosan-alginate nanoparticles as effective oral carriers to improve the stability, bioavailability, and cytotoxicity of curcumin diethyl disuccinate. *Carbohydrate Polymers*. 2021; 256: 117426: 1-11. (Q1, IF = 7.182)
25. Supasena W, **Muangnoi C**, Praengam K, Wong TW, Qiu G, Ye S, Wu J, Tanasupawat S, Rojsitthisak P. Enhanced selective cytotoxicity of doxorubicin to breast cancer cells by methoxypolyethylene glycol conjugation via a novel beta-thiopropionamide linker. *European Polymer Journal*. 2020; 141: 110056: 1-10. (Q1, IF = 3.862)



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26. Limcharoen T, Dasuni Wasana PW, Hasriadi, **Muangnoi C**, Vajragupta O, Rojsitthisak P and Towiwat P. Curcumin diglutamic acid, a prodrug of curcumin reduces pain hypersensitivity in chronic constriction injury of sciatic nerve induced-neuropathy in mice. *Pharmaceuticals*. 2020; 13(9): 212: 1-14. (Q1, IF = 4.286)
27. Phumsuay R, **Muangnoi C**, Dasuni Wasana PW, Hasriadi, Vajragupta O, Rojsitthisak P and Towiwat P. Molecular insight into the anti-inflammatory effects of the curcumin ester prodrug curcumin diglutamic acid in vitro and in vivo. *International Journal of Molecular Sciences*. 2020; 21(16): 5700: 1-16. (Q1, IF = 4.556)
28. Sorasitthyanukarn FN., **Muangnoi C**., Thaweeseest W., Ratnatilaka Na Bhuket P., Jantaratana P., Rojsitthisak P and Rojsitthisak P. Polyethylene glycol-chitosan oligosaccharide-coated superparamagnetic iron oxide nanoparticles: a novel drug delivery system for curcumin diglutamic acid. *Biomolecules*. 2020; 10(1): 73: 1-20. (Q1, IF = 4.694)
29. Supasena, W., **Muangnoi C**., Thaweeseest, W., Songkram C., Ueda, K., Higashi, K., Moribe, K., Tanasupawat, S., Rojsitthisak, P. Enhanced Antipsoriatic Activity of Mycophenolic Acid Against the TNF- $\alpha$ -Induced HaCaT Cell Proliferation by Conjugated Poloxamer Micelles. *Journal of Pharmaceutical Sciences*. 2020; 109(2): 1153-1160. (Q1, IF = 2.997)
30. **Muangnoi C**, Ratnatilaka Na Bhuket P, Jithavech P, Supasena W, Paraoan L, Patumraj S, Rojsitthisak P. Curcumin diethyl disuccinate, a prodrug of curcumin, enhances anti-proliferative effect of curcumin against HepG2 cells via apoptosis induction. *Scientific Reports*. 2019; 9: 1-9. (Ph.D) (Q1, IF = 3.998)
31. **Muangnoi C**, Ratnatilaka Na Bhuket P, Jithavech P, Wichitnithad W, Srikun O, Nerungsi C, Patumraj S, Rojsitthisak P. Scale-up synthesis and in vivo anti-tumor activity of curcumin diethyl disuccinate, an ester prodrug of curcumin, in HepG2-xenograft mice. *Pharmaceutics*. 2019; 11(8): 373: 1-14. (Ph.D) (Q1, IF = 4.421)
32. Sorasitthyanukarn FN, **Muangnoi C**, Thaweeseest W, Rojsitthisak P and Rojsitthisak P. Enhanced cytotoxic, antioxidant and anti-inflammatory activities of curcumin diethyl disuccinate using chitosan-tripolyphosphate nanoparticles. *Journal of Drug Delivery Science and Technology*. 2019; 53: 101118: 1-13. (Q2, IF = 2.734)



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33. **Muangnoi C**, Sharif U, Ratnatilaka Na Bhuket P, Rojsitthisak P, and Paraoan L. Protective Effects of Curcumin Ester Prodrug, Curcumin Diethyl Disuccinate Against H<sub>2</sub>O<sub>2</sub>-Induced Oxidative Stress in Human Retinal Pigment Epithelial Cells: Potential Therapeutic Avenues for Age-Related Macular Degeneration. *International Journal of Molecular Sciences*. 2019; 20(13): 3367: 1-18 (Q1, IF = 4.556)
34. Sorasitthiyankarn FN, Ratnatilaka Na Bhuket P, **Muangnoi C**, Rojsitthisak P and Rojsitthisak P. Chitosan/Alginate Nanoparticles as a Promising Carrier of Novel Curcumin Diethyl Diglutamate. *International Journal Biological Macromolecules*. 2019; 131: 1125–1136. (Q1, IF = 5.162)
35. Gomez C, **Muangnoi C**, Sorasitthiyankarn FN, Wongpiyabovorn J, Rojsitthisak P and Rojsitthisak P. Synergistic effects of photo-irradiation and curcumin-chitosan/alginate nanoparticles on tumor necrosis factor-alpha-induced psoriasis. *Molecules*. 2019; 24(7): 1-14. (Q1, IF = 3.267)
36. Suzuki Y, **Muangnoi C**, Thaweeseest W, Teerawonganan P, Ratnatilaka Na Bhuket P, Titapiwatanakun V, Yoshimura-Fujii M, Sritularak B, Likhitwitayawuid K, Rojsitthisak P, Fukami T. Exploring novel cocrystalline forms of oxyresveratrol to enhance aqueous solubility and permeability across a cell monolayer. *Biological and Pharmaceutical Bulletin*. 2019; 42(6): 1004-1012. (Q2, IF = 1.540)
37. Sorasitthiyankarn FN, **Muangnoi C**, Ratnatilaka Na Bhuket P, Rojsitthisak P and Rojsitthisak P. Chitosan/alginate nanoparticles as a promising approach for oral delivery of curcumin diglutamic acid for cancer treatment. *Materials Science and Engineering: C*. 2018; 93: 178-190. (Q1, IF = 5.880)
38. Kyokong N, **Muangnoi C**, Thaweeseest W, Kongkatitham V, Likhitwitayawuid K, Rojsitthisak P and Sritularak B. A New Phenanthrene Dimer from *Dendrobium palpebrae*. *Journal of Asian Natural Products Research*. 2018; 21(4): 1-7. (Q2, IF = 1.240)
39. **Muangnoi C**, Jithavech P, Ratnatilaka Na Bhuket P, Supasena W, Wichitnithad W, Towiwat P, Niwattisaiwong N, Haworth IS and Rojsitthisak P. A curcumin-diglutamic acid conjugated prodrug with improved water solubility and antinociceptive properties compared to curcumin. *Bioscience, Biotechnology and Biochemistry*. 2018; 82(8): 1301–1308. (Q2, IF = 1.063)
40. Luckanagul JA, Pitakchatwong C, Ratnatilaka Na Bhuket P, **Muangnoi C**, Rojsitthisak P, Chirachanchai S, Wang Q, Rojsitthisak P. Chitosan-based polymer hybrids for thermo-responsive nanogel delivery of curcumin. *Carbohydrate Polymers*. 2018; 181: 1119-1127. (Q1, IF = 7.182)





41. Kongkatitham V, **Muangnoi C**, Kyokong N, Thaweeseest W, Likhitwitayawuida K, Rojsitthisak P and Sritularak B. Anti-oxidant and anti-inflammatory effects of new bibenzyl derivatives from dendrobium parishii in hydrogen peroxide and lipopolysaccharide treated RAW264.7 cells. *Phytochemistry Letters*. 2018; 24: 31-38. (Q2, IF = 1.459)
42. Praengam K, **Muangnoi C**, Charoenkiatkul S, Thiyajai P. and Tuntipopipat S. Antioxidant and anti-inflammatory activity of aqueous fraction from Albizia lebbeck leaves. *International Food Research Journal*. 2017; 24(3): 1-12. (Q3, IF = 0.770)
43. Vongnam K, **Muangnoi C**, Rojsitthisak P, Sukwattanasinitt M, Rashatasakhon P. A Highly Selective Turn-on Fluorescent Sensor for Glucosamine from Amidoquinoline-Naphthalimide Dyads. *Biosens. Bioelectron.*, 2016, 86(15 Dec), 472-476.
44. Bhunchu S, Rojsitthisak P, **Muangnoi C** and Rojsitthisak P. Curcumin Diethyl Disuccinate Encapsulated in Chitosan/Alginate Nanoparticles for Improvement of Its In Vitro Cytotoxicity Against MDA-MB-231 Human Breast Cancer Cells. *Pharmazie*, 2016, 71(12), 691-700.
45. Mittraphab A, **Muangnoi C**, Likhitwitayawuid K, Rojsitthisak P and Sritularak B. A New Bibenzyl-phenanthrene Derivative from Dendrobium signatum and its Cytotoxic Activity. *Nat. Prod. Comm.*, 2016, 11(5), 657-659.
46. Chingsuwanrote P, **Muangnoi C**, Parengam K and Tuntipopipat S. Antioxidant and antiinflammatory activities of durian and rambutan pulp extract. *Inter Food Res J*. 2016; 23 (3):939- 947.
47. Tuntipopipat S, **Muangnoi C**, Thiyajai P, Srichamnong W, Charoenkiatkul S and Praengam K. A bioaccessible fraction of parboiled germinated brown rice exhibits a higher anti-inflammatory activity than that of brown rice. *Food & Function*. 2015; 6(5):1480-8.
48. Praengam K, **Muangnoi C**, Dawilai S, Awatchanawong M and Tuntipopipat S. Digested Moringa oleifera Boiled Pod Exhibits Anti-Inflammatory Activity in Caco-2 Cells. *J Herbs, Spices & Med Plants*. 2015; 21:148-160.
49. Sirikanokvilai P, Kriengsinyos W, Nantiruj K, **Muangnoi C**, Chingsuwanroj P, Praengam K and Tuntipopipat S. Anti-inflammatory activities of digested green curry paste in peripheral blood mononuclear cells from rheumatoid arthritis patients. *Mal J Nutr*. 2014; 20(2): 271-282.
50. Dawilai S, **Muangnoi C**, Praengamthanachoti P, Tuntipopipat S. Anti-inflammatory activity of bioaccessible fraction from Eryngium foetidum leaves. *Biomed Res Int*. 2013; 2013: 958567.
51. Mekhora C, **Muangnoi C**, Chingsuwanrote P, Dawilai S, Svasti S, Chasri K, Tuntipopipat S. Eryngium foetidum suppresses inflammatory mediators produced by macrophages. *Asian Pacific J Cancer Prev*. 2012; 13:723-734.



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52. **Muangnoi C**, Chingsuwanrote P, Praengamthanachoti P, Svasti S, and Tuntipopipat S. Moringa oleifera Pod Inhibits Inflammatory Mediator Production by Lipopolysaccharide-Stimulated RAW 264.7 Murine Macrophage Cell Lines. *Inflammation*. 2012; 35(2): 445-455.
53. Charoenkiatkul S, **Muangnoi C**, Chingsuwanrote P, Praengamthanachoti P, Tuntipopipat S, and Svasti S. Stir-Fry Chicken with Green Curry Suppresses Inflammatory Gene Expression by Lipopolysaccharide-Induced Murine Macrophages. *Food and Nutrition Sciences*. 2011; 2: 770-779.
54. Tuntipopipat S, **Muangnoi C**, Chingsuwanrote P, Praengam M, Chantravisut P, Charoenkiatkul S and Svasti S. Anti-inflammatory activities of red curry paste extract on lipopolysaccharide-activated murine macrophage cell line. *Nutrition*. 2011; 2: 479-487.
55. Laohavechvanich P, **Muangnoi C**, Butryee C and Kriengsinyos W. Protective effect of makrut lime leaf (*Citrus hystrix*) in HepG2 cells: Implications for oxidative Stress. *Science Asia*. 2010; 30: 112-117.
56. Tuntipopipat S, **Muangnoi C**, and Failla ML. Anti-Inflammatory Activities of Extracts of Thai Spices and Herbs with Lipopolysaccharide-Activated RAW 264.7 Murine Macrophages. *J. Med Food*. 2009; 12(6): 1-8.