

## REFERENCES

1. Chanachai, K., Pittayawonganon, C., Areechokchai, D., Suchatsoonthorn, C., Pokawattana, L. and Jiraphongsa, C., 2008, "A Food Borne Outbreak of Gastroenteritis Due To *Shigella* and Possibly *Salmonella* in A School", **Southeast Asian Journal Tropical Medical Public Health**, Vol. 39, pp. 297-302.
2. Nou, X., Arthur, T.M., Bosilevac, J.M., Harhay, D.M.B., Guerini, M, N., Kalchayanand, N. and Koochmaraie, M., 2006, "Improvement of Immunomagnetic Separation for *Escherichia coli* O157:H7 Detection by the PickPen Magnetic Particle Separation Device", **Journal of Food Protection**, Vol. 69, pp. 2870–2874.
3. Maciorowski, K.G., Herrera, P., Kunder, M.M. and Ricke, S.C., 2006, "Animal Feed Production and Contamination by Foodborne *Salmonella*", **Journal of Consumer Protection and Food Safety**, Vol. 1, pp. 197-209.
4. Pathmanathan, S.G., Castro, N.C., Jimenez, M.M.S., Ochoa, M.M.C., Puthucherry, S.D. and Thong, K.L., 2003, "Simple and Rapid Detection of *Salmonella* Strains by Direct PCR Amplification of the *hlyA* Gene", **Journal of Medical Microbiology**, Vol. 52, pp. 773–776.
5. Kawasaki, S., Fratamico, P.M., Horikoshi, N., Okada, Y., Takeshita, K., Sameshima, T. and Kawamoto, S., 2009, "Evaluation of a Multiplex PCR System for Simultaneous Detection of *Salmonella* spp., *Listeria monocytogenes*, and *Escherichia coli* O157:H7 in Foods and in Food Subjected to Freezing", **Foodborne Pathogens and Disease**, Vol. 6, pp. 81-89.
6. Daum, L.T., Barnes, W.J., McAvlin, J.C., Neidert, M.S., Cooper, L.A., Huff, W.B., Gaul, L., Riggins, W.S., Morris, S., Salmen, A. and Lohman, K.L., 2002, "Real-Time PCR Detection of *Salmonella* in Suspect Foods from a Gastroenteritis Outbreak in Kerr County, Texas", **Journal of Clinical Microbiology**, Vol. 14, pp. 3050–3052.
7. Liu, Y., Che, Y. and Li, Y., 2001, "Rapid Detection of *Salmonella typhimurium* Using Immunomagnetic Separation and Immuno-Optical Sensing Method", **Sensors and Actuators**, Vol. 72, pp. 214-218.
8. Nandakumara, V., La Belle, J.T., Reed, J., Shah, M., Cochran, D., Joshi, L. and Alford, T.L., 2008, "Methodology for Rapid Detection of *Salmonella typhimurium* Using Label-Free Electrochemical Impedance Spectroscopy", **Biosensors and Bioelectronics**, Vol 24, pp. 1039–1042.

9. Schneid, A.D.S., Rodrigues, K.L., Chemello, D., Tondo, E.C., Ayub, M.A.Z. and Aleixo, J.A.G., 2006, "Evaluation of an Indirect Elisa for The Detection of *Salmonella* in Chicken Meat", **Brazilian Journal of Microbiology**, Vol. 37, pp. 350-355.
10. Bock, J.L., 2000, "The New Era of Automated Immunoassay", **American Journal of Clinical Pathology**, Vol. 113, pp. 628-646.
11. Bosch, M.E., Sánchez, A.J.R., Rojas, F.S. and Ojeda, C.B., 2007, "Recent Development in Optical Fiber Biosensors", **Sensors**, Vol. 7, pp. 797-859.
12. Taton, T.A., Mirkin, C.A. and Letsinger, R.L., 2000, "Scanometric DNA Array Detection with Nanoparticle Probes", **Science**, Vol. 289, pp. 1757-1759.
13. Gupta, S., Huda, S., Kilpatrick, P.K. and Velez, O.D., 2007, "Characterization and Optimization of Gold Nanoparticle-Based Silver-Enhanced Immunoassays", **Analytical Chemistry**, Vol. 79, pp. 3810-3820.
14. Kim, D., Daniel, W.L. and Mirkin, C.A., 2009, "Microarray-Based Multiplexed Scanometric Immunoassay for Protein Cancer Markers Using Gold Nanoparticle Probes", **Analytical Chemistry**, Vol. 81, pp. 9183-9187.
15. Kumar, O., Singh, Y., Rao, V.K. and Vijayaraghavan, R., 2008, "Carbon Nanotubes: Detection of Chemical and Biological Warfare Agents", **Defence Science Journal**, Vol. 58, pp. 617-625.
16. Chunglok, W., Wuragil, D.K., Oaew, S., Somasundrum, M. and Surareungchai, W., 2011, "Immunoassay Based on Carbon Nanotubes - Enhanced ELISA for *Salmonella enterica* serovar Typhimurium. "Biosensors and Bioelectronics", Vol. 26, pp. 3584–3589.
17. Yang, M., Kostov, Y. and Rasooly, A., 2008, "Carbon Nanotubes Based Optical Immunodetection of Staphylococcal enterotoxin B (SEB) in Food", **International Journal of Food Microbiology**, Vol. 127, pp. 78-83.
18. Huang, J., Xing, X., Zhang, X., He, X., Lin, Q., Lian, W. and Zhu, H., 2011, "A Molecularly Imprinted Electrochemical Sensor Based on Multiwalled Carbon Nanotube-Gold Nanoparticle Composites and Chitosan for the Detection of Tyramine", **Food Research International**, Vol. 44, pp. 276–281.
19. Chauhan, N. and Pundir, C.S., 2011, "An Amperometric Uric Acid Biosensor Based on Multiwalled Carbon Nanotube–Gold Nanoparticle Composite", **Analytical Biochemistry**, Vol. 413, pp. 97–103.



20. Shen, W., Schrag, B.D., Carter, M.J. and Xiao, G., 2008, "Quantitative Detection of DNA Labeled With Magnetic Nanoparticles Using Arrays of MgO-Based Magnetic Tunnel Junction Sensors", **Applied Physics**, Vol. 93.
21. Lowery, T.J., Palazzolo, R., Wong, S.M., Prado, P.J. and Taktak, S., 2008, "Single-Coil, Multisample, Proton Relaxation Method for Magnetic Relaxation Switch Assays", **Analytical Chemistry**, Vol. 80, pp.1118-1123.
22. Liébana, S., Lermo, A., Campoy, S., Cortés, M.P., Alegret, S. and Pividori, M.I., 2009, "Rapid Detection of Salmonella in Milk by Electrochemical Magneto-Immunosensing", **Biosensors and Bioelectronics**, Vol. 25, pp. 510–513.
23. Alefantis, T., Grewal, P., Ashton, J., Khan, A.S., Valdes, J.J. and Del Vecchio, V.G., 2004, "A Rapid and Sensitive Magnetic Bead-Based Immunoassay For The Detection of Staphylococcal Enterotoxin B For High-Through Put Screening", **Molecular and Cellular Probes**, Vol. 18, pp. 379–382.
24. Fan, A., Lau, C. and Lu, J., 2005, "Magnetic Bead-Based Chemiluminescent Metal Immunoassay With a Colloidal Gold Label", **Analytical Chemistry**, Vol. 77, pp. 3238-3242.
25. Poucke, L.S.G., 1997, "*Salmonella*-Tek, a Rapid Screening Method for *Salmonella* Species in Food", **Applied and Environmental Microbiology**, Vol. 56, pp. 924-927.
26. Wick, M.J., 2004, "Living in the Danger Zone: Innate Immunity to *Salmonella*", **Current Opinion in Microbiology**, Vol. 7, pp. 51–57.
27. Lee, H.A., Wyatt, G.M., Bramham, S. and Morgan, M.R.A., 1990, "Enzyme-Linked Immunosorbent Assay for *Salmonella typhimurium* in Food: Feasibility of 1-Day *Salmonella* Detection", **Applied and Environmental Microbiology**, Vol. 56, pp. 1541-1546.
28. Jitrapakdee, S., Tassanakajon, A., Boonsaeng, V., Piankijagum, S. and Panyirn, S., 1995, "A Simple, Rapid and Sensitive Detection of *Salmonella* in Food by Polymerase Chain Reaction", **Molecular and Cellular Probes**, Vol. 9, pp. 375-382.
29. Voller, A., Bartlett, A. and Bidwell, D.E., 1978, "Enzyme Immunoassays With Special Reference to ELISA Techniques", **Journal of Clinical Pathology**, Vol. 31, pp. 507-520.
30. Darwish, I.A., 2006, "Immunoassay Methods and Their Applications in Pharmaceutical Analysis: Basic Methodology and Recent Advances", **International journal of Biomedical Science**, Vol. 2, pp. 217-235.

31. Yeh, C.H., Wanga, I.L., Lin, H.P., Chang, T.C. and Lin, Y.C., 2009, "A Novel Immunoassay Using Platinum Nanoparticles, Silver Enhancement and a Flatbed Scanner", **Procedia Chemistry**, Vol. 1, pp. 256–260.
32. Shan, G., Lipton, C., Gee, S.J. and Hammock, B.D., 2002, "Immunoassay, Biosensors and Other Nonchromatographic Methods", in **Handbook of Residue Analytical Methods for Agrochemicals**, Edited by Lee, P.W., John Wiley & Sons, Ltd, Chichester, pp. 623–679.
33. Lei, K.F. and Butt, Y.K.C., 2010, "Colorimetric Immunoassay Chip Based on Gold Nanoparticles and Gold Enhancement", **Microfluid Nanofluid**, Vol. 8, pp. 131–137.
34. Lipman, N.S., Jackson, L.R., Trudel, L.J. and Garcia, F.W., 2005, "Monoclonal Versus Polyclonal Antibodies: Distinguishing Characteristics, Applications, and Information Resources", **Institute for Laboratory Animal Research**, Vol. 46, pp. 258–268.
35. Byrne, B., Stack, E., Gilmartin, N. and O’Kennedy, R., 2009, "Antibody-Based Sensors: Principles, Problems and Potential for Detection of Pathogens and Associated Toxins", **Sensors**, Vol. 9, pp. 4407–4445.
36. Fan, M. and He, J., 2011. "**Pesticides - Strategies for Pesticides Analysis**", edited by Margarita Stoytcheva, InTech Publisher. 404 p.
37. Thirumalapura, N.R., Morton, R.J., Ramachandran, A. and Malayer, T.J.R., 2005, "Lipopolysaccharide Microarrays for the Detection of Antibodies", **Journal of Immunological Methods**, Vol. 298, pp. 73–81.
38. Feulner, J.A., 2003, "Identification of Acyloxyacyl Hydrolase, A Lipopolysaccharide-Detoxifying Enzyme, In the Murine Urinary Tract", **Dissertation**, The University of Texas Southwestern Medical Center at Dallas Dallas, Texas.
39. Sotto, A.D., Chiaretti M., Carrub, G.A., Bellucci, S. and Mazzantia, G., 2009, "Multi Walled Carbon Nanotubes: Lack of Mutagenic Activity in the Bacterial Reverse Mutation Assay", **Toxicology Letters**, Vol. 184, pp. 192–197.
40. Sinha, N., Ma, J. and Yeow, J.T.W., 2006, "Carbon Nanotube Based Sensors", **Journal of Nanoscience and Nanotechnology**, Vol. 6, No. 573 – 590.
41. Banerjee, S., Kahn, M.G. and Wong, S.S., 2003, "Rational Chemical Strategies for Carbon Nanotube Functionalization", **Chemistry**, Vol. 9, pp. 1898–1908.



42. Ebbesen, T.W., Hiura, H., Fujita, J., Ochiai, Y., Matsui, S. and Tanigaki, K., 1993, "Patterns in the Bulk Growth of Carbon Nanotubes", **Chemistry and Physics Letter**, Vol. 209, pp. 83–90.
43. Balasubramanian, K. and Burghard, M., 2005, "Chemically Functionalized Carbon Nanotubes", **Small**, Vol. 1, pp. 180–192.
44. Srivastava, D. and Wei, C., 2003, "Nanomechanics of Carbon Nanotubes and Composites", **American Society of Mechanical Engineers**, Vol 56, pp. 215-230.
45. Dai, L., Soundarrajan, P. and Kim, T., 2002, "Sensors and Sensor Arrays Based on Conjugated Polymers and Carbon Nanotubes", **Pure Application Chemical**, Vol. 74, pp. 1489–1783.
46. Wei, B.Q., Vajtai, R. and Ajayan, P.M., 2001, "Reliability and Current Carrying Capacity of Carbon Nanotubes", **Applied Physical Letter**, Vol. 79, pp. 1172 – 1174.
47. Weber, J.E., Pillai, S., Ram, M.K., Kumar, A. and Singh, S.R., 2011, "Electrochemical Impedance-Based DNA Sensor Using a Modified Single Walled Carbon Nanotube Electrode", **Materials Science and Engineering**, Vol. 31, pp. 821–825.
48. Wang, J., 2004. "Carbon-Nanotube Based Electrochemical Biosensors: A Review", **Electroanalysis**, Vol. 17, pp. 7-14.
49. Kim, S.K., Cho, H., Jeong, J., Kwon, J.N., Jung, Y. and Chung, B.H., 2010," Label free and Naked Eye Detection of PNA/DNA Hybridization Using Enhancement of Gold Nanoparticles", **Chemistry Communication**, Vol. 46, pp. 3315–3317.
50. Villamizar, R.A., Maroto, A., Rius, F.X., Inza, I. and Figueras, M.J., 2008, "Fast Detection of *Salmonella infantis* with Carbon Nanotube Field Effect Transistors", **Biosensors and Bioelectronics**, Vol. 24, pp. 279–283.
51. Villamizar, R.A., Maroto, A. and Rius, F.X., 2009, "Improved Detection of *Candida albicans* with Carbon Nanotube Field Effect Transistors", **Sensors and Actuators**, Vol. 136, pp. 451 - 457.
52. Yun, Y.H., Dong, Z., Shanov, V., Heinemand, W.R., Halsall, H.B., Bhattacharya, A., Conforti, L., Narayang, R.K., Ball, W.S. and Schulza, M.J., 2007, "Nanotube Electrodes and Biosensors", **Nanotoday**, Vol. 2, pp.30-37.
53. Jiang, K., Schadler, L.S., Siegel, R.W., Zhang, X., Zhang, H. and Terrones, M., 2004, "Protein Immobilization on Carbon Nanotubes via A Two-Step Process of Diimide-Activated Amidation", **Journal of Material Chemistry**, Vol. 14, pp. 37 – 39.

54. Chen, R.J., Zhang, Y., Wang, D. and Dai, H., 2001, "Noncovalent Sidewall Functionalization of Single-Walled Carbon Nanotubes for Protein Immobilization", **Journal of The America Chemistry Society**, Vol. 123, pp. 3838-3839.
55. Cao, C., Wolff, A. and Bang, D.D.D., 2010, "Au Nanoparticles for Applications in Analysis of Cellular and Biomolecular Recognitions", Proceedings of the 3rd International Conference on the Development of BME in Vietnam, 11-14<sup>th</sup> Jan 2010.
56. Li, Y., Schluesener, H.J. and Xu, S., 2010, "Gold Nanoparticle Based Biosensors", **Gold Bulletin**, Vol. 43, pp. 29-41.
57. Cao, C., Tram, L.L.T., Wolff, A. and Bang, D.D., 2010, "An Improved Scanometric Immunoassay Based on Dual Enlargement of Gold Nanoparticles for Rapid and Low Cost Pathogen Detection", 14<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Sciences, 3 - 7 October 2010, Groningen, Netherlands.
58. Na, M.L., Jun, L.D. and Xin, W.Z., 2010, "Synthesis and Applications of Gold Nanoparticle Probes", **Chinese Journal of Analytical Chemistry**, Vol. 38, pp. 1-7.
59. Turkevich, J., Stevenson, P.C. and Hillier, J., 1951, "The Nucleation and Growth Processes in the Synthesis of Colloidal Gold", **Discuss Faraday Society**, Vol. 11, pp. 55-75.
60. Frens G., 1973, "Controlled Nucleation for the Regulation of the Particle Size in Monodisperse Gold Suspensions", **Nature Physical Science**, Vol. 241, pp. 20-22.
61. Brust, M., Walker, M., Bethell, D., Schiffrin, D.J. and Whyman, R., 1994, "Synthesis of Thiol-Derivatized Gold Nanoparticles in A Two-Phase Liquid-Liquid System", **Journal Chemical Society Chemistry Communication**, Vol. 7, pp. 801.
62. Cai, W., Gao, T., Hong, H. and Sun, J., 2008, "Applications of Gold Nanoparticles in Cancer", **Nanotechnology, Science and Applications**, Vol. 1, pp. 17-32.
63. Lei, K.F. and Butt, Y.K.C., 2010, "Colorimetric Immunoassay Chip Based on Gold Nanoparticles and Gold Enhancement", **Microfluid Nanofluid**, Vol. 8, pp. 131-137
64. Chuang, Y.C., Li, J.C., Chen, S.H., Liu, T.Y., Kuo, C.H., Huang, W.T. and Lin, C.S., 2010, "An Optical Biosensing Platform for Proteinase Activity using Gold Nanoparticles", **Biomaterials**, pp. 1-9.
65. Ambrosi, A., Airo, F. and Merkoc, A., 2010, "Enhanced Gold Nanoparticle Based ELISA for a Breast Cancer Biomarker", **Analytical Chemistry**, Vol. 82, pp. 1151-1156.



66. Zang, R., Hummelgård, M. and Olin, H., 2009, "Simple and Efficient Gold Nanoparticles Deposition on Carbon Nanotubes with Controllable Particle Sizes", **Materials Science and Engineering**, Vol. 158, pp. 48–52.
67. Jiang, L. and Gao, L.L., 2003, "Modified Carbon Nanotubes: An Effective Way To Selective Attachment of Gold Nanoparticles", **Carbon**, Vol. 41, pp. 2923–2929.
68. Gao, X., Zhang, Y., Wu, Q., Chen, H., Chen, Z. and Lin, X., 2011, "One Step Electrochemically Deposited Nanocomposite Film of Chitosan–Carbon Nanotubes–Gold Nanoparticles for Carcinoembryonic Antigen Immunosensor Application", **Talanta**, Vol. 85, pp. 1980–1985.
69. Huang, K.J., Niu, D.J., Xie, W.Z. and Wang, W., 2010, "A Disposable Electrochemical Immunosensor for Carcinoembryonic Antigen Based on Nano-Au/Multi-Walled Carbon Nanotubes Chitosans Nanocomposite Film Modified Glassy Carbon Electrode", **Analytica Chimica Acta**, Vol. 659, pp. 102–108.
70. Fan, A., Lau, C. and Lu, J., 2005, "Magnetic Bead-Based Chemiluminescent Metal Immunoassay with a Colloidal Gold Label", **Analytical Chemistry**, Vol. 77, pp. 3238 – 3242.
71. Renault, N.J., Martelet, C., Chevolot, Y. and Cloarec, J. P., 2007, "Biosensors and Biobarcode Assays Based on Biofunctionalized Magnetic Microbeads". **Sensors**, Vol. 7, pp. 589-614.
72. Gijs, M.A.M. 2004, "Magnetic Bead Handling on Chip: New Opportunities for Analytical Applications", **Microfluid Nanofluid**, Vol. 1, pp. 22–40.
73. Mujika, M., Arana, S., Castano, E., Tijero, M., Vilares, R., Lopez, J.M.R., Cruz, A., Sainz, L. and Berganza, J., 2009, "Magnetoresistive Immunosensor for The Detection of *Escherichia coli* O157:H7 Including a Microfluidic Network", **Biosensor Bioelectronic**, Vol. 24, pp. 1253-1258.
74. Maalouf, R., Hassen, W.M., Wirth, C.F., Coste, J. and Renault, N.J., 2008, "Comparison of Two Innovatives Approaches for Bacterial Detection: Paramagnetic Nanoparticles and Self-Assembled Multilayer Processes", **Microchimia Acta**, Vol. 163, pp. 157 – 161.
75. Sanvicens, N., Pastells, C., Pascual, N. and Marco, M.P., 2009, "Nanoparticle Based Biosensors for Detection of Pathogenic Bacteria", **Trends in Analytical Chemistry**, Vol. 28, pp. 1243-1252.

76. Boswell, C.A., Tesar, D.B., Mukhyala, K., Theil, F.P., Fielder, P.J. and Khawli, L.A., 2010, "Effects of Charge on Antibody Tissue Distribution and Pharmacokinetics", **Bioconjugate Chemistry**, Vol. 21, pp. 2153-2163.
77. Gao, Y. and Kyratzis, I., 2008, "Covalent Immobilization of Proteins on Carbon Nanotubes using the Cross-Linker 1-Ethyl-3-(3-dimethylaminopropyl) carbodiimide - a Critical Assessment", **Bioconjugate Chemistry**, Vol. 19, pp. 1945-1950.
78. Olle, W.J., Messamore, J., Deogracias, M.P., McClintock, S.D., Anderson, T.D. and Johnson, K.J., 2005, "Comparison of Antibody Array Substrates and the Use of Glycerol to Normalize Spot Morphology", **Experimental and Molecular Pathology**, pp. 1-4.
79. Oaew, S., Karoonuthaisiri, N. and Surareungchai, W., 2009, "Sensitivity Enhancement In DNA Hybridization Assay Using Gold Nanoparticle-Labeled Two Reporting Probes", **Biosensors and Bioelectronics**, Vol. 25, pp. 435-441.
80. Hainfeld, J.F. and Powell, R.D., 2000, "New Frontiers in Gold Labeling", **The Journal of Histochemistry & Cytochemistry**, Vol. 48, pp. 471-480.
81. Starovasnik, M.A., O'connell, M.P., Fairbrother, W.J. and Kelley, R.F., 1999, "Antibody Variable Region Binding By *Staphylococcal* Protein A: Thermodynamic Analysis and Location of the Fv Binding Site on E-Domain", **Protein Science**, Vol. 8, pp. 1423-1431.
82. Freitag, S., Trong, I.L., Klumb, L., Stayton, P.S. and Stenkamp, R.E., 1997, "Structural Studies of The Streptavidin Binding Loop", **Protein Science**, Vol. 6, pp. 157- 166.
83. Karoonuthaisiri, N., Charlermroj, R., Uawisetwathana, U., Luxananil, P., Kirtikara, K. and Gajanandana, O., 2009, "Development of Antibody Array for Simultaneous Detection of Foodborne Pathogens", **Biosensors and Bioelectronics**, Vol. 24, pp. 1641-1648.
84. Mansfield, L.P. and Forsythe, S.J., 2000, "The Detection of *Salmonella* Using a Combined Immunomagnetic Separation and ELISA End-Detection Procedure", **Reviews in Medical Microbiology**, Vol. 11, pp. 37- 46.
85. Su, X.L. and Li, Y., 2005, "A QCM Immunosensor for Salmonella Detection With Simultaneous Measurements of Resonant Frequency and Motional Resistance", **Biosensors and Bioelectronics**, Vol. 2, pp. 1840-848.
86. Leon-Velarde, C.G., Zosherafatein, L. and Odumeru, J.A., 2009, "Application of an Automated Immunomagnetic Separation-Enzyme Immunoassay for the Detection of *Salmonella enterica* subspecies *enterica* From Poultry Environmental Swabs," **Journal of Microbiological Methods**, Vol. 79, pp. 13-17.



## CURRICULUM VITAE

<b>NAME</b>	Miss Moegiratul Amaro
<b>DATE OF BIRTH</b>	6 May 1987
<b>EDUCATIONAL RECORD</b>	
<b>HIGH SCHOOL</b>	High School Graduation Mataram 1, 2005
<b>BACHELOR'S DEGREE</b>	S.TP. Bachelor of Agricultural Technology (Agricultural Product Technology) Department of Agricultural Product Technology Faculty of Agriculture Mataram University Mataram, 2009
<b>MASTER'S DEGREE</b>	Double Degree Program(October 2009 – 2011) M.P (Master of Agriculture) Division of Biotechnology Agroindustry Faculty of Agricultural Technology Brawijaya University Malang, Indonesia, 2011  Master of Science (Biotechnology) School of Bioresources and Technology King Mongkut's University of Technology Thonburi (KMUTT), Thailand, 2011
<b>SCHOLARSHIP</b>	Awarded by the Double Degree Program Scholarship from National Education Board of Indonesia for the period 2009-2010. Brawijaya university (2010-2011)
<b>PUBLICATION</b>	Amaro, M., Oaew, S. and Surareungchai, W., 2011, "Immunoassay Based on Carbon Nanotubes/Gold Nanoparticles Nanocomposite for <i>Salmonella enterica</i> serovar Typhimurium Detection", <b>Pure and Applied Chemistry International Conference</b> , 11-13 January 2012, Chiang Mai, Thailand

**King Mongkut's University of Technology Thonburi**  
**Agreement on Intellectual Property Rights Transfer for Postgraduate Students**

Date 13 Desember 2011

Name Moegiratul Surname/Family Name Amaro Student Number 53450621  
who is a student of King's Mongkut's University of Technology Thonburi (KMUTT) in  
☐ Graduate Diploma      ☒ Master Degree

☐ Doctoral Degree

Program Biotechnology Field of Study Sensor

Faculty/School of Bioresources and Technology

Home Address Ade Irma Suryani Rd, Gang Panda 3 No. 2 Monjok, Mataram, South West  
Nusa Postal Code 83122 Country Indonesia

I, as 'Transferer', hereby transfer the ownership of my thesis copyright to King's Mongkut's University of Technology Thonburi who has appointed Assos. Prof. Narumon Jeyashoke Dean of Faculty of School of Bioresources and Technology to be 'Transferee' of copyright ownership under the 'Agreement' as follows.

1. I am the author of the thesis entitled Immunoassay Based on Carbon Nanotubes/Gold Nanoparticles Nanocomposite for *Salmonella enterica* serovar Typimurium Detection under the supervision of Assoc. Prof. Werasak Surareungchai, Ph.D who is my supervisor, and/or Sukunya Oaew, Ph.D who is/are my co-supervisor(s), in accordance with the Thai Copyright Act B.E. 2537. The thesis is a part of the curriculum of KMUTT.

2. I hereby transfer the copyright ownership of all my works in the thesis to KMUTT throughout the copyright protection period in accordance with the Thai Copyright Act B.E. 2537, effective on the approval date of thesis proposal consented by KMUTT.

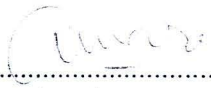
3. To have the thesis distributed in any form of media, I shall in each and every case stipulate the thesis as the work of KMUTT.

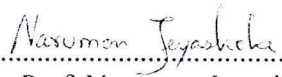
4. For my own distribution of thesis or the reproduction, adjustment, or distribution of thesis by the third party in accordance with the Thai Copyright Act B.E. 2537 with remuneration in return, I am subject to obtain a prior written permission from KMUTT.

5. To use any information from my thesis to make an invention or create any intellectual property works within ten (10) years from the date of signing this Agreement, I am subject to obtain prior written permission from KMUTT, and KMUTT is entitled to have intellectual property rights on such inventions or intellectual property works, including entitling to take royalty from licensing together with the distribution of any benefit deriving partly or wholly from the works in the future, conforming with the Regulation of King Mongkut's Institute of Technology Thonburi *Re* the Administration of Benefits deriving from Intellectual Property B.E. 2538.


6. If the benefits arise from my thesis or my intellectual property works owned by KMUTT, I shall be entitled to gain the benefits according to the allocation rate stated in the Regulation of King Mongkut's Institute of Technology Thonburi *Re* the Administration of Benefits deriving from Intellectual Property B.E. 2538.



Signature..........Transferor  
(Moegiratul Amaro, S.TP.)  
Student

Signature..........Transferee  
(Assoc. Prof. Narumon Jeyashoke)  
Dean

Signature..........Witness  
(Assoc. Prof. Werasak Surarungchai Ph.D.)

Signature..........Witness  
(Sukunya Oaew, Ph.D.)



