REFERENCES



- Abdullah, M.P., Ying, C.H., and Ramli, M.S. 2003. "Formation, Modeling and Validation of Trihalomethanes (THM) in Malaysian drinking water: a case study in the districts of Tampin, Negeri Sembilan and Sabak Bernam, Selangor, Malaysia." Water Research 37: 4637 – 4644.
- Aiken, G.R., and Leenheer, J.A. 1993. "Isolation and Chemical Characterization of Dissolved and Colloidal Organic Matter." Chemical Ecology 8: 135-151.
- American Public Health Association, AWWA, Water Pollution Control
 Federation, USA 1995. "Standard Methods for the Examination of Water
 and Wastewater, 19th edition." Washington, DC. pp.2-12.
- Benner, R., Fogel, M.L., Spraque, E.K., and Hodson, R.E. 1987. "Depletion of 13C in Lignin and its Implications for Stable Carbon Isotopic Studies." Nature 329: 708-710.
- Bowmer, K.H. 1987. "Residues of Dalapon and TCA in Sediments and Irrigation Water." Pesticide Science 18: 1-13.
- Boyce, S.D., and Hornig., J.F. 1983. "Reaction Pathways of Trihalomethane Formation from the Halogenation of Dihydroxyaromatic Model Compounds for Humic Acid." Environmental Science and Technology 17: 202-211.
- Bruchet, A., Anselme, C., Duguet, J.P., and Mallevialle, J. 1987. "THM Formation Potential and Organic Content: A New Approach in Water Chlorination Chemistry." Environmental Impact Health Effects 6: 633-647.
- Butterfield, P.W., Camper, A.K., Ellis, B.D., and Jones, W.L. 2002. "Chlorination of Model Drinking Water Biofilm: Implications for Growth and Organic Carbon Removal." Water Research 36: 4391-4405.
- Chang, C.Y., Hsieh, Y.H., Lin, Y.M., Hu, P.Y., Liu, C.C., and Wang, K.H. 2001."The Organic Precursors Affecting the Formation of Disinfection By-Products with Chlorine Dioxide." Chemosphere 44: 1153-1158.
- Chang E.E., Ching, P.C., Ko, Y.W., Lan, and W.H. 2001. "Characteristics of Organic Precursors and Their Relationship with Disinfection By-products." Chemosphere 44: 1231-1236.

- Chellam, S., and Krasner, S.W. 2001. "Disinfection Byproduct Relationships and Speciation in Chlorinated Nanofiltered Waters." Environmental Science and Technology 35: 3988-3999.
- Chen, W.J., and Weisel, C.P. 1998. "Halogenated DBP Concentrations in a Distribution System." Journal of American Water Works Association 90(4): 151.
- Christman, R.F., Norwood, D.L., Seo, Y., and Frimmel, F.H. 1989. Oxidative Degradation of Humic Substances from Freshwater Environments: Humic Substances II. New York: Wiley and Sons.
- Clark, R.M. 1998. "Chlorine Demand and TTHM Formation Kinetics: A Second-Order Model." Journal of Environmental Engineering Division of the ASCE 124(1): 16-24.
- Clark, R.M., and Sivaganesan, M. 1998. "Predicting Chlorine Residuals and the Formation of TTHMs in Drinking Water." Journal of Environmental Engineering Division of the ASCE 124(12): 1203-1210.
- Clark, R.M., and Boutin, B.K. 2001. "Controlling Disinfection By-Products and Microbial Contaminants in Drinking Water." Environmental Science and Technology 40(2): 26-32.
- Cowman, G.A., and Singer, P.C. 1996. Environmental Science and Technology 30(1): 16-24.
- Croue, J.P., Korshin, G.V., and Benjamin, M. 2000. Characterization of Natural Organic Matter in Drinking Water: United State of America, American Water Works Association: 324
- Croue, J. P., Violleau, D., and Labouyrie, L. 2000. Disinfection By-Product
 Formation Potentials of Hydrophobic and Hydrophilic Natural Organic Matter
 Fractions: A Comparison between a Low- and a High-Humic Water: in
 Natural Organic Matter and Disinfection By-Products: Characterization and
 Control in Drinking Water. American Chemical Society: S. W. Krasner, Amy,
 G.L., Eds. Washington, DC.
- Daignault, S. A., Noot, D.K., Williams, D.T., and Huck, P.M. 1988. "A Review of the Use of XAD Resins to Concentrate Organic Compounds in Water." Water Research 22(7): 803-813.

- Dalvi, A.G., Arnan, R., and Javeed, M.A. 2000. "Haloacetic Acids (HAAs) Formation in Desalination Processes from Disinfectants." Desalination 12: 261-271.
- Dojlido, J., Zbiec, E., and Swietlik, R. 1999. "Formation of the Haloacetic Acids during Ozonation and Chlorination of Water in Warsaw Waterworks (Poland)." Water Research 33(14): 3111-3118.
- Duarte, R.M., Santos, E.B., and Duarte, A.C. "Spectroscopic Characteristics of Ultrafiltration Fractions of Fulvic and Humic Acids Isolated from an Eucalyptus Bleached Kraft Pulp Mill Effluent." Water Research 37: 4073-4080.
- Elshorbagy, W.E. Aqua., H., and Elsheamy, M.K. 2000. "Simulation of THM Species in water distribution systems." Water Research 34: 3431-3439.
- Feben, D., and Taras, M.J., 1981. "Studies on Chlorine Demand Constants." Journal of American Water Works Association 43(11): 922-932.
- Galapate, R.P., Baes, A.U., Ito, K., Iwase, K., and Okada, M. 1999.
 "Trihalomethane Formation Potential Prediction using some Chemical Functional Groups and Bulk Parameters." Water Research 33: 2555-2560.
- Galapate, R.P., Baes, A.U., and Okada, M. 2001. "Transformation of Dissolved Organic Matter during Ozonation: Effects on Trihalomethane Formation Potential." Water Research 35: 2201-2206.
- Gallard, H., Gunten, U.V. 2002. "Chlorination of Natural Organic Matter: Kinetics of Chlorination and of THM Formation." Water Research 36: 65-74.
- Gjessing, E.T., et al. 1998. "Multi-Method Characterisation of Natural Organic
 Matter Isolated from Water: Characterisation of Reverse Osmosis-Isolates
 from Water of Two Semi-Identical Dystrophic Lakes Basins in Norway."
 Water Research 32(10): 3108-3124.
- Golfinopoulos K.S., Xu, K.N., Kostopoulou, N.M., and Lekkas D.T. 1998. "Use of a Multiple Regression Model for Predicting Trihalomethane Formation." Water Research 32(9): 2821-2829.
- Golfinopoulos, S.K., and Arhonditsis, G.B. 2002. "Quantitative Assessment of Trihalomethane Formation Using Simulations of Reaction Kinetics." Water Research 36: 2856-2868.

- Gracia Villanova, R.J., Garcia, C., Gomez, J.A., Garcia, M.P., and Ardanuy, R. 1997.
 "Formation, Evaluation and Modeling of Trihalomethanes in the Drinking Water of a Town 0.1 at the Municipal Treatment Utilities." Water Research 31: 1299-1308.
- Haas, C.N., and Karra, S.B. 1984. "Kinetics of Wastewater Chlorine Demand Exertion." Journal of the Water Pollution Control Federation 56(2): 170-173.
- Hanson, M.L., and Solomon, K.R. 2004. "Haloacetic Acids in the Aquatic Environment, Part II: Ecological Risk Assessment." Environmental Pollution 130: 385-401.
- Hao, O.J., Davis, A.P., and Chang, P.H. 1991. "Kinetics of Manganese(H) Oxidation with Chlorine." Journal of Environmental Engineering Division of the ASCE 117(3): 359-374.
- Harrington, G.W., Chowdhury, Z.K., and Owen, D.M. 1992. "Development a Computer Model to Simulate DBP Formation during Water Treatment." Journal of American Water Works Association 84(78): 43-50.
- Howe, K.J., Ishida, K.P., and Clark, M.M. 2002. "Use of ATR/FTIR Spectrometry to Study Fouling of Microfiltration Membranes by Natural Waters." Desalination 147: 251-255.
- Hwang, C.J., Sclimenti, M.J., and Krasner, S.W. 2000. Disinfection By-Product
 Formation Reactivities of Natural Organic Matter Fractions of a Low-Humic
 Water, in Natural Organic Matter and Disinfection By-Products:
 Characterization and Control in Drinking Water. Washington, DC.
- Jadas-Hecart, A., el Morer, A., Stitou, M., Bouillot, P., and Legube, B. 1992."Modelisation de la Demande en Chlore D'une Eau Traitee." Water Reserves 26(8): 1073.
- James, W.L., Aiken, G.R., Bergamashi, B.A., Fram, M.S., Fujii, R., and Mopper, K. 2003. "Evaluation of Specific Ultraviolet Absorbance as an Indicator of the Chemical Composition and Reactivity of Dissolved Organic Carbon." Environmental Science and Technology 37: 4702-4708.
- Juuti, S., Norokorpi, J.S., and Ruuskanen, J. 1995. "Trichloroacetic Acid (TCA) in Pine Needles Caused by Atmospheric Emissions of Kraft Pulp Mills." Chemosphere 30: 439-448.

- Kavanaugh, M.C. 1978. "Modified Coagulation for Improved Removal of Trihalomethane Precursors." Journal of American Water Works Association 70(11): 613-620.
- Kavanaugh, M.C., Trussell, A.R., Cromer, J., Trussell, R.R. 1980. "An Empirical Kinetic Model of Trihalomethane Formation: Applications to Meet the Proposed Trihalomethane Standard." Journal of American Water Works Association 10: 578-582.
- Kim, J., Chung, Y., Shin, D., Kim, M., Lee, Y., Lim, Y., and Lee, D. 2002."Chlorination By-products in Surface Water Treatment Process." Desalination 151: 1-9.
- Kitis, M., Karanfil, T., Wigton, A., and Kiduff, J.E. 2002. "Probing Reactivity of Dissolved Organic Matter for Disinfection By-Product Formation Using XAD-8 Resin Adsorption and Ultrafiltration Fractionation." Water Research 36: 3834-3848.
- Korshin, G.V., Wu, W.W., Benjamin, M.M., and Hemingway, O. 2002. "Correlations between Differential Absorbance and the Formation of Individual DBPs." Water Research 36: 3273-3282.
- Krasner, S.W., and Amy, G. 1995. "Jar test evaluations of enhanced coagulation." Journal of American Water Works Association 87(12): 93-107.
- Krasner, W.S., Croue, J.P., Buffle, J., and Perdue, E.M. 1996. "Three Approaches for Characterizing NOM." Journal of American Water Works Association 96: 66-78.
- Krasner, W.S., Speitel, G.E., Jr., Diehl, A.C., Hwang, C.J., Xia, R., and Barrett, S.E.
 1996. Water Quality, AWWA Annual Conference, Toronto, ON, Canada,
 American Water Works Association Denver, CO.
- Leenheer, J.A., and Huffman, E.W., Jr. 1979. "Analytical Method for Dissolved Organic Carbon." Water Resources Investigations 79(4): 1-16.
- Leenheer, J.A. 1981. "Comprehensive Approach to Preparative Isolation and Fractionation of Dissolved Organic Carbon from Natural Waters and Wastewaters." Environmental Science and Technolology 15(5): 578-587.
- Leenheer, J.A., Brown, P.A., Noyes, T.I. 1989. Implications of Mixture Characteristics on Humic-Substance Chemistry, In Aquatic Humic Substances : Influence on Fate and Treatment of Pollutants. Washington, DC.

- Leenheer, J.A., Croue, J.P., Benjamin, M., Korshin, G.V., Hwang, C.J., Bruchet, A., and Aiken, G.R. 2000. "Natural Organic Matter and Disinfection By-products Characterization and Control in Drinking Water." American Chemical Society: 68-83.
- Leenheer, J.A., Rostad, C.E., Barber, L.B., Schroeder, R.A., Anders, R., and Davisson, M.L. 2001. "Nature and Chlorine Reactivity of Organic Constituents from Reclaimed Water in Groundwater, Los Angeles country, California." Environmental Science and Technology 35: 3869-3876.
- Li, C.W., Korshin, G.V., and Benjamin, M.M. 1998. "Monitoring DBP formation with Differential UV spectroscopy." Journal of American Water Works Association 90(8): 88-100.
- Li, C.W., Benjamin, M.M., and Korshin, G.V. 2000. "Use of UV Spectroscopy to Characterize the Reaction between NOM and Free Chlorine." Environmental Science and Technology 34: 2570-2575.
- Liang, L., and Singer, P.C. 2003. "Factors Influencing the Formation and Relative Distribution of Haloacetic Acids and Trihalomethanes in Drinking Water." Environmental Science and Technology 37: 2920-2928.
- Lin, C.F., Liu, S.H., and Hao, O.J. 2001. "Effect of functional groups of humic substances on ultrafilration performance." Water Research 35: 2395-2402.
- Lyn, T.L., and Taylor, J.S. 1993. "Modeling Compliance of Chlorine Residual and Disinfectants and Microorganisms in Water Pipes." Water Reserves 29(3): 881-894.
- Lytle, C.R., and Perdue, E.M. 1981. "Free, Proteinaceous and Humic-Boound Amino Acids in River Water Containing High Concentration of Aquatic Humus." Environmental Science and Technology 15: 224-228.
- Mangiapan, S., Benfenati, E., Grasso, P., Terreni, M., Pregnoloto, M., Pagani, G., and Barcelo, D. 1997. "Metabolites of Alachlor in Water: Identification by Mass Spectroscopy and Chemical Synthesis." Environmental Science and Technology 31: 3637-3646.
- Marhaba, T.F., Bengraine, K., Pu, Y., and Aragi, J. 2002. "Spectral Fluorescence Signatures and Partial Least Squares Regression: Model to Predict Dissolved Organic Carbon in Water." Journal of Hazardous Materials, 3950, 1-15.

- Marhaba, T.F., and Kochar, H.I. 2000. "Rapid Prediction of Disinfection By-Product Formation Potential by Fluorescence." Environmental Engineering And Policy., 2, 29-36
- Marhaba, T.F., Lippincott, R.L., and Van, D. 2000. "Characterizing Dissolved Organic Matter Fractions using Fluorescent Signatures and Post Processing by Principal Component Analysis, Fresenius." Journal of Anal Chemistry 366: 22-25.
- Marhaba, T.F., Member, P.E., and Lippincott, R.L. 2000. "Application of Fluorescence Technique for Rapid Identification of DOM Fractions in Source Waters." Journal of Environmental Engineering, 126(11), 1039-1044.
- Marhaba, T.F., and Pipada, N.S. 2000. "Coagulation: Effectiveness in Removing Dissolved Organic Matter Fractions." Environmental Engineering Science 17(2): 107-116.
- Marhaba T.F., and Pu, Y. 2000. "Coagulation: Effective in Removing Dissolved Organic Matter Fractions." Environmental Engineering Science 17(2): 107-115.
- Marhaba, T.F., and Pu, Y. 2000. "Rapid Delineation of Humic and Non-Humic Organic Matter Fractions in Water." Journal of Hazardous Materials A73: 221-234.
- Marhaba, T.F., Pu, Y., and Bengraine, K. 2003. "Modified Dissolved Organic Matter Fraction Technique for Natural Water." Journal of Hazardous Materials 101: 43-53.
- Marhaba, T.F., and Van, D. 1999. "Chlorinated Disinfection By-product Formation Potential of Dissolved Organic Matter Fractions at an Ozonation Water Treatment Plant." Advances in Environmental Research 3(3): 255-268.
- Marhaba, T. F., Washington, M.B. 1998. "Drinking Water Disinfection and Byproducts: History and Current Practice." Advances in Environmental Research 2(1): 103-115.
- McGuire, M. J., Meadow, R.G. 1988. "AWWARF Trihalomethane Survey." Journal of American Water Works Association 80(1): 61.
- McIntyre, C., Batts, G.R., Jardine, D.R. 1997. "Electrosprag Mass Spectrometry of Groundwater Organic Acids." Journal of Mass Spectrometry 32: 328-330.

- Miller, J. W., Uden, P.C. 1983. "Characterization of Nonvolatile Aqueous Chlorination Products of Humic Substances." Environmental Science and Technology 17: 150-159.
- Milot, J., Rodriguez, M.J., Serodes, J.B. 2000. "Modeling the Susceptibility of Drinking Water Utilities to Form High Concentrations of Trihalomethanes." Journal of Environmental Management 60: 155-171.
- Moghaddam, A.P., Abbas, R., Fisher, J.W., Stravrou, S., Lipscomb, J.C. 1996.
 "Formation of Dichloroacetic Acid by Rat and Mouse Gut Microflora, An in Vitro Study." Biochemical Basophile Research Corporation 228: 639-645.
- Najm, I.M., Patania, N.L., Jacangelo, J.G., Krasner, S.W. 1994. "Evaluating Surrogates for Disinfection By-Product." Journal of American Water Works Association 6: 98-106.
- Nikolaou, A. D., Golfinopoulos, S. K., Arhonditsis G. B., Kolovoyiannis V.,
 Themistokles D.L.2004. "A modeling the Formation of Chlorination ByProducts in River Waters with Different Quality." Chemosphere 55: 409-420.
- Orlov, Y.V., Persiantsev, I.G., Rebrik, S.P., and Babichenko, S.M. 1995. "Application of Neutral Networks to Fluorecent Diagonostics of Organic Pollution in Waters." Journal of Society of Photo-Optical Instrumentation Engineering 2503: 150-156.
- Pavia, L.D., Lampman M.G., Kriz S.G., Jr. 1979. Introduction to Spectroscopy: A
 Guide for Students of Organic Chemistry; Department of Chemistry, Western
 Washington University, Belling Ham, Washington, W.B. Saunders Company.
- Pomes, M.I., Larive, C.K., Thurman, M.R., Green, R.W., Orem, W.H., Rostad, C.E., Coplan, T.B., Cutak, B.J., Dixon, A.M. 2000. "Sources and Haloacetic Acid/ Trihalomethane Formation Potentials of Aquatic Humic Substances in the Wakarusa River and Clinton Lake near Lawrence, Kansas." Environmental Science and Technology 34: 4278-4286.
- Qualla, R. G., Johnson, J.D. 1983. "Kinetics of the Short-Term Consumption of Chlorine by Fulvic Acid." Environmental Science and Technology 17(11): 692-698.
- Rathbun, R. E. 1996. "Regression Equations for Disinfection By-Products for the Mississippi, Ohio and Missouri Rivers." The Science of the Total Environmental 191: 235-244.

- Rebhun, M., Smed, T.F., Rwetabula, J. 1996. "Dissolved Humic Substances for Remediation of Sites Contaminated by Organic Pollutants Binding-Desorption Model Predictions." Water Research 9: 2027-2038.
- Reckhow, D.A., S., P.C., Malcolm, R.L. 1990. "Chlorination of Humic Materials By-Product Formation and Chemical Interpretations." Environmental Science and Technology 24: 1655-1664.
- Rodriguez, M. J., Serodes, J.B., Levallois, P. 2004. "Behavior of Trihalomethanes and Haloacetic Acids in a Drinking Water Distribution System." Water Research 38: 4367-4382.
- Serodes, J. B., Rodriguez, M.J., Li, H., Bouchard, C. 2003. "Occurrence of THMs and HAAs in Experimental Chlorinated Waters of the Quebec City Area (Canada)." Chemosphere 51: 253-263.
- Singer, P. C. 1981. "Trihalomethane Formation in North Carolina Drinking Waters." Journal of American Water Works Association 8: 392.
- Stacpoole, P. W. 1989. "The Pharmacology of Dichloroacetate." Metabolism 38: 1124-1144.
- Stanley, S. J., Baxter, C.W., and Zhang, Q. 2000. Process Modeling and Control of Enhanced Coagulation AWWARF, US.
- Steelink, C. 1977. "Humates and Other Natural Organic Substances in the Environment." Journal of Chemical Education 54: 599-603.
- Stevens, A. A., Moore, L.A., Miltner, R.J. 1989. "Formation and Control of Non-Trihalomethane Disinfection By-Products." Journal of American Water Works Association 81(8): 54-56.
- Stevenson, F. J. 1982. Spectroscopic Approaches, Humus Chemistry, Geensis, Composition, Reactions; NewYork; Wiley and Sons.
- Tanaka, T., Nagao, S., and Ogawa, H., 2001. "Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy of Functional Groups of Humic Acids Dissolving in Aqueous Solution." Analytical Sciences 17: 11081-11084.
- Tawabini, B., Kharajian, H., and Fayad N. 1987. "Trihalomethanes (THMs) Formation in a Distillation Process." Desalination 66: 403-414.
- Thompson, J. D., White, M.C., Harrington, G.W., Singer, P.C. 1997. "Enhanced Softening: Factors Influencing DOC Precursor Removal." Journal of American Water Works Association 89(6).

- Thurman, E. M., Malcolm, R.L. 1981. "Preparative Isolation of Aquatic Humic Substances." Environmental Science and Technology 15: 463-466.
- Trusell, R. R., Umphres, M.D. 1978. "The Formation of Trihalomethanes." Journal of American Water Works Association 70(10): 604-612.
- USEPA, 1994. National Primary Drinking Water Regulations: Disinfectants-Disinfection By-Products (D/DBPs) Rule, Federal Register, 59: 38832.
- Ventresque, C., Bablon, G., Legube, B., Jadas-Hecart, A., Dore, M. 1990.
 Development of Chlorine Demand Kinetics in a Drinking Water Treatment Plant, Water Chlorination: Chemistry, Environmental Impact and Health Effects. Chelsea, MI, Lewis Publication, Inc.
- Wai Ting Tang, J., and Tanner, P.A., "Instrument Determination of Organic Carbon in Marine Sediments." Marine Chemistry 80: 161-170.
- William, D.T., LeBel, G.L., Benoit, F.M. 1997. "Disinfection by-products in Canada Drinking Water." Chemosphere 34(2): 299-316.
- Wilson, R.I., Mabury, S.A. 2000. "The Photodegradation of Metalochlor: Isolation, Identification and Quantification of MCA." Journal of Agricultural Food Chemistry 48: 944-950.
- Zhang, G.R., Keine, L., Wable, O., Chan, U.S., Duget, J.P. 1992. "Modeling of Chlorine Residual in the Water Distribution System Network of Macao." Environmental Science and Technology 13: 937-946.

BIOGRAPHY

Mr. Vorapot Kanokkantapong was born on November 29, 1976 in Bangkok, Thailand. He attended Debsirin School in Bangkok and graduated in 1994. He received his Bachelor's Degree and Master's Degree in Environmental Engineering from Faculty of Engineering, Kasetsart University in 1998 and 2001, respectively. After graduation, he spent six months working for the Pollution Control Department and, at the same time, had some experiences in the wastewater treatment plant design and operation. He pursued his Philosophy of Doctoral Degree studies in the International Postgraduate Programs in Environmental Management, Inter-Department of Environmental Management, Chulalongkorn University, Bangkok, Thailand in October 2001. He finished his Philosophy of Doctoral Degree of Science in Environmental Management in April 2005.

