Curriculum Vitae

Institute of Nutrition, Mahidol University (INMU)

999 Phutthamonthon 4 Rd., Salaya, Phutthamonthon

Name Thunnalin Winuprasith

Email address: thunnalin.win@mahidol.ac.th

Current position: Associate Professor, Institute of Nutrition, Mahidol University

Education

2014 Doctoral of Philosophy (Biotechnology) Faculty of Science, Mahidol University, Thailand

2009 Master of Science (Food and Nutrition for Development) Institute of Nutrition, Mahidol University, Thailand

2005 Bachelor of Science (Public Health) Faculty of Public Health, Mahidol University, Thailand

Research interest and expertise

1. Food emulsions and encapsulations for controlling digestibility and release of nutrients and bioactive compounds in gastrointestinal tract
2. Nanocellulose for food applications
3. Food product development for nutritional purposes i.e., foods for the elderly with chewing and swallowing difficulties; medical foods
4. Heat treatment using a water spray retort for sterilizing food products
5. Texture-modified food for elderly and dysphagia patients

Research Experiences:

2025-Present: - Development and production of ready-to-use, texture modified-blenderized diet from rice and Thai agricultural raw materials for commercial use (Year 2) (funded by PMUC)

- Improving chrysin bioavailability using co-encapsulation approach with quercetin in nanoemulsion delivery system and application in food product (funded by Mahidol University under MU's Strategic Research Fund)

- Development of a Texture-Modified Thickening Powder in Compliance with IDDSI Standards (funded by Praya Quality Company Limited)

- Research and development of a meal-replacement product to reduce the risk of sarcopenia in older adults (funded by PMUC – Piii Program with Q&P Quality Trade)

- Development of a texture-modified, non-melting ice cream–like food product stable at room temperature and consumer acceptance testing for elderly and dysphagia patients (funded by NFI and Zen Kitchen Food)

2023-2024: - Smart packaging film with encapsulated anthocyanin extracted from butterfly pea flower in double emulsion towards express freshness monitoring of food (Fundamental Fund 2023)

- All-in-one texture-modified drink with complete nutrition for elderly and dysphagia patients (funded by iNT, Mahidol University, Pre-seed Fund)

- Development of high protein gel with coconut juice for athletes (funded by iNT, Mahidol University, Mahidol Incubation Program, 2023)

- Development and production of ready-to-use, texture modified-blenderized diet from rice and Thai agricultural raw materials for commercial use (funded by PMUC)

2021-2022: - Development of mulberry leaf hydrogel beads using microencapsulation technique for fabricating probiotic bacteria (funded by ARDA)

- Development of Nutritious Food Products from Cricket Powder (funded by Forcento LTD Liab Co.)

- Development of complete, balanced nutrition product using rice, beans, sesame, and herbs (funded by M.J 2015 Intertrade Company Limited)

- Development of beverage product with calcium extracted from tuna bone (funded by G.P.J Biotechnology Co., Ltd. and TED Fund)

2019-2021:

- Modulating fat digestion of single and mixed colloidal delivery systems using nanocellulose (funded by Thailand Research Fund)

- Development of swallowing practice kit for swallowing difficulty (dysphagia) patients (funded by Mahidol University, Pre-seed Fund)

- Development of low glycemic index powdered food with complete nutrition from rice flour and vegetable powder (funded by NIA and Chiangmai Bioveggie Co., Ltd.)

- Development of energy gel product (funded by iTAP and Boon Corporation Co., Ltd.)

- Development of Nutritious Tube Feeding Diet Using Water Spray Retort (funded by Nutribay Company Limited)

- Sensory evaluation of texture-modified pork, boiled rice product for elderly (funded by CP Foodlab Co., Ltd.)

- Development of encapsulation and freeze dry technique promoting nutritional value stability in food products for specific people groups (Under Talent mobility program, Office of Higher Education Commission and Mahidol University, and CP Foodlab Co., Ltd.)

2018-2019:

- Development of reduced-fat emulsion products using nanofibrillated cellulose as a functional ingredient preventing fat digestion (funded by Thailand Research Fund)

- Development Healthy Thai Dessert from Reducing Rapidly Digestible Starch Content in Flour (Under Talent mobility program, Office of Higher Education Commission and Mahidol University, and CP Foodlab Co., Ltd.)

- Development of low glycemic index rice pudding (funded by National Innovation Agency, Thailand)

2016-2018: - Development of vegetable powder pudding product for improving nutritional status in elderly with tooth loss (funded by Thailand Research Fund)

- Encapsulation of vitamin D3 in Pickering emulsion fabricated using microfibrillated cellulose from mangosteen rind (*Garcinia mangostana* L.) and its in vitro digestion study (funded by Thailand Research Fund)

- Development of nutritious boiled rice product for elderly (funded by CPram Co., Ltd.)

2012-2015: - Physicochemical Properties of Biopolymer-stabilized Colloidal Particles: Microfibrillated Cellulose-stabilized Emulsions and β-lactoglobulin-coated Gold Nanoparticles (The Royal Golden Jubilee Ph.D. Program funded by Thailand Research Fund)

Publications

International level (Peer review paper)

1. Rungchang, S., Sringarm, C., Numthuam, S., Tosuk, N., Thongsuk, T., Pinyo, M., Winuprasith, T., Jiamyangyuen, S. (2025). Hydrolysis kinetics amino acid profiling and antioxidant properties of enzymatic hydrolysates from desalted egg white. Scientific Reports, 15(1), 44270. https://doi.org/10.1038/s41598-025-27993-9
2. Kittibunchakul, S., Whanmek, K., Thangsiri, S., Inthachat, W., Prihandari, R., Winuprasith, T., Temviriyanukul, P., Suttisansanee, U., & Kemsawasd, V. (2025). Enzymatic hydrolysis of house cricket (*Acheta domesticus*) protein for the production of bioactive peptides with potential anti-aging and anti-NCD activities. Future Foods, 12, 100851. https://doi.org/10.1016/j.fufo.2025.100851
3. Phasuk, A., Putthabucha, N., Winuprasith, T., Srisawat, N., & Khomein, P. Hemoperfusion adsorbents from porous PMMA microspheres: synthesis approaches and their cytokine removal efficiency. (2025). Journal of Materials Chemistry B, 13(39), pp. 12614–12623. https://doi.org/10.1039/D5TB01570G
4. Rai, S., Whanmek, K., Akanitkul, P., Deeaum, A., **Winuprasith, T.,** Kemsawasd, V., Suttisansanee, U., Santivarangkna, C. & Kittibunchakul, S. (2025). Fabrication of

Alginate/Chitosan Composite Beads for Improved Stability and Delivery of a Bioactive Hydrolysate From Shrimp (*Litopenaeus vannamei*) Head. Food Science and Nutrition, 13, 6, e70443. https://doi.org/10.1002/fsn3.70443

5. Thamsorn, S., Phucharoenrak, P., **Winuprasith, T.**, Trachootham, D. (2024). Grilled plant (Soy, Rice, Corn)-Based patties contain lower amounts of heterocyclic aromatic amines but not polycyclic aromatic hydrocarbons than grilled beef patties. Food Control, 110398. https://doi.org/10.1016/j.foodcont.2024.110398
6. Sriprablom, J., Winuprasith, T., Suphantharika, M., Wongsagonsup, R. (2024). Physical properties and in-vitro gastrointestinal digestion of oil-in-water emulsions stabilized by single- and dual-modified cassava starches with cross-linking and octenylsuccinylation. International Journal of Biological Macromolecules, 262, 1, 129965. https://doi.org/10.1016/j.ijbiomac.2024.129965
7. Koirala, P., Sriprablom, J., **Winuprasith, T.** (2023). Anthocyanin-Rich Butterfly Pea Petal Extract Loaded Double Pickering Emulsion Containing Nanocrystalline Cellulose: Physicochemical Properties, Stability, and Rheology. Foods, 12(22), 4173. https://doi.org/10.3390/foods12224173
8. Kumar, S.R., Tangsrianugul, N., Sriprablom, J., **Winuprasith, T.**, Wansuksri, R., Suphantharika, M. (2023). Effects of single and dual modifications with debranching and heat-moisture treatments on physicochemical, rheological, and digestibility properties of proso millet starch. Carbohydrate Polymer Technologies and Applications, 6, 100399. https://doi.org/10.1016/j.carpta.2023.100399
9. **Winuprasith, T.**; Koirala P.; McClement, D.J.; Khomein, P. (2023). Emulsion Technology in Nuclear Medicine: Targeted Radionuclide Therapies, Radiosensitizers, and Imaging Agents. International Journal of Nanomedicine, 18. https://doi.org/10.2147/IJN.S416737
10. Saechio, S.; Akanitkul, P.; Thiyajai, P.; Jain, S.; Tangsuphoom, N.; Suphantharika, M.; **Winuprasith, T.** (2023). Astaxanthin-Loaded Pickering Emulsions Stabilized by Nanofibrillated Cellulose: Impact on Emulsion Characteristics, Digestion Behavior, and Bioaccessibility. *Polymers*, 15, 901. https://doi.org/10.3390/polym15040901.
11. Wongniyomkaset W, Rungraung N, Muangpracha N, **Winuprasith T**, Trachootham D. Complete nutrition drink with retrograded starch is low glycemic, and the individual glucose response to the low glycemic complete nutrition drink depends on fasting insulin levels and HOMA-IR in a

randomized cross-over control trial. J Nutr Sci. 2022; 11: 1-13. https://doi.org/10.1017/jns.2022.23

12. Fitri, I.A., Mitbumrung, W., Akanitkul, P., Rungraung, N., Kemsawasd, V., Jain, S., & **Winuprasith, T***. (2022). Encapsulation of β-Carotene in oil-in-water emulsions containing nanocellulose: Impact on emulsion properties, in vitro digestion, and bioaccessibility. Polymers, 14, 1414. https://doi.org/10.3390/polym14071414
13. Rungraung, N., Jain, S., Mitbumrung, W., Khomin, P., Suphantharika, M., McClements, D.J., & **Winuprasith, T***. (2022). Controlling the in vitro gastrointestinal digestion of emulsified lipids by encapsulation within nanocellulose-fortified alginate beads. Food Structure, 32, 100266. https://doi.org/10.1016/j.foostr.2022.100266
14. Mitbumrung, W., Rungraung, N., Muangpracha, N., Akanitkul, P., & **Winuprasith, T***. (2022). Approaches for Extracting Nanofibrillated Cellulose from Oat Bran and Its Emulsion Capacity and Stability. *Polymers*, 14, 327. https://doi.org/10.3390/polym14020327
15. Tangsrianugul, N., **Winuprasith, T.**, Suphantharika, M., Wongkongkatep, J*. (2022). Effect of hydrocolloids on physicochemical properties, stability, and digestibility of Pickering emulsions stabilized by nanofibrillated cellulose. *Food & Function*. https://doi.org/10.1039/D1FO02933A
16. Kaewsit, N., **Winuprasith, T.**, & Trachootham, D*. (2021). Detoxification of Heterocyclic Aromatic Amines from Grilled Meat by PEITC-rich Vegetable Sauce: A Randomized Crossover Controlled Trial. *Food & Function*, 12, 10411-10422. https://doi.org/10.1039/D1FO01733K
17. Surangna, J., **Winuprasith, T.**, & Suphantharika, M*. (2020). Encapsulation of lycopene in emulsions and hydrogel beads using dual modified rice starch: Characterization, stability analysis and release behaviour during *in-vitro* digestion. *Food Hydrocolloids*, 104. https://doi.org/10.1016/j.foodhyd.2020.105730
18. Mitbumrung W., Jain S., & **Winuprasith T***. (2020). Properties and stability of Pickering emulsions stabilized by nanofibrillated mangosteen cellulose: Impact of oil type and emulsifier concentration. *Songklanakarin Journal of Science and Technology*, *42*(2), 468-476. https://doi.org/10.14456/sjst-psu.2020.61
19. Rungraung, N., Trachootham, D., Muangpracha, N., Purttiponthanee, S., & **Winuprasith, T***. (2020). Textural properties and sensory acceptability of texture-modified pork balls for the elderly. *Asia-Pacific Journal of Science and Technology*, *25*(01), 1-10.

20. Surangna, J., **Winuprasith, T.**, & Suphantharika, M*. (2020). Digestion behavior and gastrointestinal fate of oil-in-water emulsions stabilized by different modified rice starches. *Food & Function*, *11*, 1087-1097. https://doi.org/10.1039/c9fo01628g

21. Mitbumrung W., Suphantharika, M., McClements, D.J., & **Winuprasith T***. (2019). Encapsulation of Vitamin D3 in Pickering Emulsion Stabilized by Nanofibrillated Mangosteen Cellulose: Effect of Environmental Stresses. *Journal of Food Science*, *84*(11), 3213-3221. https://doi.org/10.1111/1750-3841.14835.

22. Pratiwi, I. A., Kemsawasd, V., & **Winuprasith, T*.** (2019). Storage stability of high fiber snack bar. *Global Health Management Journal*, *3*(3), 124-137. https://doi.org/ 10.35898/ghmj-33456

23. Suttireung, P., **Winuprasith, T.**, Srichamnong, W., Paemuan, W., Phonyiam, T., & Trachootham, D*. (2019). Riceberry rice puddings: rice-based low glycemic dysphagia diets. Asia Pacific *Journal of Clinical Nutrition*, *28*(3), 467-475. https://doi.org/10.6133/apjcn.201906/PP.0003.

24. Treesattayakul, B., **Winuprasith, T.**, Theeranuluk, B., & Trachootham, D*. (2019). Loss of posterior occluding teeth and its association with protein-micronutrients intake and muscle mass among Thai elders: A pilot study. *The Journal of Frailty & Aging*, *8*(2), 100-103. https://doi.org/10.14283/jfa.2019.2

25. Surangna, J., **Winuprasith, T.**, & Suphantharika, M*. (2019). Design and synthesis of modified and resistant starch-based oil-in-water emulsions. *Food Hydrocolloids*, *89*, 153-162. https://doi.org/10.1016/j.foodhyd.2018.10.036

26. **Winuprasith, T.***, Khomein, P., Mitbumrung, W., Suphantharika, M., Nitithamyong, A., & McClements, D.J. (2018). Encapsulation of vitamin D_3 in Pickering emulsions stabilized by nanofibrillated mangosteen cellulose: Impact on in vitro digestion and bioaccessibility. *Food Hydrocolloids*, *83*, 153-164. https://doi.org/10.1016/j.foodhyd.2018.04.047

27. **Winuprasith, T.** & Suphantharika, M*. (2015). Properties and stability of oil-in-water emulsions stabilized by microfibrillated cellulose from mangosteen rind. *Food Hydrocolloids*, *43*, 690-699. https://doi.org/10.1016/j.foodhyd.2014.07.027

28. Li, Y., Driver, M., **Winuprasith, T.**, Zheng, J., McClements, D. J., & He, L*. (2014). In situ SERS detection of emulsifiers at lipid interfaces using label free amphiphilic gold nanoparticles. *Analyst*, *139*, 5075-5078. https://doi.org/10.1039/c4an00869c

29. **Winuprasith, T.**, Suphantharika, M., He, L. & McClements, D. J*. (2014). Alterations in protein corona around nanoparticles by biological surfactants: Impact of bile salts on β-lactoglobulin-coated gold nanoparticles. *Journal of Colloids and Interface Science*, *426*, 333-340. https://doi.org/10.1016/j.jcis.2014.04.018
30. **Winuprasith, T.**, Suphantharika, M., McClements, D. J. & He, L*. (2014). Spectroscopic studies of conformational changes of β-lactoglobulin adsorbed on gold nanoparticle surfaces. *Journal of Colloids and Interface Science*, *416*, 184-189. https://doi.org/10.1016/j.jcis.2013.11.006
31. **Winuprasith, T.** & Suphantharika, M*. (2013). Microfibrillated cellulose from mangosteen (*Garcinia mangostana* L.) rind: Preparation, characterization, and evaluation as an emulsion stabilizer. *Food Hydrocolloids*, *32*, 383-394. https://doi.org/10.1016/j.foodhyd.2013.01.023

National level (Peer review paper)

1.พิมพ์นภาณัท ศรีดอนไผ่, การะเกด ทองดอนโพธิ์, อารีย์ ประจันสุวรรณ, ศศิอำไพ พฤฒิพรธานี, **ธัญญ์นลิน วิญญูประสิทธิ์**, น้ำผึ้ง รุ่งเรือง, นิรมล ม่วงประชา, วันทนีย์ เกรียงสินยศ*. (2564). ค่าดัชนีน้ำตาลและผลของการรับประทานผลิตภัณฑ์อาหารปั่นผสมชนิดพร้อมใช้ต่อระดับน้ำตาลและอินซูลินในเลือดของ ผู้เป็นเบาหวานชนิดที่ 2. วารสารโภชนาการ, ปีที่ 59 ฉบับที่ 1. 47-59.

2. Amornsil, P., **Winuprasith, T.**, & Trachootham, D*. (2020). Effect of Nutri-Jelly Matrix on Cytotoxicity of Phenethyl Isothiocyanate in Oral Cancer Cells. *Thai Journal of Toxicology*, 35(1), 50-62.

3. Choublab, P., & **Winuprasith, T**. (2019) Application of Nanofibrillated Cellulose Extracted from Mangosteen Rind as a Single Emulsifier in mayonnaise. *Srinakharinwirot University (Journal of Science and Technology)*, 11(22), 119-130.

4. Chimkerd, C., Rungraung, N., Thiyajai, P., Purttiponthanee, S., Sahasakul, Y., Trachootham, D., **Winuprasith, T*.** (2019). Formulation of vegetable pudding for elderly and their storage effect on total phenolics and antioxidant activities. *Srinakharinwirot University (Journal of Science and Technology)*, 11(21), 64-76.

5. Kaewsritho, P., On-Nom, N., Suttisansanee, U., **Winuprasith, T.**, Chamchan, R., Sriden, N., Aursalung, A., & Sahasakul, Y*. Development of Healthy Tom Yum Flavored Rice Seasoning (Furikake) from Vegetable Powder. (2018). *Agricultural Science Journal*, *49*, 165-168.

6. **ธัญญ์นลิน วิญญูประสิทธิ์***, ยุราพร สหัสกุล, น้ำผึ้ง รุ่งเรือง. (2560). นาโนเซลลูโลส: การประยุกต์ใช้ในอาหารและความปลอดภัยอาหาร. *วารสารพิษวิทยาไทย*, *32*, 67-79.

7. สายพิน แสงสุข, **ธัญญ์นลิน วิญญูประสิทธิ์**, พรพรรณ ดีระพัฒน์, ฉัตรภา หัตถโกศล, พร้อมลักษณ์ สมบูรณ์ปัญญากุล. (2559). ผลของสายพันธุ์งาขาวที่มีต่อสมบัติทางเคมี-กายภาพของผลิตภัณฑ์เต้าหู้จากผลิตผลพลอยได้จากการสกัดน้ำมันถั่วดาวอินคา. *วารสารวิทยาศาสตร์เกษตร*, *47*, 385-388.

Commercialized innovations

1. **Texture-Modified Complete Nutrition Drink** (Powder Form) – launched with O & P Quality Trade under the "**Nutriflow®**" brand.
2. **Texture-Modified Pork Boiled Rice for the Elderly** – created in partnership with CPram.
3. **Shelf-Stable Nutri-Thai Pudding** – developed in collaboration with Premier Group.
4. **High-Performance Energy Gel from Coconut Water** – formulated for athletes under the "**POWCO®**" brand.
5. **Nutri-Pudding in Retort Pouch** – positioned as a healthy snack under the "**Taste'n Time®**" brand.

Professional and Management Experience

- **Assistant to the President for Research** (2025) Mahidol University
- **Deputy Director** (Jan-April 2025) and **Deputy Director for Innovation and Entrepreneurship Ecosystem** (2023–2024), Institute for Technology and Innovation Management (iNT), Mahidol University

  - Initiated internal pre-seed grants, university incubation programs, and IP-commercialization pathways.

  - Strengthened collaboration across faculties and external partners for technology transfer.

- **Deputy Director for Research & Innovation**, Institute of Nutrition, Mahidol University (2021–2023)

  - Oversaw strategic research planning, research fund acquisition, and cross-functional R&D coordination.

  - Led the establishment of flagship research programs on medical food, nanotechnology, GMP-certified pilot plant, and food innovation.

- **Assistant Director for Research & Innovation**, Institute of Nutrition, Mahidol University (2019–2021)

  - Oversaw strategic research planning, research fund acquisition, joint research program, industrial collaborative research service

- **Assistant Director for Research & International Relations**, Institute of Nutrition, Mahidol University (2017–2019)

  - Coordinated international partnerships, joint grants, and capacity-building programs.

- **Visiting Professor**, Department of Food Science, University of Massachusetts, Amherst, United States (2017)

- **Postdoctoral Researcher**, Department of Food Science, Tokyo University of Marine Science and Technology (KAIYODAI), Tokyo, Japan (2014)

- **Visiting Scholar**, Department of Food Science, University of Massachusetts, Amherst, United States (2012)

Consultation and others

Present	CTO and Co-Founder, FOODIYPHAGE Co., Ltd., Thailand
	Program Administrative Committee Member, Master of Science Program in Food Science for Nutrition (International Program), Institute of Nutrition, Mahidol University, Thailand

Program Administrative Committee Member, Master of Science Program in Advanced Biomedical Technology and Venture Creation in Healthcare, Faculty of Graduate Studies, Mahidol University, Thailand

Consultant, Medical Innovations Development (MIND) Center, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand

2017-2021 Consultant, CP Foodlab Co., Ltd., Thailand

Part-Time Lecturer, Food Business Program (FBM), College of Management, Mahidol University, Thailand

Article in magazine

1. Winuprasith, T. & Kittipongpittaya K. (2016). Coconut oil: 21st Century oil. Food Focus Thailand.

2.Winuprasith, T. (2016). Upcoming food trends: Functional foods and Excipient foods. Food Focus Thailand.

Awards

1. **"Gold Medal" in recognition of creative efforts** to invent "Texture-modified complete and balanced nutrition drink powder – Nutriflow®" exhibited at the Bangkok International Property, Invention, Innovation and Technology Exposition (IPITEx) on the occasion of Thailand Inventors' Day 2026
2. Ajinomoto-FoSTAT Award for Outstanding Food Science & Technology Researcher (Young Food Scientist Award) 2024
3. Mahidol University Young Alumni Awards 2024
4. Outstanding in Academic 2023 (for academic faculty who enroll in the University not exceeding 10 years) from Institute of Nutrition, Mahidol University
5. Outstanding Teaching Performance 2020 from Collage of Management, Mahidol University

Training

2025 - Certified Innovation Manager: CIM-CW5

- Leader in Innovation Fellowship (LIF) Global program, 2025 funded by Royal Academy of Engineering, UK

2023 - FOREFOOD Cohort #1: Tech to Market Acceleration by Food Innopolis (23-26 February 2023)

- INFOGEST static *in vitro* simulation of gastrointestinal food digestion at Food Biopolymers and Colloids Research Laboratory, Department of Food Science, University of Massachusetts, Amherst, *USA* (7-17 March 2023)

- Safety evaluation of food contact materials by TRAC, Thailand (30 March 2023)

- Mahidol Incubation Program 2023 by Institute for Technology and Innovation Management (iNT), Mahidol University

- ASEAN BCG Researcher by PMUB and NSTDA, Thailand

2022 - UHT and aseptic filling machine training

- Workshop on FFC Japan Case Study Review of Health Claims by Food Innovation & Regulation Network (FIRN) and Food Science and Technology Association of Thailand (FoSTAT) (16 June 2022)

2021 Executive Development Program (EDP20) by Mahidol University (October – December, 2021)

2020 Particle size measurement (Anton Paar), pH-stat technique (Metrohm), preparation of microbeads using an encapsulator (Buchi)

2019 Multi Mentoring System 2 (MMS2) by Thailand Research Fund (TRF) and Office of Higher Education Commission (OHEC) joined with Mahidol University (April 29, 2019 – May 1, 2019)

2017 *In vitro* fat digestibility measurement in food emulsions and microencapsulation technique, Food Biopolymers and Colloids Research Laboratory, Department of Food Science, University of Massachusetts, Amherst, USA. (August 2017 – January 2018)

2016 Technique for sensory evaluation and consumer testing, FoSTAT, *Thailand*

2016 ACS training course communicating science to the public and publishing research, *Thailand*

2015 Transformative education and active learning, Mahidol University, *Thailand*

2014 Magnetic Resonance Imaging (MRI) for quality determination of marine products after freezing, Department of Food Science and Technology, Faculty of Marine Science, Tokyo University of Marine Science and Technology, *Japan*

2014 Physicochemical study of polysaccharide gel using Nuclear Magnetic Resonance (NMR) technique, Department of Food Science and Technology, Faculty of Marine Science, Tokyo University of Marine Science and Technology, *Japan*

2013 Spectroscopic studies, including surface-enhanced Raman scattering (SERS) technique of conformational changes of protein-coated gold nanoparticle, Food Biopolymers and Colloids Research Laboratory, Department of Food Science, University of Massachusetts, Amherst, *USA*.