

# Lili He

*Professor*

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## Education

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May 2007 - Dec 2009	Ph.D. - Food Science	University of Missouri-Columbia	US
Sept 2004 - June 2006	Master in Agronomy - Plant Pathology	Zhejiang University	China
Sept 2000 - June 2004	Bachelor in Agronomy - Plant Protection	Zhejiang University	China

## Positions and employment

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Sep 2022 –	Professor and Graduate Program Director, Department of Food Science, University of Massachusetts, Amherst, MA, USA.
Jan 2018 – Aug 2022	Associate Professor, Department of Food Science, University of Massachusetts, Amherst, MA, USA.
Jan 2021 – present	Adjunct Faculty, Department of Chemistry, University of Massachusetts, Amherst, MA, USA.
Oct 2019- present	Director, Raman, IR, and XRF Core Facility, University of Massachusetts, Amherst, MA, USA.
Nov 2021 - present	Faculty member, Molecular and Cellular Biology Program, University of Massachusetts, Amherst, MA, USA.
Jan 2016-present	Faculty member, Institute of Applied Life Science, University of Massachusetts, Amherst, MA, USA.
Jan 2020 -June 2020	Visiting Associate Professor. Department of Food Science and Technology, National University of Singapore, Singapore.
Sept 2012- Dec 2017	Assistant Professor, Department of Food Science, University of Massachusetts, Amherst, MA, USA.
Nov 2009-Aug 2012	Postdoc/research associate, Department of Food Science and Nutrition, University of Minnesota, Saint Paul, MN, USA.

## Research activity summary

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Total Refereed Journal Articles:	135
Total Citations:	~8000
h-index:	43
i10-index:	124
Total Funds Awarded as a PI:	~\$2.6 M
Total Funds Awarded as a Co-PI:	~\$1.9 M
Total Grant Funds Awarded:	~\$4.5 M
Invited Talks:	45
Students/Scholars Mentored As Major Advisor	94

## Honors/awards

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- 2022 UMass Family Research Scholar Award
- 2021 UMass Distinguished Graduate Mentor Award
- 2019 Top 5% highly cited author in Royal Society of Chemistry's analytical portfolio of journals
- 2018-2019 Top downloaded paper in Journal of Raman Spectroscopy
- Most-cited paper of 2016 Journal of Food Science (Toxicology and chemical food safety section)
- Most-cited paper of 2014 Journal of Food Science (Toxicology and chemical food safety section)
- 2017 UMass Faculty Convocation Award
- 2016 Talented 12 by C&EN, the official magazine of American Chemical Society
- 2016 Samuel Cate Prescott Award by Institute of Food Technologists
- 2016 Young Investigator Award by Eastern Analytical Symposium
- 2015 Young Scientist Award by American Chemical Society-Agricultural and Food Chemistry Division
- 2015 UMass Faculty Exceptional Merit Award
- 2012 Young Scientist Award by International Union of Food Science and Technology
- Top ten articles in Analyst July 2011
- Most-cited paper of 2008 Journal of Food Science (Toxicology and chemical food safety section)

## Other experience and services

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1. Editor. *Analytical Science Advances* (2020-present)
2. Editorial board member. *Food Research International*, *Journal of Food Science*, *Future Foods*, *Foods – Food analytical methods section*
3. Guest editor. *Journal of Chemistry* (2015-2016), *Frontiers in Chemistry* (2020-2021)
4. Vice Chair, Food Chemical Hazards and Food Allergy Professional Development Group (PDG), International Association for Food Protection (IAFP) (2022-2023)
5. Award Committee Chair, Phi Tau Sigma – Food Science Honor Society (2021-2022)
6. Director, Phi Tau Sigma – Food Science Honor Society (2018-2021)
7. President, Phi Tau Sigma UMass Chapter (2013-2018)
8. Faculty advisor, ACS-AGFD UMass chapter (2014-present)
9. Jury Chair or Jury for IFT Samuel Cate Prescott Award (2017-2021)
10. Member, IFT Emerging Leaders Network program (2016)
11. Member, IFT Higher Education Review Board (HERB) Readiness Task Force (2016)
12. Member, International Academy of Food Science and Technology Early Career Scientists Section (2016-2019)
13. Member, Institute of Food Technologists (IFT), American chemical society (ACS), International Association for Food Protection (IAFP)
14. Proposal review panel member
  - USDA-NIFA SBIR Phase I Panel (2022)
  - USDA-NIFA SBIR Phase I Panel (2021)
  - USDA ARS Food Safety National Program Review Panel (2021)
  - NIH Emergency Awards Panel (2021)
  - National Institute of Environmental Health Sciences (NIEHS) SBIR Phase IIB panel (2021)
  - NSF Chemical Measurement and Imaging (CMI) Panel (2016)
  - NSF SBIR/STTR Phase I Panel (2013)

## Selected Major Grants as PI

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1. USDA-NIFA, 01/01/21-12/31/23, Role: PI, \$469,900  
Title: Investigate the impact of adjuvants on pesticide persistence and develop an effective strategy to reduce pesticide residues on fresh Produce
2. Syngenta Inc. 6/1/2022-12/15/2022, Role: PI, \$50,000 (core facility contract)  
Title: Feasibility study of using SERS to screen the efficacy of adjuvant to enhance pesticide foliar uptake
3. USDA-NIFA, 11/01/15-10/31/19, Role: PI, \$473,628  
Title: In situ and real time monitoring and characterization of pesticide residues on and in fresh produce using SERS
4. USDA-NIFA, 02/01/15-01/31/18, Role: PI, \$444,200  
Title: Development of a label-free SERS mapping-based platform for multi-bacterial detection in food
5. USDA-NIFA, 2/01/15-01/31/18, Role: PI, \$499,500  
Title: Investigate the interactions between silver nanoparticles and leafy vegetables using surface enhanced Raman spectroscopic mapping
6. BASF Inc., 12/01/17-03/31/19, Role: PI, \$150,000 (contract)  
1) Investigation of release kinetics of microencapsulated pesticides by surface enhanced Raman spectroscopy  
2) Investigation of pesticide penetration into leaves
7. PepsiCo Inc., 01/01/18-9/31/18, Role: PI, \$65,315 (contract)  
Characterization, detection and quantification of stevia complex using surface-enhanced Raman spectroscopy

## Recent Selected Publications (total 135, 100 as corresponding author)

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1. Wang, D., Du, X., & He, L. (2022). Investigation of the Impact of a Pesticide Adjuvant on Dimethoate Persistence, Penetration, and Stability on Apples Using Surface-Enhanced Raman Spectroscopy. *ACS Agricultural Science & Technology*. <https://doi.org/10.1021/acsagscitech.2c00092>
2. Gukowsky, J. C., & He, L. (2022). Development of a portable SERS method for testing the antibiotic sensitivity of foodborne bacteria. *Journal of Microbiological Methods*, 106496.
3. Guo, X., Lin, H., Xu, S., & He, L. (2022). Recent Advances in Spectroscopic Techniques for the Analysis of Microplastics in Food. *Journal of Agricultural and Food Chemistry*, 70(5), 1410-1422.
4. Wang, D., Yang, J., Pandya, J., Clark, J. M., Harrington, L. C., Murdock, C. C., & He, L. (2022). Quantitative age grading of mosquitoes using surface-enhanced Raman spectroscopy. *Analytical Science Advances*, 3(1-2), 47-53.
5. Gukowsky, J. C., Yang, T., & He, L. (2022). Assessment of three SERS approaches for studying E. Coli O157: H7 susceptibility to ampicillin. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 264, 120239.
6. Shen, Y., Borgatta, J., Ma, C., Singh, G., Tamez, C., Schultes, N.P., Zhang, Z., Dhankher, O.P., Elmer, W.H., He, L. and Hamers, R.J., (2022). Role of Foliar Biointerface Properties and Nanomaterial Chemistry in Controlling Cu Transfer into Wild-Type and Mutant Arabidopsis thaliana Leaf Tissue. *Journal of Agricultural and Food Chemistry*, 70(14), 4267-4278.

7. Zhou, H.; Zheng, B.; Zhang, Z.; Zhang, R.; He, L.; McClements, D. J., Fortification of Plant-Based Milk with Calcium May Reduce Vitamin D Bioaccessibility: An In Vitro Digestion Study. *Journal of agricultural and food chemistry* **2021**, *69*, 4223.
8. Zhang, Z.; Lin, H.; Ma, C.; Zhang, L.; Zelevinsky, J.; Xia, M.; Xu, Y.; White, J. C.; Tyson, J.; He, L., Integrating the Gutzeit method with X-Ray fluorescence spectroscopy for rapid quantification of inorganic arsenic in selected beverages. *Food Control* **2021**, *121*, 107588.
9. Zhang, Z., Shang, H., Xing, B., & He, L. (2021). In-situ and Real Time Investigation of Foliarly Applied Silver Nanoparticles on and in Spinach Leaves by Surface Enhanced Raman Spectroscopic Mapping. *Analytical Methods*, <https://doi.org/10.1039/D1AY00346A>.
10. Wang, P.; Sun, Y.; Li, X.; Wang, L.; Xu, Y.; He, L.; Li, G., Recent Advances in Dual Recognition Based Surface Enhanced Raman Scattering for Pathogenic Bacteria Detection: A Review. *Analytica Chimica Acta* **2021**, 338279.
11. Rojas, L. M.; Qu, Y.; He, L., A facile solvent extraction method facilitating surface-enhanced Raman spectroscopic detection of ochratoxin A in wine and wheat. *Talanta* **2021**, *224*, 121792.
12. Pandya, J. K.; Dai, H.; He, L., An innovative filtration based Raman mapping technique for the size characterization of anatase titanium dioxide nanoparticles. *Talanta* **2021**, *224*, 121836.
13. Lin, Z.; Gao, S.; Yang, J. S.; Qu, Y.; Zhang, Z.; He, L., A filtration-assisted approach to enhance optical detection of analytes and its application in food matrices. *Food chemistry* **2021**, *338*, 127814.
14. Li, Y.; Zhao, C.; Lu, C.; Zhou, S.; Tian, G.; He, L.; Bao, Y.; Fauconnier, M.-L.; Xiao, H.; Zheng, J., Simultaneous determination of 14 bioactive citrus flavonoids using thin-layer chromatography combined with surface enhanced Raman spectroscopy. *Food chemistry* **2021**, *338*, 128115.
15. Hickey, M. E.; He, L., SERS imaging analyses of bacteria cells among plant tissues. *Talanta* **2021**, *225*, 122008.
16. Guo, H.; Han, F.; Shang, H.; Xiong, S.; Huynh, M.; Thistle, L.; Meng, L.; He, L.; Xing, B., New insight into naturally formed nanosilver particles: role of plant root exudates. *Environmental Science: Nano* **2021**. <https://doi.org/10.1039/DOEN01188F>
17. Du, X.; Chen, H.; Zhang, Z.; Qu, Y.; He, L., Headspace analysis of shelf life of postharvest arugula leaves using a SERS-active fiber. *Postharvest Biology and Technology* **2021**, *175*, 111410.
18. Zhao, B.; Yang, T.; Qu, Y.; Mills, A. J.; Zhang, G.; He, L., Rapid capture and SERS detection of triclosan using a silver nanoparticle core–protein satellite substrate. *Science of The Total Environment* **2020**, *716*, 137097.
19. Zhang, Z.; Xia, M.; Ma, C.; Guo, H.; Wu, W.; White, J. C.; Xing, B.; He, L., Rapid organic solvent extraction coupled with surface enhanced Raman spectroscopic mapping for ultrasensitive quantification of foliarly applied silver nanoparticles in plant leaves. *Environmental Science: Nano* **2020**, *7*, (4), 1061-1067.
20. Zhang, Y.; Gao, W.; Cui, C.; Zhang, Z.; He, L.; Zheng, J.; Hou, R., Development of a method to evaluate the tenderness of fresh tea leaves based on rapid, in-situ Raman spectroscopy scanning for carotenoids. *Food chemistry* **2020**, *308*, 125648.
21. Zhang, Q.; Guo, W.; He, L.; He, L.; Chen, Y.; Shen, X.; Wu, D., A new SERS substrate of self-assembled monolayer film of gold nanoparticles on silicon wafer for the rapid detection of polycyclic aromatic hydrocarbons. *Materials Chemistry and Physics* **2020**, *250*, 122994.
22. Wang, P.; Wang, X.; Sun, Y.; Gong, G.; Fan, M.; He, L., Rapid identification and quantification of the antibiotic susceptibility of lactic acid bacteria using surface enhanced Raman spectroscopy. *Analytical Methods* **2020**, *12*, (3), 376-382.
23. Vu, T. P.; He, L.; McClements, D. J.; Decker, E. A., Effects of water activity, sugars, and proteins on lipid oxidative stability of low moisture model crackers. *Food Research International* **2020**, *130*, 108844.
24. Tu, Q.; Lin, Z.; Liu, J.; Dai, H.; Yang, T.; Wang, J.; Decker, E.; McClements, D. J.; He, L., Multi-phase detection of antioxidants using surface-enhanced Raman spectroscopy with a gold nanoparticle-coated fiber. *Talanta* **2020**, *206*, 120197.

25. Qu, Y.; Wang, M.; Huang, S.; Decker, E. A.; McClements, D. J.; He, L., Headspace Characterization and Quantification of Aromatic Organosulfur Compounds in Garlic Extracts Using Surface-Enhanced Raman Scattering with a Mirror-in-a-Cap Substrate. *Journal of AOAC International* **2020**, *103*, (5), 1201-1207.
26. Qu, Y.; Tian, Y.; Chen, Y.; He, L., Chemical profiling of red wines using surface-enhanced Raman spectroscopy (SERS). *Analytical Methods* **2020**, *12*, (10), 1324-1332.
27. Qu, Y.; He, L., Development of a facile rolling method to amplify an analyte's weak SERS activity and its application for chlordane detection. *Analytical Methods* **2020**, *12*, (4), 433-439.
28. Ozel, B.; Zhang, Z.; He, L.; McClements, D. J., Digestion of animal-and plant-based proteins encapsulated in  $\kappa$ -carrageenan/protein beads under simulated gastrointestinal conditions. *Food Research International* **2020**, *137*, 109662.
29. Martinez, L.; He, L., Detection of Mycotoxins in Food Using Surface-Enhanced Raman Spectroscopy: A Review. *ACS Applied Bio Materials* **2020**.
30. Hickey, M. E.; He, L., Understanding and Advancing the 3-mercaptophenylboronic Acid Chemical Label for Optimal Surface-enhanced Raman Spectroscopic Analysis of Bacteria Populations. *ACS Applied Bio Materials* **2020**, *3*, (12), 8768-8775.
31. Hickey, M. E.; Gao, S.; He, L., Comparison of label-free and label-based approaches for surface-enhanced Raman microscopic imaging of bacteria cells. *Analytical Science Advances* **2020**.
32. Gao, W.; Guo, J.; Xie, L.; Peng, C.; He, L.; Wan, X.; Hou, R., Washing fresh tea leaves before picking decreases pesticide residues in tea. *Journal of the Science of Food and Agriculture* **2020**, *100*, (13), 4921-4929.
33. Dai, H.; Gao, Q.; He, L., Rapid Determination of Saffron Grade and Adulteration by Thin-Layer Chromatography Coupled with Raman Spectroscopy. *Food Analytical Methods* **2020**, *13*, (11), 2128-2137.
34. Zhou, H.; Pandya, J. K.; Tan, Y.; Liu, J.; Peng, S.; Muriel Mundo, J. L.; He, L.; Xiao, H.; McClements, D. J., Role of mucin in behavior of food-grade TiO<sub>2</sub> nanoparticles under simulated oral conditions. *Journal of agricultural and food chemistry* **2019**, *67*, (20), 5882-5890.
35. Zhang, Z.; Guo, H.; Ma, C.; Xia, M.; White, J. C.; Xing, B.; He, L., Rapid and efficient removal of silver nanoparticles from plant surfaces using sodium hypochlorite and ammonium hydroxide solution. *Food Control* **2019**, *98*, 68-73.
36. Yang, T.; Zhao, B.; He, L., Raman instruments for food quality evaluation. In *Evaluation Technologies for Food Quality*, Elsevier: 2019; pp 119-143.
37. Yang, T.; Qu, Y.; Hickey, M.; Wang, W.; Zhao, B.; Bi, S.; Zhang, G.; He, L., Mapping of pesticide transmission on biological tissues by surface enhanced Raman microscopy with a gold nanoparticle mirror. *ACS applied materials & interfaces* **2019**, *11*, (47), 44894-44904.
38. Yang, T.; Doherty, J.; Guo, H.; Zhao, B.; Clark, J. M.; Xing, B.; Hou, R.; He, L., Real-time monitoring of pesticide translocation in tomato plants by surface-enhanced Raman spectroscopy. *Analytical chemistry* **2019**, *91*, (3), 2093-2099.
39. Wang, C.; Zhang, Z.; He, L., Development of a headspace solid-phase microextraction-surface-enhanced Raman scattering approach to detect volatile pesticides. *Journal of Raman Spectroscopy* **2019**, *50*, (1), 6-14.
40. Tu, Q.; Yang, T.; Qu, Y.; Gao, S.; Zhang, Z.; Zhang, Q.; Wang, Y.; Wang, J.; He, L., In situ colorimetric detection of glyphosate on plant tissues using cysteamine-modified gold nanoparticles. *The Analyst* **2019**, *144*, (6), 2017-2025.
41. Tu, Q.; Hickey, M. E.; Yang, T.; Gao, S.; Zhang, Q.; Qu, Y.; Du, X.; Wang, J.; He, L., A simple and rapid method for detecting the pesticide fipronil on egg shells and in liquid eggs by Raman microscopy. *Food Control* **2019**, *96*, 16-21.
42. Lin, Z.; He, L., Recent advance in SERS techniques for food safety and quality analysis: a brief review. *Current Opinion in Food Science* **2019**, *28*, 82-87.