

YUAN YAO, Ph.D.
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Whistler Center for Carbohydrate Research
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Professional Experience

Associate Professor of Food Science, Dept. Food Science, Purdue University	2011-
Assistant Professor of Food Science, Dept. Food Science, Purdue University	2005-2011
Project Coordinator (Scientist), Roquette America, Inc.	2003-2005
Post Doctoral Associate, Dept. Food Science, Pennsylvania State University	2000-2003

Academic Record

<u>Degree Received</u>	<u>Institution</u>	<u>Date</u>
B.S., Polymer Science	Dalian University of Technology, China	1989
M.S., Chemical Engineering	Dalian University of Technology, China	1992
Ph.D., Food Science	Jiangnan University, China	2000

Memberships in Academic, Professional and Scholarly Societies

- American Association of Cereal Chemists International (AACCI)
- Institute of Food Technologists (IFT)
- American Chemical Society (ACS)
- Sigma Xi (Honor Society of Scientific Research)

Book Chapters

1. Singh AK, Sarkar P, Janaswamy S, **Yao Y**, Bhunia AK. Chapter “Encapsulation and Delivery of Antimicrobial Compounds” of “Novel Food Preservation and Microbial Assessment Techniques” by CRC Press, 2014
2. **Yao Y**. Chapter “Biosynthesis of Starch” of “Comprehensive Glycoscience” by Elsevier, 2007
3. Daniel J, **Yao Y**, Weaver C. Chapter “Carbohydrates: Functional Properties” of “Food Chemistry: Principles and Application, Second Edition” by Science Technology System, 2007

Refereed Papers (Corresponding author indicated with *)

1. Randol J Rodriguez-Rosales, **Yuan Yao***. 2020. Phytoglycogen, a natural dendrimer-like glucan, improves the soluble amount and Caco-2 monolayer permeation of curcumin and enhances its efficacy to reduce HeLa cell viability. *Food Hydrocolloids*, 100:105442

2. Xie Y, **Yao Y***. 2019. Incorporation with dendrimer-like biopolymer leads to improved soluble amount and in vitro anticancer efficacy of paclitaxel. *Journal of Pharmaceutical Sciences*, 108: 1984-1990
3. Xie Y, **Yao Y***. 2018. Octenylsuccinate hydroxypropyl phytoglycogen enhances the solubility and in-vitro antitumor efficacy of niclosamide. *International Journal of Pharmaceutics*, 535: 157-163
4. Xie Y, **Yao Y***. 2018. Octenylsuccinate hydroxypropyl phytoglycogen, a dendrimer-like biopolymer, solubilizes poorly water-soluble active pharmaceutical ingredients, *Carbohydrate Polymers*, 180: 29-37
5. Peng X, **Yao Y***. 2018. Small-granule starches from sweet corn and cow cockle: Physical properties and amylopectin branching pattern. *Food Hydrocolloids*, 74: 349-357
6. Fu Y, Deering A, Bhunia AK, **Yao Y***. 2017. Biofilm of *Escherichia coli* O157:H7 on cantaloupe surface is resistant to lauroyl arginate ethyl and sodium hypochlorite, *International Journal of Food Microbiology*, 260: 11-16
7. Chen H, **Yao Y***. 2017. Phytoglycogen increases water solubility of lutein and its permeation through Caco-2 monolayer, *Food Research International*, 97: 258-264
8. Fu Y, Deering A, Bhunia AK, **Yao Y***. 2017. Pathogen biofilm formation on cantaloupe surface and its impact on the antibacterial effect of lauroyl arginate ethyl. *Food Microbiology*, 64: 139-144
9. Chen H, **Yao Y***. 2017. Phytoglycogen improves the water solubility and Caco-2 monolayer permeation of quercetin, *Food Chemistry*, 221: 248-257
10. Sarkar P, Bhunia AK, **Yao Y***. 2017. Impact of starch-based emulsions on the antibacterial efficacies of nisin and thymol in cantaloupe juice. *Food Chemistry*, 217:155-162
11. Lu F, Mosley YY, Rodriguez RJ, Carmichael B, Elesá S, **Yao Y**, HogenEsch H*. 2016. Alpha-D-glucan nanoparticulate adjuvant induces a transient inflammatory response at the injection site and targets antigen to migratory dendritic cells, *npj Vaccines*, 2: 4
12. Peng X, **Yao Y***. 2016. Carbohydrates as Fat Replacers, *Annual Review of Food Science and Technology*, 8: 331-351
13. Sadeghi R, Rodriguez RJ, **Yao Y**, Kokini J*. 2016. Advances in nanotechnology as they pertain to food and agriculture: benefits and risks. *Annual Review of Food Science and Technology*, volume 8, 8: 467-492
14. Sarkar P, Bhunia AK, **Yao Y***. 2016. Emulsion Stabilized with Starch Octenyl Succinate Prolongs Nisin Activity against *Listeria Monocytogenes* in a Cantaloupe Juice Model. *Journal of Food Science*, 81: M2982-M2987
15. Fu Y, Sarkar P, Bhunia AK, **Yao Y***. 2016. Delivery Systems of Antimicrobial Compounds to Food. *Trends in Food Science & Technology*, 57:165-177
16. Sarkar P, Bhunia AK, **Yao Y***. 2016. Nisin adsorption in colloidal systems formed with phytoglycogen octenyl succinate. *Food Biophysics*, 11: 311-318
17. Bi L, Yang L, Bhunia A, **Y Yao***. 2016. Emulsion stabilized with phytoglycogen octenyl succinate prolongs the antimicrobial efficacy of ϵ -poly-L-lysine against *Escherichia coli* O157:H7. *LWT – Food Science & Technology*, 70:245-251
18. Chen H, Narsimhan G, **Yao Y***. 2015. Particulate structure of phytoglycogen studied using β -amylolysis. *Carbohydrate Polymers*, 132: 582-588
19. Lu F, Mencia A, Bi L, Taylor A, **Yao Y**, HogenEsch H*. 2015. Dendrimer-like alpha-D-glucan

- nanoparticles activate dendritic cells and are effective vaccine adjuvants. *Journal of Controlled Release*, 204: 51–59
20. Bordenave N, Janaswamy S, **Yao Y***. 2013. Influence of glucan structure on the swelling and leaching properties of starch microparticles. *Carbohydrate Polymers*, 103: 234-243
 21. Jiang Y*, **Yao Y**, Wang Y. 2012. Physiological response, cell wall components, and gene expression of switchgrass under short-term drought stress and recovery. *Crop Science*, 52: 2718-2727
 22. Li Z, Tang X, Huang W*, Liu JF, Tilley M, **Yao Y**. 2011. Rheology, microstructure, and baking characteristics of frozen dough containing *Rhizopus chinensis* lipase and Transglutaminase. *Cereal Chemistry*, 88: 596-601
 23. Bi L, Yang L, Bhunia A, **Yao Y.*** 2011. Carbohydrate nanoparticle-mediated colloidal assembly for prolonged efficacy of bacteriocin against food pathogen. *Biotechnology and Bioengineering*, 108: 1529-1536
 24. Bi L, Yang L, Narsimhan G, Bhunia A, **Yao Y.*** 2011. Designing carbohydrate nanoparticles for prolonged efficacy of antimicrobial peptide. *Journal of Controlled Release*, 150: 150-156
 25. Huang L, **Yao Y.*** 2011. Particulate structure of phytoglycogen nanoparticles probed using amyloglucosidase. *Carbohydrate Polymers*, 83, 1665-1671
 26. **Yao Y***, Janaswamy, S. 2011. Gene dosage effect on starch structure studied using maize polygenic model containing *ae* and *su1* mutant alleles. *Food Chemistry*, 125, 1153-1159
 27. Song W, Janaswamy S, **Yao, Y.*** 2010. Structure and *in vitro* digestibility of normal corn starch: effect of acid treatment, autoclave, and β -amylolysis. *Journal of Agricultural and Food Chemistry*, 58: 9753-9758
 28. Scheffler SL, Huang L, Bi L, **Yao Y***. 2010. In vitro digestibility and emulsification properties of phytoglycogen octenyl succinate. *Journal of Agricultural and Food Chemistry*, 58: 5140-5146
 29. Scheffler SL, Wang X, Huang L, San-Martin Gonzalez F, **Yao Y*** 2010. Phytoglycogen octenyl succinate, an amphiphilic carbohydrate nanoparticle, and ϵ -polylysine to improve lipid oxidative stability of emulsions. *Journal of Agricultural and Food Chemistry*, 58: 660–667
 30. Hickman BE, Janaswamy S, **Yao, Y.*** 2009. Autoclave and beta-amylolysis lead to reduced *in vitro* digestibility of starch. *Journal of Agricultural and Food Chemistry*, 57: 7005–7012
 31. Hickman BE, Janaswamy, S., **Yao, Y.*** 2009. Properties of starch subjected to partial gelatinization and β -Amylolysis. *Journal of Agricultural and Food Chemistry*, 57: 666-674
 32. Simsek S*, Tulbek, M.C., **Yao, Y.**, Schatz, B. 2009. Starch characteristics of dry peas (*Pisum sativum* L.) grown in the USA. *Food Chemistry*, 115: 832-838
 33. Shin J, Simsek, S., Reuhs, B.L., **Yao, Y.*** 2008. Glucose release of water-soluble starch-related alpha-glucans by pancreatin and amyloglucosidase is affected by the abundance of alpha-1,6-glucosidic linkages. *Journal of Agricultural and Food Chemistry*, 56: 10879-10886
 34. Bao N, Jagadeesan B, Bhunia AK, **Yao Y**, Lu C*. 2008. Quantification of bacterial cells based on autofluorescence on a microfluidic platform. *Journal of Chromatography A*, 1181: 153-158
 35. **Yao Y**, Guiltinan MJ, Thompson DB*. 2005. High performance size-exclusion chromatography (HPSEC) and fluorophore-assisted carbohydrate electrophoresis (FACE) to describe the chain length distribution of debranched starch. *Carbohydrate Research*, 340: 701–710
 36. **Yao Y**, Thompson DB, Guiltinan MJ*. 2004. Maize starch branching enzyme (SBE) isoforms and amylopectin structure: in the absence of SBEIIb, the further absence of SBEIa leads to increased branching. *Plant Physiology*, 136: 3515–3523

37. **Yao Y***, Zhang J, Ding X. 2003. Partial beta-amylolysis retards starch retrogradation in rice product. *Journal of Agricultural and Food Chemistry*, 51: 4066-4071
38. **Yao Y***, Zhang J, Ding X. 2003. Retrogradation of starch mixtures containing rice starch. *Journal of Food Science*, 68: 260-265
39. **Yao Y***, Zhang J, Ding X. 2002. Structure-retrogradation relationship of rice starches in purified starches and cooked rice grains: a statistical investigation. *Journal of Agricultural and Food Chemistry*, 50: 7420-7425
40. **Yao Y**, Guiltinan MJ, Shannon JC, Thompson DB* 2002. Single kernel sampling method for maize starch analysis while maintaining kernel vitality. *Cereal Chemistry*, 79: 757–762
41. **Yao Y***, Ding X. 2002. Pulsed NMR study of rice starch retrogradation. *Cereal Chemistry*, 79: 751-756
42. Blauth SL, **Yao Y**, Klucinec JD, Shannon JC, Thompson DB, Guiltinan MJ*. 2001. Identification of Mutator insertional mutants of starch-branching enzyme 2a in corn. *Plant Physiology*, 125: 1396-1405

Research Funding (approximate numbers)

	Total Award	Yao as PI
External funding (competitive)	\$3,358k	\$1,954k
External funding (industry)	\$430k	\$430k
Internal funding (Purdue)	\$208k	\$140k
Grand total	\$3,997k	\$2,546k

Research Interest

- Phytoglycogen and dendrimer-like biopolymers
- New starch resources
- Molecular rotor as a novel probe of biopolymer structures
- Food safety of fresh produce

Teaching

- FS 63000 – Carbohydrates (3 credits)
- FS 55501 – Case Study (1 credit)
- Study Abroad – China Program for Food Science graduate students