Yu-Lai Jin

🕿(269) 961-6510 (office) Kellogg Company, Food Chemistry

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### ACCOMPLISHMENTS

* Completed 16 externally funded projects & participated in 11 others; Numerous internal projects;
* Research and development expertise in natural products, grain science, food proteins/enzymes, and carbohydrates, and microscopic examination of texture and structure;
* Co-authored 31 peer reviewed papers & 20 conference presentations;
* Co-inventor of two fish oil microencapsulation processes (USP 6969530 and CA 2471821);
* Co-inventor of four provisional patent applications for encapsulating omega-3 & other nutraceuticals.

### RESEARCH HIGHLIGHTS

### Food Enzymes/Proteins and Carbohydrates

* Characterization of polyphenol oxidase and the inhibition of enzymatic browning in plant foods;
* Modification/crosslinking of gelatin with transglutaminase for microcapsule gels;
* Properties of barley protease and protein degradation - high level amino acids for yeast fermentation;
* Characteristics of barley endo-beta-glucanase & changes during malting; also bacterial β-glucanases;
* Inactivating soybean lipoxygenase and preventing off-flavour formation in soy milk;
* Labeled proteins and polysaccharides with fluorescent probes for examination of microcap shells;
* Established an affinity chromatographic protocol for purification of mannose-binding proteins;
* Analytical chemistry of dietary fibers and resistant starch, vitamin C, and other food components.

### Polymer and Colloid Sciences

* Studied the characteristics (MW and MW distribution, 2-SDS PAGE, zeta-potential, viscosity, gelation and melting profiles, gel strength by rheometry, and permeability) of microcapsule shell materials;
* Discovered the critical role of interfacial tension of oils in the coalescence of O/W emulsion droplets;
* Developed a method of determining zeta potential of oil droplets using microelectrophoresis;
* Investigated the effects of MW & concentration of β-glucans on particle size & gelling problem;
* Studied the complex coacervation behavior between various proteins and polyelectrolytes;
* Investigated the effects of barley β-glucans on the interfacial and foaming properties of beer;
* Investigated the mechanism(s) & factors influencing yeast cell-to-cell interactions during flocculation.

### Natural Products

* Extraction and purification of polyphenols from tea flower (a tea byproduct) by using ultrafiltration and porous resin adsorption chromatography.
* Purification of locus leaf derived flavonoids using ultrafiltration followed by porous resin adsorption.
* Potassium alginate characterization (MW, apparent / intrinsic viscosity etc.) and clinical application;
* Physical properties of barley beta-glucans and their solution behavior in brewing.
* Barley and wheat germination and fortification with trace amount minerals for bioconversion;
* Stabilization of omega-3s by antioxidant formulation and microencapsulation and shelflife studies; Protecting high load oils (60% in powder) by complex coacervation using multiple layer polymer coating;
* Co-delivering by microencapsulation of zinc salt, CoQ10, lutein, vitamin E, and Cr-omega-3;
* Bio-encapsulating probiotic *Bifidobacteria* into Ca-alginate microcapsules.

### EDUCATION AND AREA OF STUDIES

#### *Ph.D.* Dalhousie Univ., Dept. of Food Sci. & Technol., 2002. Beta-glucan properties and behaviour in brewing.

#### *M.Sc.* Dalhousie Univ., Dept. of Food Sci. & Technol., 1999. Yeast cell-to-cell interaction and flocculation.

## *On-job training* South Yangtze University, Fermentation Engineering, 1985. Yeast fermentation.

#### *B.Sc.* Yangzhou Univ.*,* Dept. of Agronomy (Major in Agric. Chem.), 1983. Bacterial fermentation.

### EMPLOYMENT HIGHLIGHTS

Lead / Senior Food Development Chemist (2007-present), Kellogg Company, Battle Creek, MI.

Principal Research Scientist (2004-2007); Senior Research Scientist (2002-2004); Ocean Nutrition Canada Ltd.

Research Assistant / graduate student (1998-2002), Dalhousie Univ., Dept. of Food Sci. and Technol., Halifax.

Associate Professor (1994-1997); Lecturer/Instructor (1988-94;83-88); Yangzhou Univ., Dept. of Food Sci., China.

WORK HISTORY

***Lead/Senior Food Chemist*** *(03/2007 – present)*

*Food Chemistry of Research, Quality and Technology, Kellogg Company, Battle Creek, MI.*

* Characterization of grain properties and impact on food processing.
* Dietary fiber analysis and characterization of soluble fiber MW and DP (degree of polymerization).
* Stability and shelflife studies of vit C in fruit snacks; mathematical model to predict the residual Vit C;
* Analysis and troubleshooting of various fiber ingredients and fiber fortified food products;
* Analytical method development for glucosamine and chodroitin as functional ingredients in flakes.
* Method development for ion exchange and size exclusion for carbohydrates particularly dietary fibers;
* Understanding properties of wheat flour, corn flour and grits, rice and their effect on various RTEC products processing and quality attributes.
* Characterization of vital wheat gluten by electrophoresis, rheology and HPLC to understand why materials with same amount of gluten protein would perform differently in flakes and frozen foods;
* Water activity of pop tarts and equilibrium between filling and crust during the storage.

***Senior Research Scientist,*** *05/2002 – 07/2004;* ***Principal Research Scientist / Group Leader*** *(08/2004 – 10/2006),* ***Principal Research Scientist II / Group Leader*** *(11/2006 – 03/2007)*

*Microencapsulation for Nutrient Delivery, Ocean Nutrition Canada, Ltd., Halifax, NS.*

* New formulations following the requirements for Halal, Kosher, organic foods and uses in infant formula;
* Developed a column method of characterizing the apparent pore size in microcapsule shells; formulated novel food additives to block the pores and improved the shelflife of microcapsules by double stability;
* Examined the interactions between proteins and polysaccharides with fluorescent labeling techniques and fluorescent microscopy; SEM, TEM and AFM examinations of microcapsule structures (in external labs);
* Studied the effect of protein modification / crosslinking with transglutaminase on shell strength; focused on crosslinking kinetics by measuring the insoluble gel formed;
* Investigated the influence of formulation (polymer concentration, particle size as well as solvent and process conditions) on complex coacervation process and wall thickness of microcapsules;
* Discovered the patterns of changes in 180° light scattering and employed such changes in screening and evaluation of polymers as process aids;
* Characterized shell materials by MW and MW distribution, 2-SDS PAGE, zeta-potential, viscosity, gelation and melting profiles, gel strength, permeability and phase separation;
* Established a compression test to characterize the mechanical strength of microcapsule of bulk powder;
* Developed a new method to make layer-by-layer composite walls of microcapsules with reduced permeability of moisture and oxygen;
* Developed methods of improving ω-3 powder stability by antioxidants and biomaterials for long shelflife;
* For the first time I established soluble solid content as an indicator of microcapsule shell quality;
* Characterization of potassium alginate (MW, apparent and intrinsic viscosities etc.) as a nutraceutical for lowering blood pressure;
* Critically analyzed the literature and patents/applications of competing and emerging technologies; Responsible for long-term strategic planning as well as short-term work proposals;
* Prepared grant applications for external funding; also responsible for project management;
* Planned and managed various projects for fast and best commercialization outcomes; summarized and assessed research progress with critical reviews; prepared project reports to VP R&D;
* Responsible for communications to other R&D groups, QA/QC, regulatory, pilot plant, production, marketing, sales and customers (since Aug. 2004);
* Responsible for technology transfer and technical support to pilot plant and production;
* Prepared patent (application) documents and responses related to microencapsulation technologies (since Jan. 2003); also analyzed patentability of new findings and technologies;
* Acted as a liaison between microcapsule research and regulatory issues to clarify international regulations on selected shell materials and additives (to minimize risks and loss of time).

***Postdoctoral Fellow,*** *04 – 05/2002,*

*Department of Food Science and Technology, Dalhousie University, Halifax, NS, Canada.*

* Investigated the effect of high speed shearing on the cell-to-cell interactions of yeast and the mannose binding zymolectin density on cell surface;
* Microscopic examinations of yeast cell-cell aggregation and β-glucan haze formation under various medium formulations in shear field;
* Co-supervised a research scientist and an M.Sc. student on a project of modeling yeast fermentation in tall tube fermentors. Focused on physiochemical properties and yeast flocculation during fermentation.

***Research Assistant and Ph.D. Candidate,*** *09/1999 – 04/2002,*

*Department of Food Science and Technology, Dalhousie University.*

* Investigated the rheological properties and critical entanglement concentrations of β-glucans;
* Studied the efficiency of β-glucan hydrolysis by crude β-glucanase from barley malt as well as purified bacterial β-glucanase;
* Investigated the effect of molecular weights and concentrations of β-glucans on the apparent particle size distribution and gel-forming potential;
* Developed a membrane filtration technique for fast categorizing particle size of biopolymers;
* Teaching Assistant of Industrial Biotechnology/Food Fermentation, Food Microbiology, Fish/Food Processing I and II, and Industrial Rheology.

***Quality Assurance Staff,*** *05 – 08/1999,*

*Canada Malting Co. Ltd., Dept. of Technical Service, Calgary, AB, Canada.*

* Implemented a fermentability test with dry active brewing yeast to minimize deviations in the quality of yeast culture and to reduce laboratory workload;
* Tested the effect of germination and kilning conditions on wort fermentability;
* Found the effect of cotton plug/wort evaporation on the accuracy of European Brewery Convention official fermentability test.

***Research Assistant and M.Sc. Student,*** *01/1998 – 08/1999,*

*Department of Food Science and Technology, Dalhousie University.*

* Studied the colloidal interactions in food using yeast cells as a model system;
* Developed an affinity chromatography purification of mannan-binding proteins;
* Teaching Assistant of Industrial Biotechnology and Industrial Rheology.
* Established a new method to prepare Ca-alginate microspheres in the range of 20-70 µm in diameter by using a W/O emulsion technique;
* Investigated the influence of surfactants, shearing, and emulsion formula on the size distribution of Ca-alginate microcapsules;
* Developed a unique method to entrap probiotic *Bifidobacteria* into Ca-alginate microcapsules.

***Visiting Scholar,*** *09/1996 – 09/1997,*

*Department of Food Science and Technology, Dalhousie University.*

* Developed a method to determine cell surface hydrophobicity with molecular probes;
* Improved an assay of yeast surface lectins with molecular probes;
* Investigated the effect of environmental conditions on cell-to-cell interactions during fermentation.

***Research Scientist and Instructor/Lecturer/Associate Professor,*** *08/1983 – 12/1997;*

*Department of Food Science, Agricultural College, Yangzhou University (formerly Jiangsu Agricultural College), Yangzhou, China.*

* Completed numerous projects as a principal investigator or a co-investigator, with major research activities related to barley and wheat malting, food enzymes, and fermentation;
* Designed and set up a pilot plant of malting (20 kg barley input) and brewing and fermentation (a 300 L fermentation/storage tank), and a brewing analysis laboratory;
* Director of Fermentation Technology Laboratories (four faculty members, one engineer and one technician) during 1988-1994; Coordinated the use of the facilities by different classes, approved all experimental plans and schedules, supervised the technicians in safety issues, maintenance of instruments, and routinely management of the labs;
* Was appointed as Head of Fermentation Division in the Food Science Department (10 faculty members and 3 technicians in the Division) during 1994-1996. Responsible for personnel administrations, planning teaching activities, coordinating on-spot training and field-studies of Fermentation Technology, yearly budget of the Division, proposals of facility upgrade and purchasing, organizing and coordinating research projects within the unit, technology transfer and technical services to the industries, etc.;
* Responsible for various teaching, research and technology transfer activities; Courses taught include Fermentation Technology (including Ethanol Technology, Amino Acid Fermentation Technology, Enzyme Technology), Applied Enzymology, Brewing Technology, Microbiology Lab, Graduation thesis/design, and Fermentation Technology field studies in local companies.
* Supervised graduating students for their thesis research/designing (including 2-4 weeks industrial placement in local food and fermentation companies) each year during 1987-1996 (39 students in total); Co-supervised field studies of Fermentation Technology four weeks each year during 1986-1995 in various fermentation companies (ethanol, glutamate, lysine, bacterial enzymes, beer, sake, liquor) in home province.

RESEARCH EXPERIENCE (List of mainly External funded projects)

**I. Natural Products**

1. Studied the process of microencapsulation of omega-3 fish oil by using a “non-gelling” fish gelatin, including characterization of gelatin materials, process development, emulsion stability, shell formation and maturation, enzymatic crosslinking, as well as powder oxidative stability. My direct findings were making smaller oil droplets using the same formulation, tracking soluble solid content in aqueous as an indicator of shell formation and shell stability. This significantly impacts the Kosher product development cost-effectively (now in pilot scale testing). Industrial Research Assistance Program (IRAP) project of National Research Council (Canada), Primary investigator, May 2005 – Present.
2. Developed a process of co-microencapsulation of CoQ10 with fish oil for delivery in the same microcapsule (without mixing the two active ingredients). Also developed a process of fish oil microencapsulation with zinc delivery. Primary investigator. Ocean Nutrition Canada, Jan. – May, 2006.
3. Investigated the complex coacervation characteristics of various food proteins such as gelatin, whey protein isolate and soy protein isolate with polysaccharides for better coating and improved barrier properties. Many short-term projects included accomplished as well. Primary investigator. Ocean Nutrition Canada, 2004.
4. Studied the crosslinking of protein with transglutaminase for required hardening of shells of microcapsules. Primary investigator, Internal research project at Ocean Nutrition Canada Ltd. 09-10/2002; June – Dec. 2004.
5. Stepwise microencapsulation of ω-3 PUFAs with layer-by-layer composite walls. Ocean Nutrition Canada Ltd., Primary Investigator. Discovered the patterns of changes in light scattering and turbidity of various biopolymers involved in microcapsule wall formation. Developed formulations for encapsulating core materials in composite wall layers achieving desired oxygen and moisture barrier. IRAP project, Primary investigator, Senior Research Scientist. May 2002-Dec. 2003.
6. Developed a technique for microencapsulating the probiotic *Bifidobacterium* spp. in calcium-alginate microcapsules. Funded by Dairy Farmers of Canada. Research Assistant. 1998–1999.
7. Studied the extraction and purification parameters for polyphenols from tea flower (a byproduct of tea production) based on ultrafiltration and porous resin adsorption. Provincial project (Jiangsu, China), primary investigator. 1994-1995.
8. Developed a process of purifying locus leaf derived flavonoids using ultrafiltration followed by porous resin adsorption. Provincial project, primary investigator. 1993-1994.

**II. Food Proteins / Enzymes and Processing**

1. Investigated 1) the influence of kilning regime on malt diastatic power, β-glucanase and proteolytic activities; 2) the cause of decrease in malt amino nitrogen content during kilning; 3) developing a high-efficiency malt kiln of 10 000 tons/year. Part of the project was carried out in Jiaxin Malthouse in 1994. Provincial project, primary investigator. 1993–1994.
2. Investigated the effect of β-glucan polymers on the rheological, interfacial, foaming properties, membrane filtration, and colloidal stability in beverage. Strategic project by the Natural Sciences and Engineering Research Council of Canada (NSERC). Research Assistant. 1999–2002.
3. Optimal malting regime for domestic barley related to high chitting rate, short processing time, and enzyme (protease activity) regeneration during storage. Provincial project, primary investigator. 1993–1996.
4. Development of a new malting barley variety *Sunong*-21. Provincial project, co-investigator. 1990–1995.
5. Developed the optimal malting technology for the barley cultivated on Huang-Huai Flatlands of Jiangsu province. Studied the influence of cultivation especially nitrogen fertilizer and sowing density on malting barley qualities. Developed a new steeping method to overcome the water sensitivity. Part of this project was carried out in Funing Malting Co. and Binhai Malthouse for industrial applications. Provincial project, primary investigator. 1991–1993.
6. Studied the application and mechanism of using trace elements to improve malt quality. Investigated the effect of various trace elements such as zinc and copper ions on enzyme synthesis and endosperm degradation. Provincial project, primary investigator. 1991–1992.
7. Microcomputer control of mashing process and the influence of temperature fluctuation on chemical compositions of wort. Provincial project, primary investigator. 1990–1992.
8. Characteristics of polyphenol oxidase of Lotus root and development of non-thermal methods to prevent discoloration of exporting products. Provincial project, primary investigator, 1995-1996.
9. Studies on the effect of heat treatment, alkali soaking and chelators on soybean lipoxygenase activity and prevention of grassy off-flavor of soy milk. Provincial project, co-investigator, 1993-1995.
10. Characterization of polyphenol oxidase of sweet potato and control of enzymatic browning during preparation of starch and noodles. Funded by Taizhou Starch Factory. Primary investigator. 1988-1989.
11. Unpasteurized juice production of kiwifruit with ultra-filtration technology and isolation of kiwifruit protease from the concentrate as meat tenderizer. Provincial project, co-investigator. 1985–1986.

**III. Microbial Fermentation**

1. Microalgal (*Crypthecodinium cohnii)* fermentation and cell encapsulation for omega-3 fatty acids production and delivery. Co-investigator (responsible for formulating medium with vegetable oil so that the cells can use the lipids and convert them into omega-3s, and encapsulation of the cells). Part of AIF grant funded Feb. 2006. Ocean Nutrition Canada, March 2006 – present.
2. Investigated the mechanisms and control of the cell-to-cell interactions of brewing yeast. Operating project granted by the Natural Sciences and Engineering Research Council of Canada (NSERC). Research Assistant. 1996–1999. Partly completed during my M.Sc. research.
3. Improved the techniques for fermentability of brewer’s worts and studied the application of active dry yeast in fermentation test. Internal QA project, Canada Malting Company, 1999.
4. Examined the effect of extrusion conditions of corns on ethanol fermentation by *S. cerevisiae*. Provincial project, co-investigator. 1994-1996.
5. Studied liquid fermentation of an edible fungus (*Lentinus edodes*) for inoculation; solid fermentation, enzymatic hydrolysis with an *Asp. oryzae* culture and formulation of dehydrated instant soup mix from the mushroom. Provincial project, co-investigator. 1986–1989.
6. Studied soy sauce production with a new enzyme (from *Asp. oryzae*) aided fermentation process. Project funded by Chinese Ministry of Commerce. Co-investigator. 1987-1988.
7. Production of non-pollution biopesticides (fermentation of *Bacillus thuringiensis*) for vegetables. A joint project granted by Jiangsu province and the Ministry of Agriculture, Research Assistant. Participated during 07-08/1982, 01-12/1983, 08/1985-08/1986.
8. Studied the effect of fermentation conditions on biomass production of *Geotrichum candidum* during shaking flask incubation by using distillery effluent. North Jiangsu Grains and Distilling Company, Yangzhou, 07-08/1981, 07-08/1982, student under training/summer student.

PUBLICATIONS AND PRESENTATIONS

## Peer Reviewed Papers

1. Barrow, C.J., Nolan, C. and Jin, Y.L. 2007. Stabilization of highly unsaturated fatty acids and delivery into foods. Lipid Technology. 19(5): 108-111.
2. Speers, R.A., Wan, Y.Q., **Jin, Y.L.** and Stewart, R.J. 2006. The effect of fermentation parameters and cell wall properties on yeast flocculation. J. Inst. Brew., 112(3): 246-254.
3. **Jin, Y.L**., Speers, R.A., Paulson, A.T. and Stewart, R.J. 2004. Effects of β-glucans, shearing and environmental factors on the wort filtration performance. J. Am. Soc. Brew. Chem. 62(4): 155-162.
4. **Jin, Y.L**., Speers, R.A., Paulson, A.T. and Stewart, R.J. 2004. Effects of β-glucans and process conditions on the membrane filtration performance of beer. J. Am. Soc. Brew. Chem. 62(3): 117-124.
5. **Jin, Y.L**., Speers, R.A., Paulson, A.T. and Stewart, R.J. 2004. Effects of β-glucans and environmental factors on the viscosities of wort and beer. J. Inst. Brew. 110(2): 104-116.
6. Speers, R.A., **Jin, Y.L**., Paulson, A.T. and Stewart, R.J. 2004. Effects of β-glucans, shearing and environmental factors on the turbidity of wort and beer. J. Inst. Brew. Jan. 109(3): 236-244.
7. **Jin, Y.L**., Speers, R.A., Paulson, A.T. and Stewart, R.J. 2002. Barley β-glucans and their degradation during malting and brewing. MBAA Tech. Quart., 41(3): 231-240. Reprinted 2005 in Spanish in Cerveza y Malta, 42:(4): 23-35.
8. Hansen, L.T., Allan-Wojtas, P.M., **Jin, Y.L.** and Paulson, A.T. 2002. Survival of free and Ca-alginate microencapsulated *Bifidobacterium spp*. in simulated gastro-intestinal conditions. Food Microbiology. 19: 35-45.
9. **Jin, Y.L.**, Ritcey, L.L., Speers, R.A. and Dolphin, P.J. 2001. The effect of cell surface hydrophobicity, charge and zymolectin density on the flocculation of two flocculent yeast strains. J. Am. Soc. Brew. Chem. 59(1): 1-9.
10. **Jin, Y.L.** and Speers, R.A. 2000. Effect of environmental conditions on the flocculation of *Saccharomyces cerevisiae*. J. Am. Soc. Brew. Chem. 58: 108-116.
11. Fang, W.M., Hua, H.L. and **Jin, Y.L.** 1999.The effect of cultivation conditions on barley agronomic and malt qualities. Barley Sci. *(in Mandarin)* 58(1): 25-27.
12. **Jin, Y.L.** and Speers, R.A. 1998. Flocculation of *Saccharomyces cerevisiae*. Food Res. Int. 31: 421-440.
13. **Jin, Y.L**., Speers, R.A. and Gu, G.X. 1998. Colloidal properties of flocculent yeast. J. Jiangsu Agricultural College. *(in Mandarin)* 19(1): 83-87.
14. Fang, W.M., Wang, Z.J. and **Jin, Y.L.** 1998. A study on malting technology of hard kernel barley. Symposium of Barley Science. *(in Mandarin)* Vol. 4. pp. 252-255.
15. **Jin, Y.L.** 1997. The deterioration and storage of malting barley. Brewing. *(in Mandarin)* 123(6): 15-18.
16. Sun, F.L., Yang, W., Zhu, Q., **Jin, Y.L.** and Fang, W.M. 1997. A study on ethanol fermentation with extruded corn. J. Jiangsu Agricultural College. *(in Mandarin)* 18(3): 68-72.
17. Fang, W.M. and **Jin, Y.L.** 1996. Determination of malt original alpha-amino nitrogen content. Barley Sci. *(in Mandarin)* 48(3): 46-47.
18. Yu, H., **Jin, Y.L.** and Huang, A.G. 1995. Application of heat pipe in malt kilning. J. Jiangsu Agricultural College. *(in Mandarin)* 16(4): 43-46.
19. **Jin, Y.L.** and Wu, P. 1995. Effect of malting parameters on wort filtration. Barley Sci. *(in Mandarin)* 47(2): 40-42.
20. **Jin, Y.L.** and Gu, G.X. 1994. The proteolytic activity and its effect on malt α-AN content during malting. J. Jiangsu Agricultural College. *(in Mandarin)* 15(3): 25-30.
21. **Jin, Y.L.** and Liu, Z.Q. 1994. Studies on malt endo-β-glucanase. Barley Science. *(in Mandarin)* 46(1):36-38.
22. **Jin, Y.L.** 1994. Shaking flask fermentation of *Bacillus Thuringiensis* strain 7216. Industrial Microbiology. *(in Mandarin)* 24(3): 35-40.
23. **Jin, Y.L.** and Liu, Z.Q. 1994. Oxygen uptake and aeration during steeping and germination. Barley Sci. *(in Mandarin)* 46(3): 41-44.
24. **Jin, Y.L.** and Liu, Z.Q. 1994. Studies on the optimal malting technology for new barley variety *Suyin-2*. Barley Sci. *(in Mandarin)* 46(2): 44-45, 49.
25. Qian, J.Y. and **Jin, Y.L.** 1993. Beer pasteurization with microwave. Food Sci. *(in Mandarin)* (4): 22-24.
26. Liu, W.M., **Jin, Y.L.**, Huang, A.G. and Wang, Z.J. 1993. Application of LED Display. In *Symposium of Applications of Single-plate computer, II.* He, L.M. (Ed.). *(in Mandarin)* pp. 232-253. Beijing University of Aeronautics and Astronautics Press: Beijing, CHN.
27. Wang, Z.J., **Jin, Y.L.** and Kuai, J.M. 1992. Studies on the relationship between malting parameters and malt quality. J. Jiangsu Agricultural College. *(in Mandarin)* 13(4): 65-68.
28. Wang, Z.J. and **Jin, Y.L.** 1992. Studies on malting procedure to improve malt quality. J. Jiangsu Agricultural College. *(in Mandarin)* 13(3): 79-81.
29. **Jin, Y.L.**, Liu, W.M. and Jiang, L.X. 1992. Studies on computer control of EBC mashing process. J. Jiangsu Agricultural College. *(in Mandarin)* 13(2): 41-46.
30. **Jin, Y.L.**, Qian, J.Y. and Xiao, D.Q. 1989. Studies on the polyphenol oxidase of sweet potato. Food Sci. *(in Mandarin)* (9): 4-9.
31. Chen, Q.D., **Jin, Y.L.** and Jia, S.C. 1989. Development of formulation for shrimp soy sauce. Jiangsu Fermented Dressings. *(in Mandarin)* 27(1): 9-13.

Patent Publications and Book Reviews

1. Yan, N. and **Jin, Y.L.** 2005. Microcapsules having multiple shells and method for the preparation thereof. CA 2471821.
2. Curtis, C., W. Zhang, and **Y.L. Jin**. 2005. Microcapsules and emulsions containing low bloom gelatin and methods of making and using thereof. US 6969530.
3. **Jin, Y.L.** 2006. *Encapsulated and Powdered Foods*. Book Review. Trends Food Sci. Technol. In press.
4. **Jin, Y.L.** 2001. *Starches*. Book Review. Food Res. Int. 34: 81.
5. **Jin, Y.L.** 2001. *Enzymes*. Book Review. Food Res. Int. 34: 81-82.
6. **Jin, Y.L.** 1998. *Technology of Bottled Water*. Book Review. Food Res. Int. 31: 529.

Presentations (Since 1997)

1. Sang, Y.J., **Jin, Y.L**., Lai, G., and Zealinski, G. 2011. Characterization of carbohydrate DP profiles of ethanol-water soluble fraction by using maltodextrins as a model system. Oral presentation, 2011 AACC Intl Annual Meeting, Palm Spings, CA. Oct. 16-19, 2011.
2. Liu, Y-J., **Jin, Y.L**., Lai, G. and Sang, Y.J. 2011. Single lab validation of resistant starch assay by AOAC 2002.02 and in vitro digestion of some starch materials under the same conditions. 8-P, 2011 AACC Intl Annual Meeting, Palm Spings, CA. Oct. 16-19, 2011.

18. Sang, Y-J., **Jin, Y.L.,** and Lai, G. 2011. Determination of oligosaccharide concentration by HPLC using an ion exchange column with a refractive index detector. 7-P, 2011 AACC Intl Annual Meeting, Palm Spings, CA. Oct. 16-19, 2011.

1. Barrow, C.J., **Jin, Y.L.**, Curtis, J.and Cloutier, S. 2007. Microencapsulation using coacervation for delivery of omega-3 oils into foods. Presented at 233rd ACS National Meeting, Chicago, IL, March 25-29.
2. Barrow, C.J., Curtis, J., Kralvec, J.A., **Jin, Y.L.** and Cloutier, S. 2006. Complex coacervation as a methodology for delivery of unstable oils into foods. Presented at WorldNutra 2006, Reno, NV. Nov. 5-8.
3. Barrow, C.J., Curtis, J., Kralvec, J.A., **Jin, Y.L.** and Cloutier, S. 2006. Stabilization and Delivery of Omega-3 Oils into Food Products.Presented atLipids, Fats and Oils for a Healthier Future - The Need for Interdisciplinary Approaches - 4th Euro Fed Lipid Congress, Universidad computense, Madrid, Spain. Oct. 1-4[.](http://www.eurofedlipid.org/meetings/madrid/index.htm)
5. Barrow, C.J., Curtis, J., Kralvec, J.A., **Jin, Y.L.** and Cloutier, S. 2006. Omega-3 fortified foods: application and stability of fish oil fortified foods.Presented at the 97th AOCS Annual Meeting & Expo. St. Louis, MO. April 30 – May 3.
6. **Jin, Y.L.**, Sing, F., Barrow, C.J., and Curtis, J. 2006. MEG-3 fish oil microcapsules for novel functional foods. To be presented at the Food Ingredients China 2006, March 1-3. Shanghai, CHN.
7. **Jin, Y.L.**, Barrow, C.J., and Curtis, J. 2005. Microencapsulation of functional food ingredients. Presented at the AFMnet Workshop “Functional Foods, Nutraceuticals, and Natural Health Products”, Oct. 3-4, Montreal, QC.
8. Barrow, C.J., **Jin, Y.-L.** and Curtis, J. 2004. Microencapsulation of omega-3 oils as a stabilization method for functional food delivery. Presented at the 19th Annual Meeting of the Canadian Section of the Am. Oil Chemists’ Soc. Oct. 2-4. Halifax, NS.
9. Barrow, C.J., **Jin, Y.-L.** and Curtis, J. 2004. Microencapsulation of Omega-3 Oils as a Stabilization Method for Functional Food Delivery. Presented at the **5th International Conference and Exhibition on Nutraceuticals and Functional Foods. WorldNutra 2004. November 7-10, San Francisco, CA.**
10. Wan, Y.Q., Speers, R.A. and **Jin, Y.L.** 2004. The effect of fermentation parameters and cell wall properties on yeast flocculation. To be presented at the Tsingtao International Symposium on Brewing Technology 2004 (TISBT’2004), Qingdao, China. August 15-17.
11. **Jin, Y.L**., Speers, R.A. and Paulson, A.T. 2002. Barley β-glucan behaviour in brewing. Presented at the Brewing Workshop of Master Brewers Association of the Americas (MBAA) District Ontario. January 26. Toronto, ON.
12. Speers, R.A., Patelakis, S.S.J., Egi, A., J. W-C. Hsu, and **Jin Y.L.** 2002. Flow and filtration: the physics of brewing. Presented at the Annual Meeting of the MBAA District Ontario. January 25, Toronto, ON.
13. **Jin, Y.L.** andR.A. Speers. 2001. The influence of beta-glucan molecular weight and concentration on the turbidity, viscosity and filtration of wort and beer. Presented at the 67th Annual Meeting of the Am. Soc. of Brewing Chemists (ASBC), June 23-27, 2001. Victoria, BC.
14. **Jin, Y.L.** and Speers, R.A. 1999. Effect of environmental conditions on the flocculation of *S. cerevisiae*. Presented at the 65th Annual Meeting of the ASBC. June 19-23. Phoenix, AZ.
15. **Jin, Y.L.** and Speers, R.A. 1999. Cell surface hydrophobicity of flocculent brewing yeast: its relationship to cell flocculation and the effect of environmental conditions. Poster presented at the 41st Annual Conference of the CIFST. June 6-9. Kelowna, BC.
16. Speers, R.A. and **Jin, Y.L.** 1998. Current advances in brewing yeast flocculation. Presented at the MBAA Western Canada Section Meeting, Presentation #3. June. 5-7. Vancouver, BC.
17. **Jin, Y.L.** and Speers, R.A. 1997. Detection of lectin binding on *Saccharomyces cerevisiae* and the effect of environmental conditions. Presented at the 1st Brewing Yeast Fermentation Performance Congress, Presentation #11. Sept. 17-19. Oxford, GBR.
18. *Speers, R.A*. and **Jin, Y**.**L**. 1997. Physiochemical studies of brewing yeast flocculation. (*Invited Speaker*) Brewing Research Foundation. Nutfield, Redhill, UK and Department of Biology, Oxford Brookes University, March 20 and 21. Oxford, UK.

HONOURS AND AWARDS

* American Association of Cereal Chemists Graduate Fellowship, 2001.
* American Society of Brewing Chemists Student Travel Grant, 2001.
* American Association of Cereal Chemists Graduate Fellowship, 2000.
* American Association of Cereal Chemists Graduate Fellowship, 1999.
* Bruce and Dorothy Rosetti Engineering Research Scholarship, Dalhousie University, 1998.
* Science and Technology Progress Awards of Jiangsu Province, China, 1997.
* Visiting Scholar Fellowship, Ministry of Education of the P R China, 1996.
* Teaching Excellence Award, Yangzhou University, 1995.
* Outstanding Workers of Spreading Science and Technology, Yangzhou University, 1994.
* Science and Technology Progress Awards of Jiangsu Province, China, 1992.