



Xia, Wenshui

Ph.D., Professor

Tel: 13606193362

E-mail: xiaws@jiangnan.edu.cn

Areas of Expertise : Food Processing and Preservation; Aquatic Food Product Technology; Food Components, Structure and Modification.

Website: <http://foodsci.jiangnan.edu.cn/Teacher.asp?GH=2700002>

1994-Present Professor, Jiangnan University, PRC

1993-1994 Postdoc, ANCONA, Italy

1989-1993 Associate Professor, Jiangnan University, PRC

1986-1989 PhD Candidate, Jiangnan University, PRC

1985-1986 Staff, Medicine Industry Office, PRC

1983-1985 Ms Candidate, China Pharmaceutical University, PRC

Research of Special Interest

1. Food Chemistry

Fundamental understanding of the relationship is focused on between functional components and structural activity of polysaccharide with specific interesting in chitosan/chitosan oligosaccharide, which is a natural amino polysaccharide from shrimp and crab shells. This fundamental knowledge will lead to a systematic approach to develop polysaccharide applications in food, pharmaceutical, and chemical areas.

1) Polysaccharide functionalities

Structural modification: Use chemical or enzymatic modification to improve various biological activities (e.g. antioxidant, antimicrobial) and functionalities of polysaccharide and its derivatives.

Application and development: Find possible application of chitosan and its derivatives in food preservation, such as coating preservation.

2) Physiological activities and mechanisms

Interest is growing within the food and pharmaceutical industry to develop innovative functional products that may have health benefits or reduce the risk of high blood glucose and high blood lipid diseases. The influence of chitosan on lipid metabolism and its mechanism on the level of Mups expressions and gene expressions is being studied.

2. Food Processing Technologies and Food Quality

The effect of processing on the quality of food products is focused. Aimed at preserving perishable food products, freezing, heating, drying, etc. are applied to increase shelf life of foods. To ensure food safety and quality during storage, relationship between critical control point during processing and food properties, and its theoretical foundation is important. Including study on dairy foods and fruit/vegetables qualities during processing and preservation, special interest is taken into aquatic food products.

1) Fermentation

Sensory qualities such as textural properties and flavor/taste formation, safety factors such as change of nitrite and biogenic amines is investigated. Also, the mechanism of gel and flavor/taste formation during fermentation of aquatic food products is attractive. The endogenous enzymes and behavior of microorganisms are other interests.

2) Temperature and water content control

How protein, lipids and carbohydrates vary during heating and freezing is an interesting topic. The relationship between food qualities during storage and drying process is another focus.

Publications *Correspondence Author

Prof. Xia is teaching and researching in the area of Food Science and Engineering. More than 360 related scientific papers have been published, included over 160 SCI papers. The papers in recent 3 years are shown below:

- Gao P, Jiang Q, Xu Y, **Xia W***. Biosynthesis of acetate esters by dominate strains, isolated from Chinese traditional fermented fish (Suan yu) [J]. *Food Chemistry*, 2018, 244: 44-49.
- Liu X, Jiang Q, **Xia W***. One-step procedure for enhancing the antibacterial and antioxidant properties of a polysaccharide polymer: Kojic acid grafted onto chitosan [J]. *International Journal of Biological Macromolecules*, 2018.
- Liu X, **Xia W***, Jiang Q, Yu P, Yue L. Chitosan oligosaccharide-N-chlorokojic acid mannich base polymer as a potential antibacterial material [J]. *Carbohydrate Polymers*, 2018, 182: 225-234.
- Yu D, Xu Y, Regenstein J M, **Xia W***, Yang F, Jiang Q, Wang B. The effects of edible chitosan-based coatings on flavor quality of raw grass carp (*Ctenopharyngodon idellus*) fillets during refrigerated storage [J]. *Food Chemistry*, 2018, 242: 412-420.
- Yu N, Xu Y, Jiang Q, **Xia W***. Molecular forces involved in heat-induced freshwater surimi gel: Effects of various bond disrupting agents on the gel properties and protein conformation changes [J]. *Food Hydrocolloids*, 2017, 69: 193-201.
- Yue L, Li J, Chen W, Liu X, Jiang Q, **Xia W***. Geraniol grafted chitosan oligosaccharide as a potential antibacterial agent [J]. *Carbohydrate Polymers*, 2017, 176: 356-364.
- Zeng X, **Xia W***, Jiang Q, Xu Y, Fan J. Contribution of Mixed Starter Cultures to Flavor Profile of Suanyu - A Traditional Chinese Low-Salt Fermented Whole Fish [J]. *Journal of Food Processing and Preservation*, 2017, 41(5).
- Zhao J, Jiang Q, Xu Y, **Xia W***. Effect of mixed kojis on physicochemical and sensory properties of rapid-fermented fish sauce made with freshwater fish by-products [J]. *International Journal of Food Science and Technology*, 2017, 52(9): 2088-2096.
- Zang J, Xu Y, **Xia W***, Jiang Q. The impact of desmin on texture and water-holding capacity of ice-stored grass carp (*Ctenopharyngodon idella*) fillet [J]. *International Journal of Food Science and Technology*, 2017, 52(2): 464-471.
- Yu D, Xu Y, Jiang Q, **Xia W***. Effects of chitosan coating combined with essential oils on quality and antioxidant enzyme activities of grass carp (*Ctenopharyngodon idellus*) fillets stored at 4 degrees C [J]. *International Journal of Food Science and Technology*, 2017, 52(2): 404-412.
- Yu D, Li P, Xu Y, Jiang Q, **Xia W***. Physicochemical, microbiological, and sensory attributes of chitosan-coated grass carp (*Ctenopharyngodon idellus*) fillets stored at 4 degrees C [J]. *International Journal of Food Properties*, 2017, 20(2): 390-401.

- Yu D, Jiang Q, Xu Y, **Xia W***. The shelf life extension of refrigerated grass carp (*Ctenopharyngodon idellus*) fillets by chitosan coating combined with glycerol monolaurate [J]. *International journal of biological macromolecules*, 2017, 101: 448-454.
- Wang B, Zhang S, Wang X, Yang S, Jiang Q, Xu Y, **Xia W***. Transcriptome analysis of the effects of chitosan on the hyperlipidemia and oxidative stress in high-fat diet fed mice [J]. *International Journal of Biological Macromolecules*, 2017, 102: 104-110.
- Zhang W, Chen J, Chen Y, **Xia W***, Xiong YL, Wang H. Enhanced physicochemical properties of chitosan/whey protein isolate composite film by sodium laurate-modified TiO₂ nanoparticles [J]. *Carbohydrate Polymers*, 2016, 138: 59-65.
- Zeng H, Chen J, Zhai J, Wang H, **Xia W***, Xiong YL. Reduction of the fat content of battered and breaded fish balls during deep-fat frying using fermented bamboo shoot dietary fiber [J]. *Lwt-Food Science and Technology*, 2016, 73: 425-431.
- Yang F, **Xia W***, Zhang X-W, Xu Y-S, Jiang Q-X. A comparison of endogenous and microbial proteolytic activities during fast fermentation of silver carp inoculated with *Lactobacillus plantarum* [J]. *Food Chemistry*, 2016, 207: 86-92.
- Yang F, **Xia W***, Rustad T, Xu Y, Jiang Q. Changes in myofibrillar structure of silver carp (*Hypophthalmichthys molitrix*) as affected by endogenous proteolysis under acidic condition [J]. *International Journal of Food Science and Technology*, 2016, 51(10): 2171-2177.
- Yang F, Hu F, Jiang Q, Xu Y, **Xia W***. Effect of Pretreatments on Hydrolysis Efficiency and Antioxidative Activity of Hydrolysates Produced from Bighead Carp (*Aristichthys nobilis*) [J]. *Journal of Aquatic Food Product Technology*, 2016, 25(6): 916-927.
- Xu Y, Chen Y, Cao Y, **Xia W***, Jiang Q. Application of simultaneous combination of microwave and steam cooking to improve nutritional quality of cooked purple sweet potatoes and saving time [J]. *Innovative Food Science & Emerging Technologies*, 2016, 36: 303-310.
- Xu Y, Chen Y, Cao Y, Huang W, Zhang S, **Xia W***, Jiang Q. Effect of Steam Cooking on Textural Properties and Taste Compounds of Shrimp (*Metapenaeus ensis*) [J]. *Food Science and Technology Research*, 2016, 22(1): 75-81.
- Tan C, Feng B, Zhang X, **Xia W***, Xia S. Biopolymer-coated liposomes by electrostatic adsorption of chitosan (chitosomes) as novel delivery systems for carotenoids [J]. *Food Hydrocolloids*, 2016, 52: 774-784.
- Liu H, Liu X, Yue L, Jiang Q, **Xia W***. Synthesis, characterization and bioactivities of N,O-carbonylated chitosan [J]. *International Journal of Biological Macromolecules*, 2016, 91: 220-226.
- Jiang Q, Li S, Xu Y, **Xia W***. Nutrient Compositions and Properties of Antarctic Krill (*Euphausia superba*) Muscle and Processing By-Products [J]. *Journal of Aquatic Food Product Technology*, 2016, 25(3): 434-443.
- Ge L, Xu Y, **Xia W***, Jiang Q, Jiang X. Differential role of endogenous cathepsin and microorganism in texture softening of ice-stored grass carp (*Ctenopharyngodon idella*) fillets [J]. *Journal of the Science of Food and Agriculture*, 2016, 96(9): 3233-3239.
- Ge L, Xu Y, Jiang X, **Xia W***, Jiang Q. Broad-spectrum inhibition of proteolytic enzymes by allicin and application in mitigating textural deterioration of ice-stored grass carp (*Ctenopharyngodon idella*) fillets [J]. *International Journal of Food Science and Technology*, 2016, 51(4): 902-910.
- Gao P, Wang W, **Xia W***, Xu Y, Jiang Q. Lipolysis and lipid oxidation caused by *Staphylococcus xylosum* 135 and *Saccharomyces cerevisiae* 31 isolated from Suan yu, a traditional Chinese low-salt fermented fish [J]. *International Journal of Food Science and Technology*, 2016, 51(2): 419-426.
- Gao P, Wang W, Jiang Q, Xu Y, **Xia W***. Effect of autochthonous starter cultures on the volatile flavour compounds of Chinese traditional fermented fish (Suan yu) [J]. *International Journal of Food Science and Technology*, 2016, 51(7): 1630-1637.

- Chen J, Chen Y, **Xia W***, Xiong YL, Ye R, Wang H. Grass carp peptides hydrolysed by the combination of Alcalase and Neutrase: Angiotensin-I converting enzyme (ACE) inhibitory activity, antioxidant activities and physicochemical profiles [J]. *International Journal of Food Science and Technology*, 2016, 51(2): 499-508.
- Zhang W, **Xia W***. Effect of media milling on lipid-lowering and antioxidant activities of chitosan [J]. *International Journal of Biological Macromolecules*, 2015, 72: 1402-1405.
- Zhang L, **Xia W***, Jiang Q, Xu Y. Prediction of the Thermophysical Properties of Bighead Carp (*Aristichthys nobilis*) Fillets After Curing and Deep-Fat Frying [J]. *Journal of Aquatic Food Product Technology*, 2015, 24(8): 762-781.
- Zeng X, **Xia W***, Jiang Q, Guan L. Biochemical and Sensory Characteristics of Whole Carp Inoculated With Autochthonous Starter Cultures [J]. *Journal of Aquatic Food Product Technology*, 2015, 24(1): 52-67.
- Yang F, Rustad T, Xu Y, Jiang Q, **Xia W***. Endogenous proteolytic enzymes - A study of their impact on cod (*Gadus morhua*) muscle proteins and textural properties in a fermented product [J]. *Food Chemistry*, 2015, 172: 551-558.
- Xu Y, Ge L, Jiang X, **Xia W***, Jiang Q. Inhibitory effect of aqueous extract of *Allium* species on endogenous cathepsin activities and textural deterioration of ice-stored grass carp fillets [J]. *Food and Bioprocess Technology*, 2015, 8(10): 2171-2175.
- Xu Y, Dai M, Zang J, Jiang Q, **Xia W***. Purification and Characterization of an Extracellular Acidic Protease of *Pediococcus pentosaceus* Isolated from Fermented Fish [J]. *Food Science and Technology Research*, 2015, 21(5): 739-744.
- Tan C, Zhang Y, Abbas S, Feng B, Zhang X, **Xia W***, Xia S. Biopolymer-Lipid Bilayer Interaction Modulates the Physical Properties of Liposomes: Mechanism and Structure [J]. *Journal of Agricultural and Food Chemistry*, 2015, 63(32): 7277-7285.
- Siddeeg A, **Xia W***. Oxidative stability, chemical composition and organoleptic properties of seinat (*Cucumis melo* var. tibish) seed oil blends with peanut oil from China [J]. *Journal of Food Science and Technology-Mysore*, 2015, 52(12): 8172-8179.
- Liu X, **Xia W***, Jiang Q, Xu Y, Yu P. Effect of kojic acid-grafted-chitosan oligosaccharides as a novel antibacterial agent on cell membrane of gram-positive and gram-negative bacteria [J]. *Journal of Bioscience and Bioengineering*, 2015, 120(3): 335-339.
- Jiang X, Xu Y, Ge L, **Xia W***, Jiang Q. The impact of collagen on softening of grass carp (*Ctenopharyngodon idella*) fillets stored under superchilled and icestorage [J]. *International Journal of Food Science and Technology*, 2015, 50(11): 2427-2435.
- Ge L, Xu Y, **Xia W***. The function of endogenous cathepsin in quality deterioration of grass carp (*Ctenopharyngodon idella*) fillets stored in chilling conditions [J]. *International Journal of Food Science and Technology*, 2015, 50(3): 797-803.
- Chen W, Li Y, Yang S, Yue L, Jiang Q, **Xia W***. Synthesis and antioxidant properties of chitosan and carboxymethyl chitosan-stabilized selenium nanoparticles [J]. *Carbohydrate Polymers*, 2015, 132: 574-581.
- Siddeeg A, Xu Y, Jiang Q, **Xia W***. In vitro antioxidant activity of protein fractions extracted from seinat (*Cucumis melo* var. tibish) seeds [J]. *Cyta-Journal of Food*, 2015, 13(3): 472-481.
- Liu X, **Xia W***, Jiang Q, Xu Y, Yu P. Binding of a novel bacteriostatic agent-chitosan oligosaccharides-kojic acid graft copolymer to bovine serum albumin: spectroscopic and conformation investigations [J]. *European Food Research and Technology*, 2015, 240(1): 109-118.
- Gu W, Wang M, Mao X, Wang Y, Li L, **Xia W***. A facile sensitive L-tyrosine electrochemical sensor based on a coupled CuO/Cu₂O nanoparticles and multi-walled carbon nanotubes nanocomposite film [J]. *Analytical Methods*, 2015, 7(4): 1313-1320.

Achievements and Honors

Prof. Xia hosts and participates in more than 50 projects. The typical projects are shown below:

1. National Agriculture Ministry Project: Chinese freshwater fish industry system (CARS-45-26). 2008.01-2010.12, 2011.01-2015.12, 2016.01-2020.12. (2.1 million, 3.5 million, 3.5 million).
2. Jiangsu Province Project for Fisheries: Application and demonstration of key technologies in producing delicious and convenient fish foods (Y2017-30). 2017.06-2019.06. (0.5 million).
3. Shandong Province Project for Leading Talents: Industrial production of chitosan with high purity by enzyme. 2015.01-2018.12. (18 million).
4. National Natural Science Fund: Study on the mechanism of flavor formation in Chinese traditional fermented fish (suanyu) (NSFC 31371823). 2013.01-2018.12. (0.84 million).
5. National Natural Science Fund: Study on the mechanism of gel formation of fermented surimi. (NSFC 31171709). 2012.01-2015.12. (0.68 million).
6. Jiangsu Province Project for Fisheries: Application and demonstration in deep processing of Chinese freshwater fish (D2013-7). 2013.07-2015.12. (1 million).
7. National "Twelfth Five-Year Plan" Supporting Project: Food emulsion stabilizer – production and industrialization (2011BAD23B04). 2011.01-2015.12. (0.4 million).
8. Jiangsu Province Project for Transformation in Significant Achievements: Amino polysaccharide as new food additive (BA2009082). 2009.01-2013.12. (1.2 million).
9. National Science and Technology Ministry Project for Transformation in Achievements: Efficiency, eco-friendly, and comprehensive utilization of shrimp byproducts (2014GB2C100312). 2014.08-2016.12. (0.6 million).
10. National Science and Technology Ministry Project for Transformation in Achievements: Sodium citrate as effective and safe food additive (2011GB2E00003). 2011.01-2013.12. (1 million).
11. National "863 plans": Agricultural biological manufacturing and food fine processing technology and products (2007AA100401). 2007-2010. (11.9 million).
12. National Natural Science Fund: Study on the mechanism of bifunctional enzymes in hydrolyzing chitosan (NSFC 20576104). 2005.01-2008.12. (0.32 million).
13. National "863 plans": Effective utilization of marine aquatic resources (2006AA09Z444). 2006.01-2009.12. (4 million).
14. Province Collaborative Project for University and Industry: Deep processing and comprehensive utilization of aquatic products – research and industrialization (2007A090302059). 2007.01-2010.12. (0.4 million).
15. Province Collaborative Project for University and Industry: Development of chitosan nanoparticles with weight loss function (2010B090400467). 2010.01-2012.12. (0.4 million).
16. Jiangsu Province High-Tech Project: Chitosan and its derivatives as natural food preservatives (BE2003316). 2005.

Prof. Xia achieved more than 20 awards for scientific research. The typical awards are shown below:

1. Education Ministry – Science and Technology Progress (Second Prize): Freshwater fish, shrimp and crab for delicious and convenient food – key processing technologies and application. 2017.
2. Jiangsu Province – Science and Technology Progress (Second Prize): Clean production of chitin and industrialization. 2015.
3. Chinese Food Industry Association – Science and Technology (Second Prize): Comprehensive utilization and industrialization of low value aquatic resources. 2007.

4. Hubei Province – Science and Technology Progress (Second Prize): Traditional freshwater fish flavor foods production and industrialization. 2007.
5. Education Ministry – Science and Technology Progress (Second Prize): New dairy foods by bioengineering technologies. 2006.
6. National Science and Technology Progress Nominees (Second Prize): Chitosan enzymatic modification technology and application. 2005.

Prof. Xia achieved more than 20 awards as an educator. The typical awards are shown below:

1. Jiangsu Province – Teaching Achievements (First Prize): Combining Science and Engineering in Food Schools – Creation and Practice of One-Core-Course System. 2017.
2. “The Best Teacher” in Jiangnan University. 2016.
3. “Excellent Teaching Materials” Reviewed by Chinese Light Industry Association (Second Prize): Food Processing Technology. 2015.
4. “National High-Quality Resource Sharing Course”: Food Processing Technology. 2013.
5. “The Well-Known Teacher” in Jiangsu Province. 2011.
6. “Model for Educators” in Jiangnan University. 2011.
7. Chinese Light Industry Association – Teaching Materials Progress (Second Prize): Food Processing Technology. 2010.
8. “My Favorite Teacher” in Jiangnan University. 2008.