

# 农药加工使用与环境安全课题组

## 课题组负责人



**刘峰**，博士，教授，博士生导师，农药学系主任，山东农业大学“1512工程”第二层次。中国植物病理学会化学防治专业委员会委员，中国植物保护学会园艺病虫害防治专业委员会委员，山东省农药学会常务理事，山东省农药管理专家，《农药学报》编委。为本科生开设《植物化学保护学》、《农药制剂学》，为博士硕士研究生开设《农药学研究进展》、《农药制剂学原理》、《有害生物抗药性》等课程。主要致力于农药制剂加工、植物病害化学防治和蔬菜病原物抗药性治理等研究，面向农药制剂生产企业、农业基地和农民开展技术推广和培训。以首位及通信作者发表研究论文130多篇，其中SCI收录论文45篇；参编教材与专著7部。授权国家发明专利9项，实用新型专利4项。农药微囊悬浮剂生产技术转化给企业，获得7个登记证书。已毕业研究生50人，指导研究生中5人获研究生国家奖学金，1人获山东省优秀科技创新成果一等奖，1人获评山东省优秀硕士学位论文。

## 研究方向:

- 农药剂型及加工技术**：以缓（控）释和安全使用等为目的，发掘和利用新型载体材料，研究调控释放机理和调控途径，研发增效助剂，并进行工业化技术开发。
- 农药对靶高效施用技术**：研究理化特性、剂型及施药方式等对农药在靶标生物表面的沉积、分布及体内运移规律，研发提高农药利用率、规避或降低农药环境风险的技术。
- 蔬菜真菌病害抗药性风险评估**：研究新农药杀菌机理、病原物对杀菌剂抗性机制，开展抗性风险评估和区域抗性监测，研发抗性快速检测技术和治理措施。



**慕卫**，博士，教授，博士生导师，山东农业大学“1512工程”第二层次。农业农村部农药环境试验认证实验室质量负责人，中国植物保护学会农药学专业委员会委员，中国昆虫学会农药毒理专业委员会委员，山东省昆虫学会理事，山东省农药管理专家。目前为本科生开设《植物化学保护》、《农药分析》、《农药与环境安全》；为博士硕士生开设《农药学进展》、《农药残留与环境毒理》、《农药学专题讲座》等课程。近五年来以通信作者发表论文50余篇，其中SCI收录论文25篇。2014年以来指导的研究生6人获研究生国家奖学金，2人获山东省优秀毕业生，1人获山东省研究生优秀科技创新成果一等奖。获得2017年山东省大中专学生暑期“三下乡”社会实践活动优秀指导教师。

## 研究方向:

- 农药分析与残留分析；
- 杀虫剂毒理；
- 农药环境风险评估

## 课题组成员



**李北兴**，博士，2019年获山东农业大学农药学博士学位，主要从事农药剂型与施药技术研究。以第一作者在 *Advanced Functional Materials* (影响因子13.325)、*Journal of Agricultural and Food Chemistry*、*Science of The Total Environment*、*Chemosphere*等期刊发表SCI论文11篇，累计5年影响因子55.567。获山东省研究生优秀科技创新成果一等奖、山东省高等学校科学技术奖三等奖、国家奖学金、山东省优秀毕业生、赵善欢院士奖学金教基金优秀研究生奖等荣誉/称号。



**郭楠**，博士，讲师，山东农业大学“1512工程”第四层次人才。2017年获中国农业大学理学院农药学博士学位。主要研究方向为农药残留分析、农残快速检测、膳食摄入风险评估等，以第一作者在 *Journal of Chromatography A*、*Journal of Agricultural and Food Chemistry*、*Journal of Separation Science*等期刊发表SCI论文多篇。主持国家自然科学基金青年基金、山东省自然科学基金博士基金项目。曾获大学生暑期“三下乡”社会实践活动“优秀指导教师”称号。



**张大侠**，硕士，助理研究员，在读博士研究生。主要负责农药剂型课题组管理与科研成果转化。以第一作者在 *Journal of Agricultural and Food Chemistry*、*RSC Advances*等期刊发表SCI论文多篇；授权发明专利和实用新型专利共计12项。作为主要完成人获得山东省高等学校科学技术奖三等奖，参与国家自然科学基金面上项目2项。



**刘尚刚**，硕士，助理研究员，主要负责农药田间药效试验评价。作为主要参与者参加国家自然科学基金3项，国家公益性行业（农业）科研专项3项，发表SCI论文3篇。



**范卫芳**，主要负责课题组财务及档案管理，田间药效试验业务管理。



**徐双玉**，硕士，助理研究员，主要从事杀线虫剂应用技术研究。参与国家自然科学基金3项，国家公益性行业（农业）科研专项2项。以第一作者发表SCI论文3篇。



**冯振美**，主要负责小地老虎、棉铃虫、甜菜夜蛾、小菜蛾、韭蛆等生物试材培育、实验室物品管理。

本课题组每年招收博士后1-2名，博士生2名，硕士生6名，欢迎咨询并加入我们！

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# 农药加工使用与环境安全课题组

## 主持科研项目

### 1. 国家自然科学基金

- 配位组装型微囊与植物根系互作提高农药吸收利用率的机制研究(2019-2021);
- 配位组装型农药微胶囊的对靶递释规律及选择毒性调控机制(2018-2021);
- 金属-多酚配合物负载型杀虫微胶囊的成囊机制、释放及杀虫活性调控(2016-2017);

### 2. 国家重点研发计划

- 化学农药对靶高效传递与沉积机制及调控子课题-剂型及助剂对叶用和土壤处理农药施用效率的影响及调控途径(2017-2020);
- 化学农药协同增效关键技术及产品研发(2016-2020);

### 3. 国家公益性行业(农业)科研专项

- 作物根蛆类害虫综合防治技术与示范-山东设施韭菜等作物根蛆类害虫综合防治技术与示范(2013-2017);
- 农药风险评估综合配套技术研究-我国农药职业暴露典型场景建立与风险分析(2010-2013);
- 作物孢囊线虫病控制技术研究与示范-防治孢囊线虫病新药剂研制及应用(2009-2013);
- 农药高效安全科学施用技术-白粉病菌对防治药剂敏感性变异检测及药剂对靶高效沉积技术研发(2009-2013);
- 甜菜夜蛾防控技术研究与示范(2008-2010)

### 4. “十二五”农村领域国家科技计划

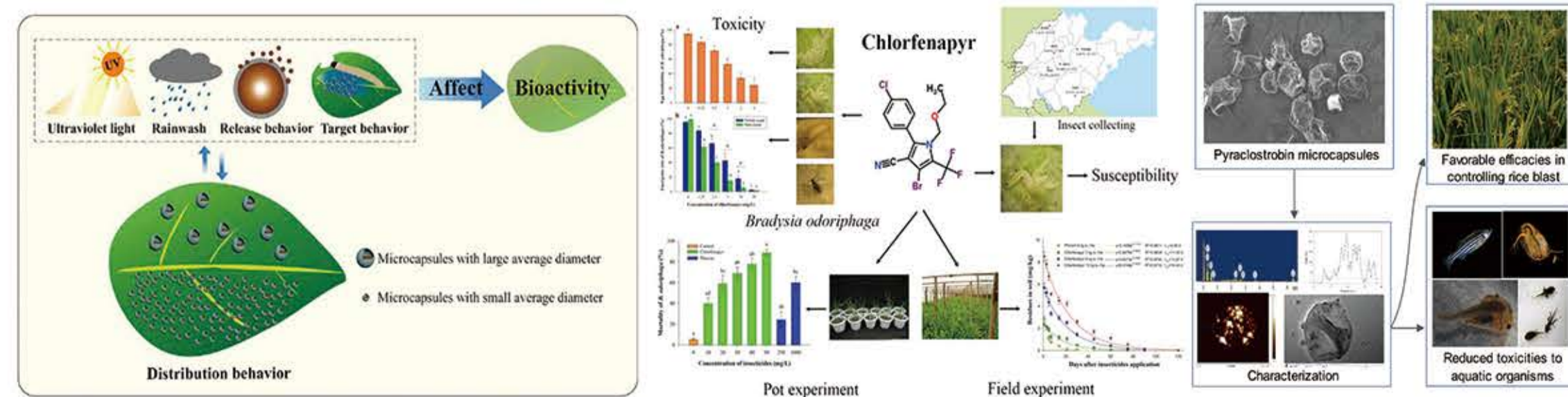
- 棉花重大病虫害防控技术研究与集成示范-绿盲蝽等棉田主要害虫高效低毒药剂研制及配套低风险施药技术(2012-2016)

### 5. 山东省优秀中青年科学家科研奖励基金

- 多粘类芽孢杆菌BMP-11挥发性化合物的诱导抗病活性研究(2011-2013)

### 6. 山东省自然科学基金

- 韭菜迟眼蕈蚊性信息素结合蛋白(PBPs)基因的鉴定及功能研究(2018-2021);
- 微流色谱柱与离子迁移谱连用设计及其在地下水农药多残留快速检测中的应用研究(2018-2020)



## 奖励与荣誉

- 山东省高等学校科学技术三等奖, 防治地下害虫农药微囊化技术与开发, 2017;
- 山东省科技进步二等奖, 韭菜和大蒜根蛆灾变机制及绿色防控关键技术的研究与应用, 2015;
- 山东省高等教育教学成果二等奖, 培养创新人才的方法与实践, 2005;
- 山东省科学技术进步三等奖; 旱田除草剂新制剂应用技术配套研究, 2001;
- 国家科技进步三等奖, 棉铃虫抗药性规律及综合治理研究, 1995

## 研究生培养

- 课题组从2002年开始招收研究生, 现已培养101名硕士毕业生, 2名博士毕业生。目前, 在读硕士研究生21名, 在读博士研究生7名。
- 2014年以来, 课题组研究生7人被评为山东省优秀毕业生, 1人获评山东省优秀硕士学位论文, 1人获山东省研究生优秀科技创新成果一等奖, 1人获山东省高等学校科学技术奖, 2人获赵善欢院士奖学基金优秀研究生奖, 1人获山东省昆虫学科研究生创新论坛-特等奖。



研究生国家奖学金获得者

## 著作、标准

- 主编高等学校规划教材《农药学实验技术与指导》, 化学工业出版社, 2009;
- 副主编全国高等学校农林规划教材《植物保护学实验》, 高等教育出版社, 2014;
- 副主编普通高等教育“十一五”规划教材《农药分析与残留分析》, 化学工业出版社, 2007;
- 参编《植物化学保护学》、《农药制剂学》、《农药学实验技术与指导》、《中国植物保护百科全书-农药卷》、《现代农药剂型加工技术》、《蔬菜农药高效科学施用技术指导手册》、《农药无公害使用指南》、《绿色食品蔬菜农药使用手册》等规划教材或专著;
- 参与起草国家标准《化学农药环境安全评价试验准则》。

## 授权专利

### 1. 发明专利

- 一种农药组合物及其用途;
- 一种复配熏蒸剂;
- 一种具有协同增效作用的三元杀菌和杀线组合物;
- 一种虫螨腈和吡丙醚的杀虫组合物及其制剂与应用;
- 一种防治马铃薯黑痣病的杀菌组合物;
- 一种防治线虫的农药组合物;
- 一种虫螨腈和新烟碱类杀虫剂的杀虫组合物及其制剂与应用;
- 一种微胶囊囊芯释放率的测试方法及装置;
- 一种含吡丙醚和氟铃脲的农药组合物;
- 一种以单宁酸的金属离子螯合物作为囊壁的农药微胶囊及其制备方法;

### 2. 实用新型专利

- 一种多孔型双层囊壁微胶囊;
- 一种多位点滴灌管道;
- 一种新型微胶囊;
- 一种微胶囊囊芯释放率测试所用装置。



# 农药加工使用与环境安全课题组

## 学术论文

### 1. 农药缓释剂型研究及加工技术

- Using coordination Assembly as the microencapsulation strategy to promote the efficacy and environmental safety of pyraclostrobin. *Advanced Functional Materials*, 2017 (IF=13.325)
- Analysis of particle size regulating the insecticidal efficacy of phoxim polyurethane microcapsules on leaves. *ACS Sustainable Chemistry and Engineering*, 2018 (IF=6.970)
- Porous microcapsules with tunable pore sizes provide easily controllable release and bioactivity. *Journal of Colloid and Interface Science*, 2018 (IF=6.361)
- Easily Tunable Membrane thickness of microcapsules by using a coordination assembly on the liquid-liquid interface. *Frontiers in Chemistry*, 2018 (IF=3.782)
- Two-stage controlled release system possesses excellent initial and long-term efficacy. *Colloids and Surfaces B: Biointerfaces*, 2018 (IF=3.973)
- Porous epoxy phenolic novolac resin polymer microcapsules: tunable release and bioactivity controlled by epoxy value. *Colloids and Surfaces B: Biointerfaces*, 2018 (IF=3.973)
- Assessment of ethylene glycol diacetate as an alternative carrier for use in agrochemical emulsifiable concentrate formulation. *Ecotoxicology and Environmental Safety*, 2018 (IF=4.527)
- Integrating uniform design and response surface methodology to optimize thiacloprid suspension. *Scientific Reports*, 2017 (IF=4.122)
- Phoxim microcapsules prepared with polyurea and urea-formaldehyde resins differ in photostability and insecticidal activity. *Journal of Agricultural and Food Chemistry*, 2016 (IF=3.154)
- Tunable thermal, mechanical, and controlled release properties of epoxy phenolic novolac resin microcapsules mediated by diamine crosslinkers. *RSC Advances*, 2019 (IF=3.049)
- Thiacloprid suspension formula optimization based on a response surface methodology. *RSC Advances*, 2015 (IF=3.289)
- A versatile method for evaluating the controlled-release performance of microcapsules. *Colloids and Surfaces A*, 2017 (IF=2.829)
- Causation analysis and improvement strategy for reduced pendimethalin herbicidal activity in the field after encapsulation in polyurea. *ACS Omega*, 2018 (IF=2.584)
- Formula and process optimization of controlled-release microcapsules prepared using a coordination assembly and the response surface methodology. *Journal of Applied Polymer Science*, 2016

### 2. 有害生物防治及农药对靶高效施用技术

- High-efficiency control of gray mold by the novel SDHI fungicide benzovindiflupyr combined with a reasonable application approach of dipping flower. *Journal of Agricultural and Food Chemistry*, 2018 (IF=3.571)
- Modifying the formulation of abamectin to promote its efficacy on southern root-knot nematode (*Meloidogyne incognita*) under blending-of-soil and root-irrigation conditions. *Journal of Agricultural and Food Chemistry*, 2018 (IF=3.571)
- Nematicidal activity of trans-2-hexenal against southern root-knot nematode (*Meloidogyne incognita*) on tomato plants. *Journal of Agricultural and Food Chemistry*, 2017 (IF=3.412)
- Chlorfenapyr, a potent alternative insecticide of phoxim to control *Bradysia odoriphaga* (Diptera: Sciaridae). *Journal of Agricultural and Food Chemistry*, 2017 (IF=3.412)
- Seed treatment combined with a spot application of clothianidin granules prolongs the efficacy of controlling piercing-sucking insect pests in cotton fields. *Journal of Agricultural and Food Chemistry*, 2017 (IF=3.412)
- Nitenpyram, dinotefuran and thiamethoxam used as seed treatments act as efficient controls against *Aphis gossypii* via high residues in cotton leaves. *Journal of Agricultural and Food Chemistry*, 2016 (IF=3.154)

- Cyantraniliprole seed treatment efficiency against *Agrotis ipsilon* (Lepidoptera: Noctuidae) and residue concentrations in corn plants and soil. *Pest Management Science*, 2019 (IF=3.255)
- A precisely targeted application strategy of dipping young cucumber fruit in fungicide to control cucumber gray mold. *Pest Management Science*, 2018 (IF=3.255)
- Effects of imidacloprid and clothianidin seed treatments on wheat aphids and their natural enemies on winter wheat. *Pest Management Science*, 2016 (IF=3.253)
- Dissipation dynamics of clothianidin and its control efficacy against *Bradysia odoriphaga* Yang and Zhang in Chinese chive ecosystems. *Pest Management Science*, 2016 (IF=3.253)
- Oil adjuvants enhance the efficacy of pyraclostrobin in managing cucumber powdery mildew (*Podosphaera xanthii*) by modifying the affinity of fungicide droplets on diseased leaves. *Plant Disease*, 2019 (IF=3.583)
- Nitenpyram seed treatment effectively controls against the mirid bug *Apolysus lucorum* in cotton seedlings. *Scientific Reports*, 2017 (IF=4.122)
- Toxicity of nine insecticides on four natural enemies of *Spodoptera exigua*. *Scientific Reports*, 2016 (IF=4.259)

### 3. 农药毒理与抗药性风险评估

- Favorable bioactivity of the SDHI fungicide benzovindiflupyr against *Sclerotinia sclerotiorum* mycelial growth, sclerotial production, and myceliogenic and carpogenic germination of sclerotia. *Plant Disease*, 2019 (IF=3.583)
- Characterization and fungicide sensitivity of colletotrichum spp. from different hosts in Shandong, China. *Plant Disease*, 2019 (IF=3.583)
- Baseline sensitivity and control efficacy of tetramycin against *Phytophthora capsici* isolates in China. *Plant disease*, 2018 (IF=3.583)
- Detection and characterization of QoI-resistant *Phytophthora capsici* causing pepper phytophthora blight in China. *Plant disease*, 2018 (IF=3.583)
- First report of *Colletotrichum lindemuthianum* causing anthracnose on pepper in China. *Plant disease*, 2018 (IF=3.583)
- Activity, translocation, and persistence of isopyrazam for controlling cucumber powdery mildew. *Plant Disease*, 2017 (IF=2.941)
- Baseline sensitivity of *Botrytis cinerea* to the succinate dehydrogenase inhibitor isopyrazam and efficacy of this fungicide. *Plant Disease*, 2016 (IF=3.173)
- Proteomic profile of the *Bradysia odoriphaga* in response to the microbial secondary metabolite benzothiazole. *Scientific Reports*, 2016 (IF=4.259)
- Effects of trans-2-hexenal on reproduction, growth and behaviour and efficacy against the pinewood nematode, *Bursaphelenchus xylophilus*. *Pest Management Science*, 2017 (IF=3.249)
- Sex- and tissue-specific expression profiles of odorant binding protein and chemosensory protein genes in *Bradysia odoriphaga* (Diptera: Sciaridae). *Frontiers in Physiology*, 2018 (IF=3.201)
- A bioactivity and biochemical analysis of iminoctadine tris (albesilate) as a fungicide against *Corynespora cassiicola*. *Pesticide Biochemistry and Physiology*, 2019 (IF=2.870)
- Evaluation of bioactivity and control efficacy of tetramycin against *Corynespora cassiicola*. *Pesticide Biochemistry and Physiology*, 2019 (IF=2.870)
- Sublethal effects of chlorfenapyr on the life table parameters, nutritional physiology and enzymatic properties of *Bradysia odoriphaga* (Diptera: Sciaridae). *Pesticide Biochemistry and Physiology*, 2018 (IF=2.870)
- Toxicity and biochemical action of the antibiotic fungicide tetramycin on *Colletotrichum scovillei*. *Pesticide Biochemistry and Physiology*, 2018 (IF=2.870)

- Effects of the plant volatile trans-2-hexenal on the dispersal ability, nutrient metabolism and enzymatic activities of *Bursaphelenchus xylophilus*. *Pesticide Biochemistry and Physiology*, 2017 (IF=3.440)
- Lethal and sublethal effects of the chitin synthesis inhibitor chlorfluazuron on *Bradysia odoriphaga* Yang and Zhang (Diptera: Sciaridae). *Pesticide Biochemistry and Physiology*, 2017 (IF=3.440)
- Effects of the microbial secondary metabolite benzothiazole on the nutritional physiology and enzyme activities of *Bradysia odoriphaga* (Diptera: Sciaridae). *Pesticide Biochemistry and Physiology*, 2016 (IF=2.590)

### 4. 农药残留分析与环境安全

- The minimally effective dosages of nitenpyram and thiamethoxam seed treatments against aphids (*Aphis gossypii* Glover) and their potential exposure risks to honeybees (*Apis mellifera*). *Science of the Total Environment*, 2019 (IF=5.589)
- Alcohol ethoxylates significantly synergize pesticides than alkylphenol ethoxylates considering bioactivity against three pests and joint toxicity to *Daphnia magna*. *Science of The Total Environment*. 2018 (IF=5.589)
- Sublethal and transgenerational effects of thiamethoxam on the demographic fitness and predation performance of the seven-spot ladybeetle *Coccinella septempunctata* L. (Coleoptera: Coccinellidae). *Chemosphere*, 2019 (IF=5.108)
- Selection of organosilicone surfactants for tank-mixed pesticides considering the balance between synergistic effects on pests and environmental risks. *Chemosphere*, 2019 (IF=5.108)
- Concentrations of imidacloprid and thiamethoxam in pollen, nectar and leaves from seed-dressed cotton crops and their potential risk to honeybees (*Apis mellifera* L.). *Chemosphere*, 2018 (IF=5.108)
- Binary mixtures of alcohol ethoxylates, nonylphenol ethoxylates and pesticides exhibit comparative bioactivity against three pests and toxicological risks to aquatic organisms. *Chemosphere*, 2018 (IF=5.108)
- Coupling of multi-walled carbon nanotubes/ polydimethylsiloxane coated stir bar sorptive extraction with pulse glow discharge-ion mobility spectrometry for analysis of triazine herbicides in water and soil samples. *Journal of Chromatography A*, 2016 (IF=3.981)
- Influence of lethal and sublethal exposure to clothianidin on the seven-spotted lady beetle, *Coccinella septempunctata* L. (Coleoptera: Coccinellidae). *Ecotoxicology and Environmental Safety*, 2018 (IF=4.527)
- Quaternary ammonium cationic surfactants increase bioactivity of indoxacarb on pests and toxicological risk to *Daphnia magna*. *Ecotoxicology and Environmental Safety*, 2018 (IF=4.527)
- Multiresidue method for determination of 183 pesticide residues in leeks by rapid multiplug filtration cleanup and gas chromatography-tandem mass spectrometry. *Journal of Agricultural and Food Chemistry*, 2016 (IF=3.154)

本课题组每年招收博士后1-2名，博士生2名，硕士生6名。

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