18 November 2022

Curriculum Vitae

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Education

Ph.D.	Kyungpook National University, Daegu, Republic of Korea · Applied Biosciences – Environmental Toxicology · Thesis - Toxicological mechanisms of methyl bromide and its alternative fumigants (phosphine and ethyl formate) against *Arabidopsis thaliana* and quarantine insect pests using multi-omics approaches	2018-2022
M.S.	Kyungpook National University, Daegu, Republic of Korea · Applied Biosciences – Environmental Toxicology	2016-2018
B.S.	Kyungpook National University, Daegu, Republic of Korea · Applied Biosciences – Molecular Microbiology (microbial toxin)	2011-2014

Position Held

Post-Doc.	Institute for Quality and Safety Assessment of Agricultural Products, Kyungpook National University, Daegu, Republic of Korea	2022.09-Present
Post-Doc.	Department of Applied Biosciences (BK21 program), Kyungpook National University, Daegu, Republic of Korea	2022.03-08
Instructor	School of Applied Biosciences, Kyungpook National University, Daegu, Republic of Korea	2022

Research Interests

Publications

- Students under my direct mentoring are underlined / †Authors equally contributed to this paper as first authors.

1. **Kim, K.**†, Kim, C.†, Yoo, J., Kim, J.R., Kim, Y. H., Lee, S. E. Phosphine gas in the dark induces severe phytotoxicity in *Arabidopsis thaliana* by increasing a hypoxia stress response and disrupting the energy metabolism: Transcriptomic approaches. **2023** *J Hazard Mater* 43, 130141.
2. Jeon, H.J., **Kim, K**., Kim, C., Cho, Y., Kwon, T.H., Lee, B.H., Lee, S.E., Residual evaluation of ethyl formate in soil and crops after fumigation in green house. **2022**. *Korean J. Environ. Biol.* 40(3): 316-324.

3. Park, J., Kim, Y., Jeon, H. J., **Kim, K.**, Kim, C., Lee, S., Son, J., Lee, S.E. Acute and developmental toxic effects of mono-halogenated and halomethyl naphthalenes on zebrafish (*Danio rerio*) embryos: Cardiac malformation after 2-bromomethyl naphthalene exposure. **2022**. *Environ Pollut* 297, 118786.
4. **Kim, K**., Kim, C., Park, J., Yoo, J., Kim, W., Jeon, H.J., Kim, J.R., Lee, S.E., Reduction effects of N-acetyl-L -cysteine, L -glutathione, and indole-3-acetic acid on phytotoxicity generated by methyl bromide fumigation- in a model plant *Arabidopsis thaliana.* **2021**. *Korean J. Environ. Biol.* 39(3): 354-361.
5. Park, J., Kim, C., Jeon, H.J., **Kim, K**., Kim, M.J., Moon, J. K., Lee, S.E. Developmental toxicity of 3-phenoxybenzoic acid (3-PBA) and endosulfan sulfate derived from insecticidal active ingredients: Abnormal heart formation by 3-PBA in zebrafish embryos. **2021** *Ecotoxicol Environ Saf* 224, 112689.
6. **Kim, K.**, Park, M. G., Lee, Y. H., Jeon, H. J., Kwon, T. H., Kim, C., Park, J., Lee, B. H., Yang, J. O., Lee, S. E. Synergistic Effects and Toxic Mechanism of Phosphine with Ethyl Formate against Citrus Mealybug (*Planococcus citri*). **2021** *Appl Sci-Basel* 11 (21).
7. Choe, H., Kim, M. J., Jeon, H. J., **Kim, K**., Kim, C., Park, J., Shin, J., Lee, S. R., Lee, S. E. Acute toxicity of the insecticide EPN upon zebrafish (Danio rerio) embryos and its related adverse effects: Verification of abnormal cardiac development and seizure-like events. **2021** *Ecotox Environ Safe* 222.
8. **Kim, K.**[†], Kim, C.[†], Park, J., Jeon, H. J., Park, Y. J., Kim, Y. H.; Yang, J. O., Lee, S. E., Transcriptomic evaluation on methyl bromide-induced phytotoxicity in *Arabidopsis thaliana* and its mode of phytotoxic action via the occurrence of reactive oxygen species and uneven distribution of auxin hormones. **2021** *J Hazard Mater* 419, 126419.
9. **Kim, K**., Lee, S. E. Combined toxicity of dimethyl sulfoxide (DMSO) and vanadium towards zebrafish embryos (*Danio rerio*): Unexpected synergistic effect by DMSO. **2021** *Chemosphere* 270, 129405.
10. Kim, C., Choe, H., Park, J., Kim, G., **Kim, K**., Jeon, H. J., Moon, J. K., Kim, M. J., Lee, S. E.. Molecular mechanisms of developmental toxicities of azoxystrobin and pyraclostrobin toward zebrafish (*Danio rerio*) embryos: Visualization of abnormal development using two transgenic lines. **2021** *Environ Pollut* 270.
11. Jeon, H. J., **Kim, K.**, Kim, C., Kim, M. J., Kim, T. O., Lee, S. E. Molecular Mechanisms of Anti-Melanogenic Gedunin Derived from Neem Tree (*Azadirachta indica*) Using B16F10 Mouse Melanoma Cells and Early-Stage Zebrafish. **2021** *Plants-Basel* 10 (2).
12. Kim, Y. C., Lee, S. R., Jeon, H. J., **Kim, K.**, Kim, M. J., Choi, S. D., Lee, S. E. Acute toxicities of fluorene, fluorene-1-carboxylic acid, and fluorene-9-carboxylic acid on zebrafish embryos (Danio rerio): Molecular mechanisms of developmental toxicities of fluorene-1-carboxylic acid. **2020** *Chemosphere* 260.
13. Lee, H.K.[†], **Kim, K.**[†], Lee, J., Lee, J., Lee, J., Kim, S., Lee, S.E., Kim, J.H. Targeted toxicometabolomics of endosulfan sulfate in adult zebrafish (*Danio rerio*) using GC-MS/MS in multiple reaction monitoring mode. **2020** *J Hazard Mater* 389, 122056.
14. **Kim, K**.[†], Yang, J. O.[†], Sung, J.Y., Lee, J.Y., Park, J. S., Lee, H.S., Lee, B.H., Ren, Y., Lee, D.W., Lee, S.E. Minimization of energy transduction confers resistance to phosphine in the rice weevil, *Sitophilus oryzae*. **2019** *Sci Rep* 2019, 9 (1).
15. Jeon, H.J., **Kim, K.**, Kim, Y.D., Lee, S.E. Naturally occurring Piper plant amides potential in agricultural and pharmaceutical industries: perspectives of piperine and piperlongumine. **2019** *Appl Biol Chem* 62 (1), 63.
16. **Kim, K.,** Lee, Y. H., Kim, G., Lee, B.H., Yang, J.O., Lee, S.E., Ethyl formate and phosphine fumigations on the two-spotted spider mite, *Tetranychus urticae* and their biochemical responses. **2019** *Appl Biol Chem* 62 (1).

17. **Kim, K.,** Wang, C.H., Ok, Y. S., Lee, S.E. Heart developmental toxicity by carbon black waste generated from oil refinery on zebrafish embryos (*Danio rerio*): Combined toxicity on heart function by nickel and vanadium. **2019** *J Hazard Mater* 363, 127-137.
18. **Kim, K.,** Park, J., Yang, J.O, Lee, S.E., Proteomic Evaluation of Insecticidal Action of Phosphine on Green Peach Aphids, *Myzus persicae*. **2018** *Appl Sci* 8 (10), 1764.
19. **Kim, K**., Jeon, H.J., Choi, S.D., Tsang, D. C. W., Oleszczuk, P., Ok, Y. S., Lee, H.S., Lee, S.E. Combined toxicity of endosulfan and phenanthrene mixtures and induced molecular changes in adult Zebrafish (*Danio rerio*). **2018** *Chemosphere* 194, 30-41.
20. Nam, T.H., Kim, L., Jeon, H.J., **Kim, K.**, Ok, Y.S., Choi, S.D., Lee, S.E. Biomarkers indicate mixture toxicities of fluorene and phenanthrene with endosulfan toward earthworm (*Eisenia fetida*). **2017** *Environ Geochem Health* 39 (2), 307-317.
21. Kim, L., Jeon, J.W., Son, J.Y., Park, M.K., Kim, C.S., Jeon, H.J., Nam, T.H., **Kim, K.**, Park, B.J., Choi, S.D., Lee, S.E., Concentration and distribution of polychlorinated biphenyls in rice paddy soils. **2017** *Appl Biol Chem* 60 (2), 191-196.

Publications – In preparation

1. **Kim, K.**[†], Kim, D.[†], Jeon, H.J., Jeong, M., Shin, J.H., Lee, S. E. Phosphine resistant biomarkers of the red flour beetle (*Tribolium castaneum*) based on transcriptomics with machine learning approaches. **2023** *J Pest Sci* **(In preparation)**
2. **Kim, K.**, Jeon, H.J., Kim, C.' Kim. Y., Kwon, T.H., Lee, B.H., Lee, S. E. Phytotoxic effect and reduction methods of Ethyl formate fumigants: new pest management methods in green-house for watermelon and *Myzus persicae*. *Sci Total Environ* **(In preparation)**
3. Kim, D.[†], **Kim, K.**[†], Jeon, H.J., Lee, S. E. Phosphine resistance in the red flour beetle (*Tribolium castaneum*) involved chitin biosynthesis. **2023** *Postharvest Biol Technol* **(In preparation)**
4. Jeon, H.J.[†], **Kim, K.**[†], Choe, H., Kim, C., Lee, S. E. Melanogenesis inhibited by curcumin and DMC, BDMC. **2023** *Plants* (**In preparation)**

Patents

1	Method for reducing phytotoxicity of plant by methyl bromide (10-2022-0055032)	2022
2	Biomarkers for diagnosing phosphine resistance-induced insects (10-2240047-0000)	2018
3	Biomarker composition for discriminating remaining endosulfan or determining toxicity of ensodulfan comprising wax ester (10-2225307-0000)	2017

Conferences & Symposia

1	Fall International Conference of Korean Society of Applied Entomology (KSAE) - ***Invited*** · Phytotoxic mechanisms and reduction methods of major quarantine fumigants through transcriptome analysis	Oral	Oct., 2022
2	The 77th Annual Meeting of the Korean Association of Biological Sciences - ***Invited*** · The current status of quarantine fumigants and their efficacy & phytotoxicity	Oral	Aug., 2022
3	International Symposium and Annual Meeting of the KSABC – Young Scientist Presentation - ***Invited*** · Omics-based toxicological aspects of phosphine fumigant: Resistance and phytotoxic mechanisms	Oral	June, 2022

4	4th BK21 Participating Education Group Performance Forum - Excellent Performance Presentation Competition (**Top prize**)	Oral	Feb., 2022
5	4th BK21 program symposium (**Top prize**)	Oral	Feb., 2022
8	Fall International Conference of KSAE - Corteva award competition (Insecticide resistance: Mechanism and management) (**Top prize**) · A novel mechanism in a phosphine (PH_3)-resistant rice weevil (*Sitophilus oryzae*) to overcome PH_3 fumigation via minimizing energy transduction	Oral	Oct., 2019
11	The 2nd International Conference on Biological Waste as Resource 2017 (BWR2017) in Hongkong · Mixture Toxicities of Persistent Organic Pollutants and Combinational Effects on Gene Expression in Zebrafish Adults (*Danio rerio*)	Oral	May, 2019
13	International Symposium and Annual Meeting of the KSABC – Graduate Student Presentation · Heart developmental toxicity by carbon black waste generated from oil refinery on zebrafish embryos (*Danio rerio*): Combined toxicity on heart function by nickel and vanadium	Oral	June, 2018
15	International Symposium and Annual Meeting of the KSABC – Graduate Student Presentation (**Excellent Paper**) · Developmental toxicity of carbon black waste generated from oil refinery process against zebrafish embryos (*Danio rerio*)	Oral	June, 2017

Awards, Fellowship, and Grants

1.	(*Current grant*) Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education **- Development of mutant models of the red flour beetle (*Tribolium castaneum*) for assessing phosphine resistance mechanism and control**	$89698.84 (2 years)	2022-2024
2.	The top prize in the 4th BK21 Participating Education Group Performance Forum Excellent Performance Presentation Competition (Bioscience & Engineering Department)	$3737.45	2022
3.	The top prize in KNU Alumni Association Academic Award	$3737.45	2022
4.	The top prize in Participating Graduate Students Performance Sharing Presentation in the 4th BK21 Program	$768.90	2022
5.	4th BK21 Government Scholarship Program: Doctor course	$38810.0 (3.5 years)	2018-2022
6.	The top prize of the Corteva award competition (Insecticide resistance: Mechanism and management) in KSAE	$768.90	2019
7.	3rd BK21 Government Scholarship Program: Master course	$11044.8 (2 years)	2016-2018
8.	Excellent Paper Presentation Award in 3rd BK21 Program		2018
9.	Excellent Paper Presentation Award in KSABC		2017
10.	KNU Challenge Scholarship: Undergraduate Student (Tuition)	$84328.0 (3 years)	2012-2014
11.	KNU Challenge Scholarship – Global program (Australia)	$1917.5	2013
12.	KNU Challenge Scholarship – Global program (Philippine)	$1917.5	2012
13.	KNU Undergraduate Student Tutoring Service Scholarship	$920.40	2013-2014

Invited and contributed lectures

1 Theory and practice of analytical instrumentation (GC-MS and HPLC), Plant Quarantine Technology Center, Animal and Plant Quarantine Agency, Gimcheon 39660, Republic of Korea — Aug., 2022

Experimental skills

1 Organism breeding skills
- *Tribolium castaneum*, *Sitophilus oryzae*, *Rhyzopertha dominica*, *Galleria mellonella*, *Myzus persicae, Planococcus citri,* and so on
- Cell lines (HepG2, AML12, C2C12, and B16F10), *Danio rerio, Eisenia fetida, Arabidopsis thaliana,* and various crops

2 Molecular biology techniques
- DNA/RNA isolation, PCR (RT-PCR, qRT-PCR), Western blot, Enzyme assays
- Gene cloning, Microinjection (in *Tribolium castaneum* and *Danio rerio*), Genotyping (T7E1and CAPS methods)

3 Analytical instruments
- HPLC-DAD (and FLD), LC-MS/MS, LC-Q-TOF-MS
- GC-MS, GC-FID(and ECD, NPD)

4 Bioinformatics
- R for Omics analysis (Transcriptomics, proteomics, lipidomics, and metabolomics)

5 Design tools
- GraphPad Prism, Adobe Illustrator, Photoshop, and Premiere

Teaching Experience

1 School of Applied Biosciences, Kyungpook National University, Daegu, Republic of Korea — 2022-present
- Agricultural Food Hazardous Substances Informatics
- Analytical Organic Chemistry Experiment
- Functional Cosmetics based on Natural Product

2 Facilitator Workshop using Design Thinking, Design Thinking Community (DTC), Daegu, Republic of Korea — 2015-2016

3 Youth Community Workshop for Career Exploration, KKONGBAT, Daegu, Republic of Korea — 2014-2016

Journal review and Editorial service – peer reviewer

1 Journal of Asia-Pacific Entomology (Elsevier)

2 Science of The Total Environment (Elsevier)

References

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