

# Kang Mo Ku

Department of Horticulture, Chonnam National University, Gwangju, Republic of Korea  
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## **EDUCATION**

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Ph. D. Crop Sciences, University of Illinois at Urbana-Champaign (UIUC), 2013.

M.S. Horticulture, Kyungpook National University (South Korea), 2008.

B.A. School of Plant Biosciences, Kyungpook National University (South Korea), Summa Cum Laude, 2006.

## **RESEARCH EXPERIENCE**

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**Assistant Professor in Department of Horticulture, Chonnam National University (2019-)**

**Assistant Professor in Division of Plant and Soil Sciences, West Virginia University (2015-2019)**

- Conducted experiments to improve health-promoting phytonutrients in food crops.
- Conducted experiments to improve biosafety/sensory quality of food crops.
- Evaluated pre-harvest stresses on postharvest food crop quality.

**Postdoctoral Associate in Vegetable Physiological Genetics Lab, UIUC (2013-2015)**

- Evaluated produce safety during postharvest storage and attachment mechanism
- Value-added sustainable vegetable production in controlled environment.
- Evaluated anthocyanin from colored corn as a natural pigment—collaborated with Kraft

**Research Assistant in Vegetable Physiological Genetics Lab, UIUC (2009-2013)**

- Evaluated methyl jasmonate effect on quinone reductase (QR) detoxifying activity and postharvest quality of broccoli and other brassica crops.
- Measured gene expression of glucosinolate biosynthesis and hydrolysis genes, and chlorophyll catabolism genes from broccoli using qRT-PCR during postharvest.

**Researcher in Functional Metabolomics Lab, KonKuk Univ., South Korea (2008-2009)**

- Evaluated different chemicals and bioactivity between conventional grown green teas and shade grown green teas using LC/MS and GC/MS.
- Conducted metabolomic research using LC/MS and partial least squares regression approach to assess fermentation period and type of pu-er teas.

**Research Assistant in Functional Plant Bioscience Lab, Kyungpook National University, South Korea (2006-2008)**

- Isolated QR inducing compounds from vegetables and medicinal plants.
- Identified QR inductive compounds using mass spectrometry.
- Screened anti-inflammatory and antioxidant activity from extract library.

### **TEACHING EXPERIENCE**

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- Taught PLSC 493D/593A: Metabolomics: An Introduction at Summer 2018 (Online)
- Taught PLSC 206 (Principles of Plant Sciences with lab, 96 students) at Fall semester, West Virginia University.
- Taught PLSC 490/790 (Teaching Practicum), West Virginia University.
- Volunteer Teaching Assistant for Greenhouse Management and Production HORT 341, Spring 2015, UIUC.
- Guest lecturer for Greenhouse Management and Production HORT 341, Mar 18 2015, UIUC
- Guest lecturer for Research Methods in Plant sciences, UIUC (HORT 505 online), Sep 18 2014.
- Guest lecturer for Horseradish Growers Conference, Collinsville, IL, Jan 30 2014.
- Teaching Assistant in Natural Product Chemistry Honors Program, Agrobiotechnology Education Center, Kyungpook National University (Spring semester of 2006 and 2007)  
Taught lab class: isolation of active compounds from medicinal plants for 20 students.

### **MENTORING EXPERIENCE**

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- Independent Study (HORT 495, CHEM 497, HONR 495) WVU (N=5).
- Summer Undergraduate Research Experience (SURE) 2016, West Virginia University, Two students.
- Mentor for Morgantown High School student in Environ Mentor, 2<sup>nd</sup> ranked in West Virginia State Competition.
- Mentor for graduate students in Dr. Juvik's and Dr. Wortman's Labs.
- Mentor for Summer International Internship Students in Department of Crop Science, University of Illinois, 2010, 2012-2014, taught basic experimental design, phytochemical extraction, and operation of analytical instruments including HPLC and GC. (3 Chinese, 2 Puerto Ricans, and 1 Taiwanese student).
- Mentor for a high school student for Summer Science Camp in Department of Crop Science, University of Illinois, 2011.

### **FELLOWSHIPS & AWARDS**

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1. West Virginia University, Senate Grant (\$15,000) 2018
2. Davis College and Extension collaboration grant (\$13,395) 2018
3. Davis College Research Grant for undergraduate research (\$500), 2017

4. WVU-School of Agriculture and Food Research Grant. Kang Mo Ku (PI) and Cangliang Shen (Co-PI). Survival and attachment mechanism of foodborne pathogens on various leafy green surfaces. (\$3,000).
5. WVU- Summer Undergraduate Research Experience. Mentoring two students (\$4,000), 2016
6. Daniel C. & Elizabeth D. Brown Faculty Development, West Virginia University (\$6,000), 2016
7. Travel Grants from Senate Research Committee, West Virginia University (\$800), 2016
8. Graduate Student Research Award, College of ACES (\$1,000), UIUC, 2014.
9. Department of Crop Sciences Awards, Eugene Boerner Awards (\$1,000), UIUC, 2012.
10. Travel Grants from American Society of Horticultural Science, 2012.
11. Travel Grants from Department of Crop Sciences in UIUC, 2012.
12. Travel Grants from American Society of Horticultural Science, 2011.
13. Boerner Fellowship for 4 years (\$40,000/year) from Crop Sciences, UIUC, 2009.
14. Research Poster Award from the Plant Resources Society of Korea “Chemopreventive activity of *Glycine soja*”, 2007.
15. Research Poster Award from the Korean Society of breeding Science. Korea. “Antioxidant activity of Cheongja and Aga soybean”, 2007.
16. The LG Scholarship during Master’s program (2 years, \$10,000), 2006.
17. Research Poster Award from the Plant Resources Society of Korea. “Chemopreventive activity of pepper leaves”, 2006.
18. 4<sup>th</sup> ranked in Venture Company Proposal Competition, Agrobiotechnology Education Center, Kyungpook National University, 2006.
19. Chancellor Award of Kyungpook National University in recognition of outstanding academic achievements, 2006.

## **PUBLICATIONS (Total 42 published papers)**

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\*Equally contributed.

1. Palma S, **Ku KM**, Juvik JA, Nguyen T, Feng H. Adhesion and removal of E. coli K-12 as affected by produce epicuticular wax composition, surface roughness, and produce and bacterial surface hydrophobicity. Food Microbiology. 2019. In revision.
2. Simpson TJ, Chiu YC, Richards-Babb M, Blythe JM, and **Ku KM**. Demonstration of allelopathy of horseradish root extract on lettuce seed. Biochemistry and Molecular Biology Education. 2019. Accepted.
3. Kim HJ, **Ku KM**, Choi S, Cardarelli M. Vegetal-derived biostimulant enhances adventitious rooting in cuttings of basil, tomato, and chrysanthemum via brassinosteroid-mediated processes. Agronomy. 2019, 9(2), 74.
4. Zhang L, **Ku KM**. Biomarkers-based classification between green teas and decaffeinated green teas using gas chromatography mass spectrometer coupled with in-tube extraction (ITEX). Food Chemistry. 2019. 271 450-456.  
<https://doi.org/10.1016/j.foodchem.2018.07.137>

5. Skinner CR, Gigliotti JC, **Ku KM**, Tou JC. A comprehensive analysis of the composition, health benefits, and safety of apple pomace. *Nutritional Review*. 2018. <https://doi.org/10.1093/nutrit/nuy033>
6. Kim MJ, Simpson TJ, Chiu YC, Becker TM, Juvik JA, and **Ku KM**. Environmental and genetic variation in essential mineral nutrients and nutritional value among Brassica vegetables. *Journal of Agricultural Science*. 10 (7) 2018. <https://doi.org/10.5539/jas.v10n7p1>
7. Liu M, Zhang L, Suk Lan Ser, Cumming RJ, **Ku KM**, Comparative analysis of broccoli by-products for human nutrition: the potentials of broccoli by-product utilization. *Molecules*. 23(4), 900. 2018. doi:10.3390/molecules23040900
8. Chiu YC, Juvik JA, **Ku KM**. Targeted metabolomic and transcriptomic analyses of ‘Red Russian’ kale (*Brassica napus* var. *pabularia* following methyl jasmonate treatment and larval infestation by the cabbage looper (*Trichoplusia ni* Hübner). *International Journal of Molecular Science*. 19, 1058. 2018. doi:10.3390/ijms19041058
9. Zucoloto M, **Ku KM\***, Kim MJ, Kushad, MM. Influence of 1-methylcyclopropene treatment on postharvest quality of scab (*Venturia inaequalis*) resistant apple cultivars. *Journal of Food Quality*. 2017. Article ID 5951041, 12 pages, <https://doi.org/10.1155/2017/5951041> [Link]
10. Frazie MD, Kim MJ, **Ku KM**. Health-promoting phytochemicals from 11 mustard cultivars at baby leaf and mature stages. *Molecules*, 22(10), 1749, 2017. doi:10.3390/molecules22101749 [Link]
11. Kim MJ, Chiu YC, and **Ku KM**. Glucosinolates, carotenoids, and vitamins E and K variation from selected kale and collard cultivars. *Journal of Food Quality*. 2017 Article ID 5123572, 8 pages, <https://doi.org/10.1155/2017/5123572> [Link]
12. Sim I, Suh DH, Do SG, Moon KH, Lee JH, **Ku KM**, Lee CH. Unraveling Metabolic Variation for Blueberry and Chokeberry Cultivars Harvested from Different Geo-Climatic Regions in Korea. *Journal of Agricultural Food Chemistry*. 65 (41), pp 9031–9040. 2017. DOI: 10.1021/acs.jafc.7b04065 [Link]
13. Lee YS, **Ku KM\***, Becker T, Juvik JA. Chemopreventive glucosinolate accumulation in various broccoli and collard tissues: microfluidic-based targeted transcriptomics for by-product valorization. *PLoS One*. 12(9): e0185112, 2017. <https://doi.org/10.1371/journal.pone.0185112> [Link]
14. Kim MJ, Chiu YC, Kim NK, Park HM, Lee CH, Juvik JA, and **Ku KM**. Cultivar specific changes in primary and secondary metabolites in pak choi (*Brassica rapa*, *Chinensis*. Group) by methyl jasmonate. *International Journal of International Molecular Sciences*. 18(5), 1004, 2017. doi:10.3390/ijms18051004 [Link]

15. Chiu YC, Jenks MA, Richards-Babb M, Ratcliff BB, Juvik JA, **Ku KM**. Demonstrating the effect of surfactant on water retention of waxy leaf surfaces. *Journal of Chemistry Education*. 2017. doi: 10.1021/acs.jchemed.6b00546. [[Link](#)] [[Tutorial Video](#)]
16. **Ku KM**, Kim MJ, Jeffery EH, Kang Y-H, Juvik JA. Profiles of glucosinolates and their hydrolysis products, and quinone reductase inducing activity from 39 arugula (*Eruca sativa* Mill.) Accessions. *Journal of Agricultural Food Chemistry*. 64(34), 6524-6532, 2016. doi: 10.1021/acs.jafc.6b02750. [[Link](#)]
17. Fuzawa M, **Ku KM**, Palma-Salgado S, Nagasaka K, Feng H, Juvik JA, Sano D, Shisler J, and Nguyen T. Effect of leaf surface chemical properties on sanitizer efficacy of sanitizer for rotavirus inactivation. *Applied and Environmental Microbiology*. 2016. 82(20), 6214-6222 doi: 10.1128/AEM.01778-16 [[Link](#)]
18. **Ku KM**, Becker TM, Juvik JA. Transcriptome and metabolome analyses of glucosinolates in two broccoli cultivars following jasmonate treatment for the induction of glucosinolate defense to *Trichoplusia ni* (Hübner). *International Journal of Molecular Science*. 17(7), 1135 2016. doi:10.3390/ijms17071135. [[Link](#)]
19. Kim NK, Park HM, Lee J, **Ku KM**, Lee CH. Seasonal variations of metabolome and tyrosinase inhibitory activity of *Lespedeza maximowiczii* during the growth periods. *Journal of Agricultural Food Chemistry*. 63(38), 8631-8639, 2015. doi: 10.1021/acs.jafc.5b03566. [[Link](#)]
20. Zucoloto M, **Ku KM**, Kushad, MM, Sawwan J. Bioactive compounds and quality characteristics of five apples cultivars. *Ciência Rural*. 45(11), 1972-1979, 2015. <http://dx.doi.org/10.1590/0103-8478cr20141160>. [[Link](#)]
21. Lu L, **Ku KM\***, Sindy P-S, Storm A, Andrew P Storm, Feng H, Juvik JA, Nguyen TH. Influence of Epicuticular Physicochemical Properties on Porcine Rotavirus Adsorption to 24 Leafy Green Vegetables and Tomatoes. *PloS One*. 10(7): e0132841, 2015. doi:10.1371/journal.pone.0132841. [[Link](#)]
22. **Ku KM**, Jeffery EH, Juvik JA, Kushad MM. Correlation of quinone reductase activity and allyl isothiocyanate formation in different genotypes and grades of horseradish roots. *Journal of Agricultural Food Chemistry*. 63(11), 2947-2955, 2015. doi: 10.1021/jf505591z. [[Link](#)]
23. **Ku KM**, Jeffery EH, Juvik JA. Exogenous methyl jasmonate treatment increases glucosinolate biosynthesis and quinone reductase activity in kale leaf tissue. *PLoS One* 9(8): e103407, 2014. [[Link](#)]
24. Dosz EB, **Ku KM\***, Juvik JA, Jeffery EH. Total myrosinase activity estimates in *Brassica* vegetable produce. *Journal of Agricultural Food Chemistry*. 62(32) 8094-8100, 2014. [[Link](#)]

25. **Ku KM**, Kim HS, Kim SK, Kang YH. Correlation analysis between antioxidant activity and phytochemicals in Korean colored corns using principal component analysis. *Journal of Agricultural Science*. 6(4), 2014. doi:10.5539/jas.v6n4p1 [[Link](#)]
26. Chen L, Hwang J-E, Choi B, **Gu KM**, Park Y, Kang YH. Antioxidant capacities and cytostatic effect of Korean red pepper (*Capsicum annuum* L): a screening and in vitro study. *Journal of the Korean Society for Applied Biological Chemistry* 57(1) 43-52, 2014. [[Link](#)]
27. **Ku KM**, Jeffery EH, Juvik JA. Optimization of glucosinolate biosynthesis using methyl jasmonate for human health promoting activity. *Journal of the Science of Food and Agriculture*. 94(10) 2090-2096, 2014 [[Link](#)]
28. **Ku KM**, Choi J-H, Kim HS, Kusahd MM, Jeffery EH, Juvik JA. Methyl jasmonate and 1-methylcyclopropene treatment effects on quinone reductase induction activity and post-harvest quality of broccoli. *PLoS One*. 8(10):e77127, 2013. [[Link](#)]
29. **Ku KM**, Jeffery EH, Juvik JA. Influence of seasonal variation and methyl jasmonate mediated induction of glucosinolate biosynthesis influence quinone reductase activity of broccoli floret. *Journal of Agricultural Food Chemistry*. 61 9623-9631, 2013. [[Link](#)]
30. **Ku KM**, Juvik JA. Methyl jasmonate-mediated changes in flavonoid concentrations and antioxidant activity in broccoli florets and kale leaf tissues. *Hortscience*. 48(8) 996-1002, 2013. [[Link](#)]
31. **Ku KM**, Choi J-H, Kushad MM, Jeffery EH, Juvik JA. Pre-harvest methyl jasmonate treatment enhances cauliflower chemoprotective attributes without a loss in postharvest quality. *Plant Foods for Human Nutrition*. 68(2) 113-117, 2013. [[Link](#)]
32. Chen L, Hwang JE, **Gu KM**, Kim JE, Choi B, Son KS, Park Y, Kang YH. Comparative study of antioxidant effects of five Korean varieties red pepper (*Capsicum annuum* L.) extracts from various parts including placenta, stalk, and pericarp. *Food Science and Biotechnology*. 21: 712-721, 2012. [[Link](#)]
33. Kim HS, Jung JY, Kim HK, **Ku KM**, Sur JK, Park Y, Kang YH. Influences of meteorological conditions of harvest time on water-soluble vitamin contents and quality attributes of oriental melon. *Protected Horticulture and Plant Factory*. 20: 290-296, 2011 [[Link](#)]
34. Kim J, Choi JN, **Ku KM**, Kang D, Kim JS, Park JH, Lee CH. A correlation between antioxidant activity and metabolite release during the blanching of *Chrysanthemum coronarium* L. *Bioscience, Biotechnology, and Biochemistry* 75: 674-680, 2011. [[Link](#)]
35. **Ku KM**, Kang YH. Quinone reductase activity of *Capsicum annuum* leaves and isolation the active compounds. *Journal of Korean Society for Applied Biological Chemistry* 53: 709-715, 2010. [[Link](#)]

36. **Ku KM**, Choi JN\*, Kim JY, Kim JK, Yoo LG, Lee S, Hong YS, Lee CH. Metabolomics analysis reveals the compositional differences of shade grown tea (*Camellia sinensis* L.) Journal of Agricultural Food Chemistry 58: 418-426, 2010. [[Link](#)]
  37. **Ku KM**, Kim JY\*, Park HJ, Liu KH, Lee CH. Application of metabolomics in the analysis of manufacturing type and composition changes of pu-erh tea during fermentation. Journal of Agricultural Food Chemistry 58: 345-352, 2010. [[Link](#)]
  38. **Ku KM**, Kang YH. Antioxidant and quinone reductase inductive activity of various organs of pepper. Journal of Applied Biological Chemistry. 53: 31-36, 2010.
  39. **Ku KM**, Kim BS, Kang YH. Antioxidant activity and quinone reductase inductive activity of pepper leaves in various leaf lengths of pepper leaves. Korean Journal of Horticultural Science & Technology. 28: 120-125, 2010.
  40. Kim HS, **Ku KM**, Suh JK, Kang YH. Quinone reductase inductive activity and growth inhibitory effect against hepatoma cell of oriental melon extract. Protected Horticulture and Plant Factory. 18: 448-453, 2009.
  41. **Ku KM**, Kim MN, Hong MJ, Jung YS, Kim JS, Lee IJ, Shin DH, Hwang YH, Kang YH. Antioxidant and QR inductive activity of novel functional soybean agakong3. Food Science and Biotechnology. 18: 634-629, 2009.
  42. **Ku KM**, Kim HS, Kim BS, Kang YH. Antioxidant activities and antioxidant constituents of pepper leaves from various cultivars and correlation between antioxidant activities and antioxidant constituents. Journal of Applied Biological Chemistry. 52: 70-76, 2009.
  43. **Ku KM**, Kim SK, Kang YH. Biologically active substances of corn silk and comparison of antioxidative activities by different assays. Korean Journal Plant Resources. 22: 323-329, 2009.
  44. **Ku KM**, Chang YJ, Kim MG, Kim KU, Song KS, Kang YH. Cancer chemopreventive activity of the rhizome extract of *Alpinia officinarum*. Korean Journal of Pharmacognosy. 38: 95-99, 2007.
- Ph. D. dissertation title: Enhancing human health promoting activity through the regulation of the methyl jasmonate mediated glucosinolate biosynthesis in *Brassica oleracea*. 2013. [[PDF](#)]
- M. S. thesis title: Chemoprevention of pepper leaves and its functional constituents. 2008.
- B. A. thesis title: Chemoprevention activity of newly bred soybean ‘Agakong’. 2006.