

Rachel E. Kopec

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Research Interests: bioavailability and metabolism of lipophilic nutrients, analytical chemistry, chronic disease prevention

EDUCATION

2013-Present	Postdoctorate , INRA (French National Institute for Agricultural Research)
2006-2012	Ph.D. – Human Nutrition, The Ohio State University
2002- 2006	B.S., Pharmaceutical Sciences , with Distinction and Honors, The Ohio State University
2002- 2006	B.S., Business Administration , with Distinction and Honors, The Ohio State University

RESEARCH AND TEACHING EXPERIENCE

Postdoctoral Researcher, June 2014 - present, INRA Avignon, UMR408, Sécurité et Qualité des Produits d'Origine Végétale (SQPOV), *under Dr. Catherine Caris-Veyrat in collaboration with Dr. Patrick Borel of INRA/INSERM Marseille*

- topic : stability of carotenoids and vitamin E during digestion

Ph.D., September 2006 – December 2012, The Ohio State University, Columbus, OH *under Dr. Steven J. Schwartz*

- Thesis: Bioavailability, Bioefficacy, and Metabolism of Tomato Carotenoids
- participated in 11 publicly funded interdisciplinary projects, and 5 corporately funded projects
- guest lecturer for food toxicology graduate course

Lab Manager, September 2005 – June 2012, The Ohio State University, Columbus, OH *under Dr. Steven J. Schwartz*

- trained 15 graduate students and visiting researchers in laboratory analytical methods, direct supervision of 4 student research projects

Research Technician, October 2003 - June 2005, The Ohio State University, Columbus, OH *under Dr. Steven J. Schwartz*

OTHER COMPETENCIES

Languages: English (native language); French (intermediate); Portuguese (basic)

Research Models: Fresh and processed fruits and vegetables, *in vitro* digestion, rodents, humans

Good Laboratory Practices (GLP)

Analytical Chemistry: liquid chromatography-mass spectrometry method development and validation, qualitative and quantitative analysis, stable isotope analysis

Statistical Packages : R, SAS, Minitab

FELLOWSHIPS & AWARDS

Poster Presentation Award, 17th International Carotenoid Symposium, July 2014

AgreenSkills Postdoctoral Fellowship, October 2013-October 2015

Long-term program award, du Conseil Scientifique de l'Université d'Avignon et des Pays de Vaucluse, June-July 2013

Clinical Research Award Winner, Poster Presentation. 9th Annual Russell Klein Nutrition Research Symposium, June 2012

Presidential Fellowship, The Ohio State University, August 2010-August 2011

Best Poster Award, 6th International Congress on Pigments in Food, June 2010

2010 Russell Klein Award, for Excellence in Scholarship and Service

Nutrition and Cancer Award Winner, Poster Presentation, 7th Annual Russell Klein Nutrition Research Symposium, June 2010

Basic Research Award Winner, Poster Presentation. 6th Annual Russell Klein Nutrition Research Symposium, June 2009

College of Pharmacy Honoree, President's Salute to Undergraduate Academic Achievement, May 2006

First Place, Poster Presentation, Food Science Division. CFAES Undergraduate Research Forum, April 2005

LEADERSHIP & SERVICE

Public Policy Committee Member, American Society for Nutrition, June 2012 – June 2014

Chair, Student Interest Group of the American Society for Nutrition, June 2010 – June 2011

Seeds Grant Reviewer, Ohio Agricultural and Research Development Center (OARDC), 2008, 2010, 2011

Student Blogger, American Society for Nutrition, January 2009 – June 2010 <http://www.nutrition.org/asn-blog/>

Executive Board Member, *Student Interest Group of the American Society for Nutrition*, June 2008 – June 2012
Committee Chair, 5th and 6th Annual Russell Klein Nutrition Research Symposium, 2008 and 2009
Treasurer & Journal Club Coordinator, *Graduate Students for Nutritional Sciences (GSNS)*, 2006 – 2009

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

Graduate Society of Nutritional Sciences, 2006 – 2012
American Society for Nutrition, 2007 – present
American Chemical Society, 2007 – present
Institute of Food Technology, 2009 - 2012

PERSONAL INTEREST/HOBBIES: Running, yoga, rowing, climbing, scuba diving, cooking, reading

PEER-REVIEWED PUBLICATIONS

Kopec, R.E., Cooperstone, J.L., Schweiggert, R.M., Riedl, K.M., Harrison, E.H., Francis, D.M., Clinton, S.K., Schwartz, S.J. 2014. Avocado consumption enhances human post-prandial provitamin A absorption and conversion from a novel high β -carotene tomato sauce and from carrots. *Journal of Nutrition*. 144(8):1158-1166

Biddle, M.J., Lennie, T.A., Bricker, G.V., **Kopec, R.E.**, Schwartz, S.J., Moser, D.K. 2014. Lycopene dietary intervention: a pilot study in patients with heart failure. *Journal of Cardiovascular Nursing*. Epub before print, DOI: 10.1097/JCN.000000000000108

Schweiggert, R.M., **Kopec, R.E.**, Villalobos, M.G., Högel, J., Quesada, S., Esquivel, P., Schwartz, S.J., Carle, R. 2014. Carotenoids are more bioavailable from papaya than from tomato and carrot in humans: a randomized crossover study. *British Journal of Nutrition*. 111(3):490-498

Kopec, R.E., Schweiggert, R.M., Riedl, K.M., Carle, R., Schwartz, S.J. 2013. Comparison of an HPLC-PDA and HPLC-MS/MS method for the analysis of carotenoids and fat soluble vitamins in triglyceride rich lipoproteins. *Rapid Communications in Mass Spectrometry*. 27(12):1393-1402

Garzon, G.A., Narvaez C., **Kopec, R.E.**, Riedl, K., Schwartz, S.J. 2012. Characterization and quantification of carotenoids in Arazá (*Eugenia stipitata* McVaugh) an Amazonian fruit. *Journal of Agricultural and Food Chemistry*. 60(18):4709-4717

Eroglu, A., Hruszkewycz, D.P., dela Sena, C., Narayanasamy, S., Riedl, K.M., **Kopec, R.E.**, Schwartz, S.J., Curley, R.W.Jr., Harrison, E.H. 2012. Naturally-occurring eccentric cleavage products of provitamin A β -carotene function as antagonists of retinoic acid receptors. *Journal of Biological Chemistry*. 287(19):15886-15895

Pickworth, C.L., Loerch, S.C., **Kopec, R.E.**, Schwartz, S. J., Fluharty, F.L. 2012. Concentration of pro-vitamin A carotenoids in common beef cattle feedstuffs. *Journal of Animal Science*. 90(5):1553-1561

Barona, J., Jones, J.J., **Kopec, R.E.**, Comperatore, M., Andersen, C., Schwartz, S.J., Lerman, R.H., Fernandez, M.L. 2012. A Mediterranean-style low-glycemic-load diet increases plasma carotenoids and decreases LDL oxidation in women with metabolic syndrome. *Journal of Nutritional Biochemistry*. 23(6):609-615

Gupta, R., **Kopec R.E.**, Balasubramaniam, V.M., Schwartz, S.J. 2011. Combined pressure-temperature effects on carotenoid retention and bioaccessibility in tomato juice. *Journal of Agricultural and Food Chemistry*. 59(14):7808-7817

Fleshman M.K, Lester, G.E., Riedl, K.M., **Kopec, R.E.**, Narayanasamy, S., Curley, R.W. Jr., Schwartz, S.J., Harrison, E.H. 2011. Carotene and novel apocarotenoid concentrations in orange-fleshed Cucumis melo melons: determinations of β -carotene bioaccessibility and bioavailability. *Journal of Agricultural and Food Chemistry*. 59(9):4448-4454

Kopec, R.E., Riedl, K.M., Harrison, E.H., Curley, R.W. Jr., Hruszkewycz, D.P., Clinton, S.K., Schwartz, S.J. Identification and quantification of apo-lycopenals in fruits, vegetables, and human plasma. 2010. *Journal of Agricultural and Food Chemistry*. 58(6):3290-3296

Story, E.N., **Kopec, R.E.**, Schwartz, S.J., Harris, G.K. An update on the health effects of tomato lycopene. In: Annual Reviews in Food Science and Technology. M.P. Doyle and T. Klaenhammer, eds. Vol 1. Palo Alto, CA: Annual Reviews, 2010:189-210

PUBLICATIONS IN PREPARATION

Kopec, R.E., Schick, J., Tober, K.L., Riedl, K.M., Francis, D., Young, G.S., Schwartz, S.J., Oberyshyn, T.M. 2014. Gender differences in skin carotenoid deposition and acute UVB-induced skin damage after tangerine tomato consumption in an SKH-1 hairless mouse. *Submitted*

Kopec, R.E., Gleize, B., Borel, P., Demarchelier, C., Caris-Veyrat, C. Carotenoid degradation through the digestive process. 2014. *In preparation*

Kopec, R.E., Carail, M., Caris-Veyrat, C. Synthesis and separation of lutein oxidation products. 2014. *In preparation.*

BOOK CHAPTERS

Kopec, R.E., Schwartz, S.J. Carotenoid cleavage dioxygenases and presence of apo-carotenoids in biological matrices. In: Carotenoid Cleavage Products. P. Winterhalter, ed. Washington, D.C.: American Chemical Society. 2013: 31-41

Kopec, R.E., Schwartz, S.J. Absorption, bioavailability, and metabolism of carotenoids. In: Forschung und Lehre am Lehrstuhl Lebensmittel pflanzlicher Herkunft: Eine Zwischenbilanz. R. Valet, ed. Aachen, Germany: Shaker Verlag GmbH. 2012:126-141

Kopec, R.E., Cooperstone, J.L., Cichon, M., Schwartz, S.J. Analysis Methods of Carotenoids. In: Analysis of Antioxidant-Rich Phytochemicals. Z. Xu and L. Howard, eds. Oxford, England: Wiley-Blackwell. 2012: 105-148

Kopec, R.E., Schwartz, S.J., Hadley, C. Lycopene. In: Encyclopedia of Dietary Supplements. P. Coates and M. Blackman, eds. 2nd Ed. New York, NY: Informa Healthcare USA, Inc., 2010:504-517

PRESENTATIONS

Kopec, R.E., Gleize, B., Borel, P., Demarchelier, C., Carail, M., Caris-Veyrat, C. Stability of carotenoids through the digestive process : *In vitro* studies of oxidation. 17th International Carotenoid Symposium, June 29-July 4, 2014. Park City, UT

Bernier, M., **Kopec, R.E.**, Schwartz, S.J., Wysocki, V. Ion mobility studies of isomeric species lycopene, α -carotene, and β -carotene and the retention of *trans* and *cis* confirmation, 62nd American Society for Mass Spectrometry Conference, June 15-19, 2014. Baltimore, MD

Goetz, H.J., **Kopec, R.E.**, Riedl, K.M., Cooperstone, J.L., Narayanasamy, S., Curley R.W. Jr., Harrison, E.H., Schwartz, S.J. Separation of α -retinyl palmitate and quantitation of vitamin A after consumption of naturally α -carotene-rich carrots, Experimental Biology, April 26-30, 2014. San Diego, CA, *The FASEB Journal*. 28:645.24

Goetz, H.J., **Kopec, R.E.**, Riedl, K.M., Cooperstone, J.L., Narayanasamy, S., Curley R.W. Jr., Harrison, E.H., Schwartz, S.J. Separation of α -retinyl palmitate and quantitation of vitamin A after consumption of naturally α -carotene-rich carrots, 10th Annual Russ Klein Nutrition Research Symposium, March 21, 2014. Columbus, OH

Schweiggert, R., Steingass, C., **Kopec, R.**, Quesada, S., Esquivel, P., Schwartz, S., Carle, R. Nutritional potential of Costa Rican papaya genotypes for diminishing vitamin A deficiency. SILAE XXII Congress, September 2-6, 2013. Puntarenas, Costa Rica

Cichon, M.J., **Kopec, R.E.**, Riedl, K.M., Schwartz, S.J. Isomerization and oxidative metabolism of lycopene in a 13C human tracer study. IVth International Symposium on Nutrition, Oxygen Biology, and Medicine. June 5-7, 2013. Paris, France

Schweiggert, R., Steingass, C., Heller, A., **Kopec, R.**, Quesada, S., Esquivel, P., Schwartz, S., Carle, R. Chromoplasten-Morphologie als entscheidender Einflussfaktor auf die Bioverfügbarkeit von Carotinoiden aus Papaya, Tomate und Karotte. Wissenschaftlicher Kongress der Deutsche Gesellschaft für Ernährung, March 20-22, 2013. Bonn, Germany

Schweiggert, R.M., **Kopec, R.E.**, Riedl, K., Schwartz, S.J., Carle, R. Vergleich von HPLC-MS/MS und HPLC-DAD zur Quantifizierung von Carotinoiden, Retinylestern, Phyllochinon und α -Tocopherol in der triglyzerid-reichen Lipoprotein-Fraktion aus humanem Plasma. Deutscher Lebensmittelchemikertag, September 10-12, 2012. Münster, Germany

Garzon, G.A., Rincon, J., **Kopec, R.E.**, Riedl, K.M., Schwartz, S.J. The Influence of Ripening on the Carotenoid Profile of the Pulp Arazá Fruit (*Eugenia stipitata* McVaugh). Institute of Food Technologists Annual Meeting, June 25 - 28, 2012. Las Vegas NV

Wan, L., **Kopec, R.E.**, Grainger, E., Francis, D., Abaza, R., Schwartz, S.J., Clinton, S. Dose dependent carotenoid bioavailability from a novel soy-tomato juice developed for prostate cancer prevention trials. 9th Annual Russell Klein Nutrition Symposium, June 1, 2012. Columbus, OH

Kopec, R.E., Cooperstone, J.L., Schweiggert, R.M., Riedl, K.M., Harrison, E.H., Francis, D.M., Clinton, S.K., Schwartz, S.J. Provitamin A absorption and conversion from a unique high β -carotene tomato is higher when consumed with avocado. 9th Annual Russell Klein Nutrition Symposium, June 1, 2012. Columbus, OH

Kopec, R.E., Cooperstone, J.L., Schweiggert, R.M., Riedl, K.M., Harrison, E.H., Francis, D.M., Clinton, S.K., Schwartz, S.J. Provitamin A absorption and conversion from a unique high β -carotene tomato is higher when consumed with avocado. Experimental Biology, April 21-25, 2012. San Diego, CA, *The FASEB Journal*. 26:31.5

Schweiggert, R.M., Mezger, D., Schimpf, F., Steingass, C.B., Heller, A., Riedl, K., **Kopec, R.**, Quesada, S., Esquivel, P., Carle, R., Schwartz, S.J. Bioavailability and bioaccessibility of carotenoids from papaya, tomato, and carrot are modulated by chromoplast morphology. Experimental Biology, April 21-25, 2012. San Diego, CA, *The FASEB Journal*. 26:31.7

Engelmann Moran, N., Conlon, L.E., Rogers, R.B., Riedl, K.M., Cichon, M.J., **Kopec, R.**, Grainger, B., Lila, M.A., Schwartz, S.J., Erdman, J.W. Jr., Clinton, S.K. Plant cell culture strategies to increase ¹³C-enrichment of lycopene for human metabolic tracing studies. Experimental Biology, April 21-25, 2012. San Diego, CA

Schwartz, S.J., **Kopec, R.E.** 2012. Carotenoid absorption and cleavage to vitamin A and nonvitamin A metabolites. ACS Spring National Meeting, March 25-29, 2012. San Diego, CA

Grainger, E.M., Wan, L., **Kopec, R.**, Abaza, R., Schwartz, S.J., Clinton, S.K. 2011. A comparison of plasma changes in phytoene, phytofluene, and lycopene in men with prostate cancer consuming a tomato-soy juice developed for food-based clinical intervention studies. AICR Annual Research Conference, November 3-4, 2011. Washington D.C.

Kopec, R.E., Schick, J., Tober, K.L., Riedl, K.M., Francis, D., Oberyszyn, T.M., Schwartz, S.J. Consumption of a tomato carotenoid containing diet reduces UV-induced inflammation and DNA damage in a Skh-1 hairless mouse model. Experimental Biology, April 9-13, 2011. Washington D.C.

Kopec, R.E., Riedl, K., Fleshman, M., Curley, R.W.Jr., Harrison, E., Schwartz, S.J. Potential Apo-Carotenoid Metabolites in Plant Foods and Humans. 6th International Conference on Pigments in Food, June 20-24, 2010. Budapest, Hungary

Kopec, R.E., Schick, J., Tober, K.L., Riedl, K.M., Francis, D., Oberyszyn, T.M., Schwartz, S.J. Consumption of a tomato carotenoid containing diet reduces inflammation and DNA damage in a rodent model. PacifiChem 2010, December 15-20, Honolulu, HI

Kopec, R.E., Schick, J., Tober, K.L., Riedl, K.M., Francis, D., Oberyszyn, T.M., Schwartz, S.J. Consumption of a tomato carotenoid containing diet reduces inflammation and DNA damage in a rodent model. 7th Annual Russell Klein Nutrition Symposium, June 4, 2010, Columbus, OH

Garzon, G.A., Narvaez, C., **Kopec, R.**, Riedl, K., Schwartz, S.J. Characterization and quantification of carotenoids in Arazá (*Eugenia stipitata* McVaugh), an Amazonian fruit. Institute of Food Technologists Annual Meeting, July 17-20, 2010. Chicago, IL

Barona, J., **Kopec, R.**, Jones, J., Lerman, R., Schwartz, S., Fernandez, M.L. Reductions of atherogenic lipoproteins are related to concentrations of plasma carotenoids in women following a Mediterranean-style low glycemic diet. Presented at Experimental Biology, April 24-28, 2010. Anaheim, CA, *The FASEB Journal*. 24:539.12

Ata, S., Barona, J., **Kopec, R.**, Jones, J., Calle, M., Schwartz, S., Fernandez, M.L.. Consumption of either one egg or lutein enriched egg per day increases HDL cholesterol, reduces apolipoprotein B while increasing plasma carotenoids and macular pigment density in adult subjects. Experimental Biology, April 24-28, 2010. Anaheim, CA, *The FASEB Journal*. 24:92.4

Pickworth, C.L., Loerch, S.C., Fluharty, F.L., **Kopec, R.E.**, Schwartz, S. J. Pro-vitamin A carotenoids in feedstuffs. Midwest American Society of Animal Science, American Dairy Science Association (ASAS/ADSA) Annual Meeting, March 15-17, 2010, Des Moines, IA

Sharma, P.L., **Kopec, R.E.**, Schwartz, S.J., Harris, C., Clark, T. Isolation of alpha-mangostin in *Garcinia mangostana L.* Central Regional Meeting of the American Chemical Society, May 20-23, 2009, Cleveland, OH

Kopec, R.E., Riedl, K.M., Harrison, E.H., Curley, R.W. Jr., Schwartz, S.J. Quantification of apo-lycopenals in food products and human blood plasma. 6th Annual Russell Klein Nutrition Research Symposium, June 5, 2009, Columbus, OH

Kopec, R.E., Riedl, K.M., Harrison, E.H., Curley, R.W. Jr., Schwartz, S.J. Quantification of apo-lycopenals in food products and human blood plasma. Ohio Agricultural Research and Development Center (OARDC) Annual Research Conference, April 23, 2009, Columbus, OH

Gupta, R., **Kopec, R.E.**, Balasubramaniam, V.M., Schwartz, S.J. Combined pressure temperature effects on lycopene stability and isomerization in tomato juice. Ohio Agricultural Research and Development Center (OARDC) Annual Research Conference, April 23, 2009, Columbus, OH

Gupta, R., **Kopec, R.E.**, Balasubramaniam, V.M., Schwartz, S.J. Combined pressure temperature effects on lycopene stability and isomerization in tomato juice. 5th International High Pressure Bioscience and Biotechnology Conference, Sept. 15-19, 2008, Scripps Institute of Oceanography, San Diego, CA

Sharma, P.L., **Kopec, R.E.**, Schwartz, S.J., Harris, C., Clark, T. Extraction of alpha-mangostin in *Garcinia mangostana L.* REEL Student Symposium. November 1, 2008. Miami University, OH

Kopec, R.E., Riedl, K.M., Curley, R.W. Jr., Harrison, E.H., Schwartz, S.J. Presence of apo-lycopenals in food products and human blood plasma. 5th Annual Russell Klein Nutrition Research Symposium, May 30, 2008. Columbus, OH

Kopec, R.E., Riedl, K.M., Curley, R.W. Jr., Harrison, E.H., Schwartz, S.J. Presence of apo-lycopenals in food products and human blood plasma. Experimental Biology, April 4-9, 2008. San Diego, CA, *The FASEB Journal*. 22:1105.8

Kopec, R.E., Schwartz, S.J. Separation and isolation of S(-)-equol: The biologically relevant metabolite of the soy isoflavone daidzein. Brazil Research Exchange Program, November 5-13, 2005, Universidade de São-Paulo, São-Paulo, Brazil

Kopec, R.E., Schwartz, S.J. Separation and isolation of S(-)-equol: The biologically relevant metabolite of the soy isoflavone daidzein. Denman Undergraduate Research Forum, May 18, 2005, The Ohio State University, Columbus, OH

Kopec, R.E., Schwartz, S.J. Separation and isolation of S(-)-equol: The biologically relevant metabolite of the soy isoflavone daidzein. CFAES Undergraduate Research Forum, April 26, 2005, The Ohio State University, College of Food, Agriculture, and Environmental Sciences, Columbus, OH