

# MARIO G. FERRUZZI

## EDUCATION

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### The Ohio State University

Columbus, Ohio

*Carl E. Haas Fellow, Department of Food Science and Technology*

1998-2001

**Doctoral Dissertation:** Digestive stability, human intestinal cell uptake, and bioactivity of dietary chlorophyll derivatives.

- ◆ **Degree Received:** June 2001.

### The Ohio State University

Columbus, Ohio

*Carl E. Haas Fellow, Department of Food Science and Technology*

1996-1998

- ◆ **Master Thesis:** Carotenoid microanalysis using high performance liquid chromatography with coulometric electrochemical array detection: Application to biological microsamples.
- ◆ **Degree Received:** August 1998.

### Duke University

Durham, North Carolina

*Bachelor of Science, Department of Chemistry*

1992-1996

- ◆ **Undergraduate research:** Characterization of hemoglobin *Ranier*.
- ◆ **Degree Received:** May 1996.

## PROFESSIONAL EXPERIENCE

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### Purdue University

West Lafayette, Indiana

*Assistant Professor, Departments of Food Science and Foods & Nutrition*

2004- Present

- ◆ **Phytochemical and botanical chemistry:** Investigation of health promoting properties of phytochemical food constituents with specific focus of food pigments (carotenoids, chlorophylls, anthocyanins) and flavonoids (tea, coffee, and grain phenolics). Focus on development of accurate methodology for qualitative and quantitative determination of phytochemicals in food and biological matrices.
- ◆ **Food Processing Effects on Phytochemical/Botanical biological activity:** Investigation of traditional food processing techniques on quantitative and qualitative phytochemical profiles, bioavailability and physiological relevance.
- ◆ **Digestive and Absorptive behavior of phytochemicals:** Development and application of model systems for systematic study of factors influencing digestive stability, intestinal uptake and metabolism of phytochemicals.

### Nestlé Research Center

Lausanne, Switzerland

*Research Scientist, Nutrition & Health and Scientific & Nutritional Support*

2003- 2004

- ◆ **Nutritional Ingredient Assessment & Management:** Development and implementation of system for evaluation of novel ingredients for potential efficacy, risk assessment, and management strategies in order to best leverage internal and external knowledge to product pipelines.
- ◆ **Nutritional Platform Design:** Identification of novel and strategic functional platforms including evaluation of experimental programs required for support of new product concepts.
- ◆ **Energy Management:** Development, assessment, and implementation of novel metabolic weight management strategies into commercial product pipelines.

## PROFESSIONAL EXPERIENCE (Continued)

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### Nestlé Research & Development

Marysville, Ohio

#### *Development Technologist, Liquid Beverages Group*

2001- 2003

- ◆ Recipe Development: Formulation, production, evaluation including technical support for new and current Nestlé RTD beverage and liquid concentrate products.
- ◆ Beverage Processing: Working experience of major beverage processing methods including: retort, HTST and UHT including aseptic filling.
- ◆ Product Categories: Significant experience in ready to drink coffee, tea, juice and dairy-based nutritional beverage categories.
- ◆ Functional Ingredients: Significant experience in novel food ingredient evaluation and application including integration into mainstream beverage platforms.
- ◆ Successful Development: Commercialization of new nutraceutical beverage concepts resulting in new product launches.

### The Ohio State University

Columbus, Ohio

#### *Graduate Research Fellow, Carl E. Haas Endowed Chair Laboratory*

1996- 2001

- ◆ Cell-culture and *in vitro* models: Use of *in vitro* digestion and cell model systems to study digestive and absorptive aspects of select phytochemicals.
- ◆ Food Processing: Assessment of commercial processing effects on nutraceutical properties of foods.
- ◆ Bioavailability assessment: Development and application of bioavailability assessment techniques in phytochemical/nutraceutical research.
- ◆ Antimutagenicity and Antioxidant Activity assessment: Development and application of antimutagenicity and antioxidant methods in phytochemical/nutraceutical research.
- ◆ Analytical Chemistry: Development of novel analytical methodology for high sensitivity phytochemical and metabolite determination in both food and biological matrices.

### The Ohio State University

Columbus, Ohio

#### *Graduate Teaching Assistant*

1996- 2000

- ◆ Food Analysis: Aided in the design and execution of laboratory experiments, demonstrations and examinations for undergraduate instruction.
- ◆ Food Processing: Aided in the design and execution of pilot scale product manufacturing and demonstrations for large undergraduate course.

### Nestlé Research & Development

Marysville, Ohio

#### *R&D Internship in Ice Cream Coatings Group*

January-June 1998

- ◆ Formulation and evaluation of ice cream coatings based on proprietary lipid systems.
- ◆ Pilot and full scale plant trials of new products and line extensions.
- ◆ Technical service support for current novelty ice cream products.

## PUBLICATIONS (Past 5 years from 18 total)

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Kean, E.G., Ejeta, G., Hamaker, B, and **Ferruzzi, M.G.**. Characterization of carotenoid pigments in mature and developing kernels of select yellow endosperm sorghum varieties. *Journal of Agriculture and Food Chemistry*. **2007**. 55(7):2619-26.

**Ferruzzi, M.G.** and Blakeslee, J. Chlorophyll bioavailability and physiological relevance as dietary phytochemicals. A Review. *Nutrition Research*. **2007**. 27:1-12.

## **PUBLICATIONS (continued)**

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- Rudelle, S., **Ferruzzi M.G.**, Cristiani, I., Moulin, I., Mace, C., Acheson, K., and Tappy, L. Effect of beverage containing green tea catechins, caffeine and calcium on 24-hr energy metabolism in humans. *Obesity Research*. **2007**. 15: 349-355
- Watkins, B., Hannon, K., **Ferruzzi, M.G.**, Li, Y. Dietary PUFA and Flavonoids as Deterrents for Environmental Pollutants. *Journal of Nutritional Biochemistry*. 18:196-205. **2007**.
- Neilson, A., Green, R., Wood, K.V. and **Ferruzzi, M.G.** High throughput analysis of catechins and theaflavins from tea by RP-C18 HPLC-PDA. *J. Chromatography A*. 1132: 132-140. **2006**.
- Ferruzzi, M.G.**, Lumpkin, J.L., Schwartz, S.J., Failla, M.L. Digestion, micellarization and intestinal cell uptake of  $\beta$ -carotene isomers. *Journal of Agriculture and Food Chemistry*. 54:2780-5. **2006**.
- Ferruzzi, M.G.** and Schwartz S.J. Thermal stability of crude sodium copper chlorophyllin. *Journal of Agriculture and Food Chemistry* 53: 7098-7102. **2005**.
- Ferruzzi, M.G.** and Green R. Analysis of catechins from milk-tea beverages by enzyme assisted extraction followed by high performance liquid chromatography. *Food Chemistry*. 99:484-491. **2006**.
- Brown, M.J., **Ferruzzi, M.G.**, Nguyen, M.L., Cooper, D.A., Schwartz, S.J., and White, W.S. The bioavailability of carotenoids is higher in salads ingested with full-fat versus fat-modified dressings as measured by using electrochemical detection. *American Journal of Clinical Nutrition*. 80:396-403. **2004**.
- Wu, K., Schwartz, S.J., Platz, E.A., Clinton, S.K., Erdman, J.W., **Ferruzzi, M.G.**, Willett, W.G., Giovannucci, E.L. Variation in blood lycopene and its isomers over time in a cohort of US men. *Journal of Nutrition* 133: 1930-1936, **2003**.
- Ferruzzi, M.G.**, Böhm, V., Courtney, P. and Schwartz, S.J. Antioxidant and antimutagenic activity of dietary chlorophyll derivatives determined by radical scavenging and bacterial reverse mutagenesis assays. *Journal of Food Science*. 67:2589-2595, **2002**.
- Ferruzzi, M.G.**, Failla, M.L., and Schwartz, S.J. Sodium copper chlorophyllin: *In vitro* digestive stability and accumulation by Caco-2 human intestinal cells. *Journal of Agricultural and Food Chemistry*. 50: 2173-2179, **2002**.
- Puspitasari-nienaber, N.L., **Ferruzzi, M.G.**, Schwartz, S.J. Simultaneous detection of tocopherols, carotenoids and chlorophylls in vegetable oils by direct injection C30 RP-HPLC with coulometric electrochemical array detection. *Journal of the American Oil Chemistry Society*. 79: 633-640, **2002**.
- Ferruzzi, M.G.**, Nguyen, M.L., Sander, L.C., Rock, C.L, and Schwartz, S.J. Analysis of lycopene geometrical isomers by liquid chromatography with coulometric array detection. *Journal of Chromatography B*. 760: 289-299, **2001**.
- Ferruzzi, M.G.**, Failla, M.L., and Schwartz, S.J. Assessment of degradation and intestinal cell uptake of chlorophyll derivatives from spinach puree using an in vitro digestion and Caco-2 human cell model. *Journal of Agricultural and Food Chemistry*. 49: 2082-2089, **2001**.
- Böhm, V., Puspitasari-Nienaber, N.-L., **Ferruzzi, M.G.**, and Schwartz, S.J.\* Trolox equivalent antioxidant capacity of different geometrical isomers of  $\alpha$ -carotene,  $\beta$ -carotene, lycopene and zeaxanthin. *Journal of Agricultural and Food Chemistry*. 50:221-226, **2001**.

## **BOOK CHAPTERS**

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**Ferruzzi, M.G.** & Schwartz, S.J. Analysis of Human Carotenoids in “ Carotenoids in Health and Disease” Norman I. Krinsky, Susan T. Mayne and Helmut Sies (eds). Marcel Dekker, 2004.

**Ferruzzi, M.G.**, and Schwartz, S.J. Overview of chlorophylls in foods. In: *Supplement 1 to Current Protocols in Food Analytical Chemistry*. John Wiley & Son Inc. Unit F4.1. **2001**.

**Ferruzzi, M.G.**, and Schwartz, S.J. Chromatographic techniques and separation of chlorophylls. In: *Supplement 1 to Current Protocols in Food Analytical Chemistry*. John Wiley & Son Inc. Unit F4.4. **2001**.

## **CONFERENCE PROCEEDINGS**

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**Ferruzzi, M.G.**, Failla, M., Schwartz, S.J. Bionutritional aspects of chlorophyll derivatives. Proceedings of International Congress on Pigments in Food II, Lisbon, Portugal. **2002**.

Böhm, V., Puspitasari-Nienaber, N.L., **Ferruzzi, M.G.**, and Schwartz, S.J. *Antioxidant activity of different lycopene isomers*. Proceedings of the German Nutrition Society. **2001**.

Green, D.P., **Ferruzzi, M.** and Fulcher, B. *Evaluation of cooling rates for atmospheric steamed blue crab meat*. Proceedings of the 19th Annual Tropical and Subtropical Fisheries Tech. Conf., Sept. 11-14, 1994, New Orleans, LA. Florida Sea Grant Program. SGR-115:105-114. **1995**.

## **PATENT APPLICATIONS**

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**Ferruzzi, M.** Healthy alternative ready-to-drink energy beverage. US 2004/0096547 A1. Application Filed: February 6, 2003

**Ferruzzi, M.**, Cilliers, J., & Tuot, J. Tea based weight management beverage preparations. US Patent Application Filed: May, 2004.

Smola, H., Laroia, S., Tuot, J., & **Ferruzzi, M.** Skin care beverage composition. EPO# 04022987.4 Application Filed September 27, 2004.

## **PUBLISHED ABSTRACTS (past 5 years from 30 total)**

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Machado, C.M., **Ferruzzi, M.G.**, and Nielsen, S.S. (2006) *Antioxidant activity in three varieties of beans (Phaseolus vulgaris)*. Presented at the IFT National Meeting, Orlando, Florida.

Shim, S., **Ferruzzi, M.G.**, Kim, Y., Janle, E.M., and Santerre, C. (2006) *Predicting the impact of foods on mercury bioavailability*. Presented at the Mercury 2006 Meeting. Madison, Wisconsin.

Tappy, L., Rudelle, S., **Ferruzzi, M.G.**, Cristiani, I., Moulin, J., Mace, K., and Acheson, K.J. (2006) *Effect of a thermogenic beverage on 24-h energy metabolism in humans*. Presented at the NAASO, Obesity Society 2006 Annual Scientific Meeting. Boston, MA.

Oonsivilai, R., Cheng, C., Ningsanond, S., Bomser, J.A., **Ferruzzi, M.G.** (2006) *Induction of quinone reductase activity in murine hepatoma cells by extracts of Thunbergia Laurifolia Lindl*. Presented at Experimental Biology 2006. San Francisco, California.

Green, R. and **Ferruzzi, M.G.** (2006) *Food matrix factors affecting stability of green tea catechins during simulated digestion*. Presented at Experimental Biology. San Francisco, California.

## **PUBLISHED ABSTRACTS (continued)**

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Neilson, A.P., Li, Y. Hannen, K., **Ferruzzi, M.G.**, Watkins, B.A. (2006) *Accumulation of catechins in bone and liver of mice while under physical stress*. Presented at Experimental Biology 2006. San Francisco, California.

Kean, E.G., Ejeta, G., Hamaker, B, and **Ferruzzi, M.G.** (2006) *Characterization of major carotenoids in five golden sorghum varieties*. Presented at the IFT National Meeting, Orlando, Florida.

Watkins, B.A., Li, Y., Seifert, M., Reuhs, B., **Ferruzzi, M.G.** and Hamstra, K (2006) *Phytochemical Learning Resource (PLR)*. Presented at Experimental Biology 2006. San Francisco, California.

Ortiz, J., Green, R., Taylor, L., **Ferruzzi, M.** Mauer, L. (2006) *Effects of environmental moisture and deliquescent ingredients on catechin stability in a powdered green tea mix*. Presented at the IFT National Meeting, Orlando, Florida.

Kohut, A., Failla, M.L., **Ferruzzi, M.G.** (2006) *Dietary lipids modulate in vitro bioaccessibility of carotenoids from vegetables*. Presented at the IFT National Meeting, Orlando, Florida.

Green, R.J. and **Ferruzzi, M.G.** (2005) *Improved recovery of tea catechins from a milk matrix by enzymatic hydrolysis*. To be presented at the IFT National Meeting, New Orleans, LA.

**Ferruzzi, M.G.**, Failla, M., Schwartz, S.J. (2002) *Bionutritional aspects of chlorophyll derivatives*. Presented at the International Congress on Pigments in Food II 2002. Lisbon, Portugal.

## **INVITED SEMINARS**

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**Ferruzzi, M.G.** Nutritional Ingredients: Sourcing, Quality and Application. Present at Sensient Flavors Global Beverage Strategy Meeting. Indianapolis, IN. July, 2006.

**Ferruzzi, M.G.** Digestive modifications, bioavailability, and physiological significance of carotenoids and chlorophylls. Presented at the IFT Annual Meeting Fruit and Vegetable Products Division Symposium: Health Benefits of Fruits and Vegetables: Biological Activity of Phytonutrients. June, 2005.

**Ferruzzi, M.G.** In vitro modeling of tea catechin digestive stability. Presented to Nestlé Research and Development, Marysville, OH. August, 2005.

**Ferruzzi, M.G.** Putting Science into Food... An Overview of Food Science. Presented at the Ohio State University at Lima. February, 2003. Lima, OH.

**Ferruzzi, M.G.** Putting Science into Food... An Overview of Food Science. Presented at The Ohio State University at Marion. February, 2002. Marion, OH.

**Ferruzzi, M.G.** Bio-nutritional Aspects of Dietary Chlorophyll Derivatives: Digestive Stability, Human Intestinal Cell Uptake and Antioxidant/Antimutagenic Activity. Presented at the Purdue University Center for Enhancing Foods to Protect Health. October, 2002. West Lafayette, IN. (Note: Presented while not affiliated with Purdue)

**Ferruzzi, M.G.** Product Development in the Modern Food Industry. Presented at the Department of Food Science & Technology, The Ohio State University. October, 2002. Columbus, OH.

## **PROFESSIONAL CERTIFICATIONS**

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### **Better Process Control School**

**Columbus, Ohio**

*The Ohio State University Department of Food Science and Technology*

**2003**

**Instruction in:** Retort operations, processing systems operations, aseptic processing and packaging operations and container closures inspections.

## **TEACHING EXPERIENCE**

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- ◆ FS 291H-Food in the Media and Public Opinion
- ◆ FS 690W-Phytochemicals, Biochemistry and Physiology
- ◆ AGR 493- International Programs Study Abroad in Italy
- ◆ FN 205-Food Science I

## **GRADUATE STUDENTS**

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- ◆ Ratchadaporn Oonsivilai (PhD) 2004-2006
- ◆ Rodney Green (PhD) 2004-
- ◆ Ellie Georg Kean (PhD) 2005-
- ◆ Andrew Neilson (PhD) 2005-
- ◆ Angela Kohut (MS) 2005-
- ◆ Catrina Peters (MS) 2006-

## **PROFESSIONAL MEMBERSHIPS**

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- ◆ Institute of Food Technologist (IFT)  
Chair IFT Hoosier Section (2006-2007)
- ◆ American Chemical Society (ACS)
- ◆ American Society for Nutritional Sciences (ASNS)

## **REVIEW ACTIVITIES**

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- ◆ Grants:  
Ohio Agricultural Research and Development Center (OARDC) Ad Hoc Reviewer.  
USDA-NRI Improving Food Quality Review Panel Member
- ◆ Journals:  
Nutrition Research – Editorial Board  
Journal of Food Agriculture and the Environment – Ad Hoc Reviewer  
Journal of Agriculture and Food Chemistry – Ad Hoc reviewer  
Journal of Dairy Science –Ad Hoc Reviewer

## **LANGUAGES**

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- ◆ Italian: Fluency in both spoken and written communications.
- ◆ French: Reading and basic conversational competence.
- ◆ Spanish: Reading and conversational competence.

## **HONORS & AWARDS**

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- ◆ IFT Outstanding Member- IFT Hoosier Section (2006)
- ◆ Ohio State University Food Science Outstanding Graduate Research Award (2001)
- ◆ Kalsec Inc. *Steven S. Chang* Memorial IFT Fellowship Recipient (2000)
- ◆ Carl E. Haas Chair Fellowship Recipient (1996-2001)