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New Approaches for Discovery in Flavor Research



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Modern flavor science began with the advent of gas chromatography ca. 50 years ago. Over the intervening years, many approaches have been taken to understand the relationships between the chemical composition of a food and ultimately flavor perception. We have passed through periods of attempting to identifying all volatiles in a food, and studying flavor interactions with food components, determining “key” components of flavor, and most recently, flavor release.

During this time a great deal of knowledge has been gained. However, these approaches have not yielded the needed understanding of chemical composition and perception. A limitation to our understanding is that our approaches for discovery are tied to using a targeted approach: we limit our studies to compounds that have a flavor in themselves as opposed to any compound that may influence perception overall.

This presentation will describe a relatively new approach to discovery in food flavor research using a technique based on metabolomics. The objective is to develop methods for the *untargeted* analysis of chemical stimuli related to flavor perception as opposed to the more common metabolomics application in health-related research. In our field we wish to consider for study all (ideally) low molecular weight compounds as candidate chemical stimuli in flavor perception instead of focusing only on compounds already known to influence the flavor quality (unbiased).

This presentation will outline our application of this methodology to citrus juices (mandarin). Analytical approaches will be outlined and a brief summary of results obtained will be presented.



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Gary Reineccius, Ph.D., is a Professor and Department Head in the Department of Food Science and Nutrition at the University of Minnesota. He has been actively involved in flavor research for more than 42 years. During this time he has published over 210 research articles. Dr. Reineccius has spent sabbatical leaves with Fritzsche Dodge and Olcott (New York, flavor creation and production), Nestle (Switzerland, process flavors) and Robertet S.A. (France, taste modifiers and manufacturing).

Dr. Reineccius has taught courses in Food Processing, Food Chemistry, Food Analysis, and Flavor Chemistry and Technology. He has written a College textbook on food flavors: the second edition of this book became available in 2006. This was the first textbook in the flavor area which combined both flavor chemistry and technology. Dr. Risch and he edited and were major contributors to two books on flavor encapsulation. He is the sole author of the Source Book of Flavors and coeditor of Heteroatomic Flavor Compounds in Foods.

Dr. Reineccius' achievements have been recognized by several local and international organizations. He is an honorary member of the Society of Flavor Chemists. He has been granted the Palmer Award for his contribution to chromatography by the Minnesota Chromatography Forum. He has received the Distinguished Achievement and Service in Agricultural and Food Chemistry Award and been honored by being made a Fellow by the American Chemical Society. He has been presented the Stephen S. Chang Award by the Institute of Food Technologists (first flavor chemist to be so honored). These are the highest awards given to individuals in the flavor area. In 2006 he was selected to receive the new FEMA (Flavor Extract Manufacturers Association) award. This award comes from the largest flavor industry association in the US. His selection as the *first* recipient of this award reflects their opinion of his standing in the profession.

He often speaks at public schools and other groups. His favorite lay topics are chocolate (he spent 3 years researching chocolate flavor for his Ph.D. thesis) and the chemistry of gourmet cooking. From a professional standpoint, his favorite topic is flavor encapsulation. He has been actively engaged in research in this area since 1964.