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# Dennis Miller



## Professor

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Dennis Miller is Professor of Food Chemistry and Nutrition in the Department of Food Science at Cornell University. He holds a joint appointment in the Division of Nutritional Sciences and is a member of the graduate fields of Food Science and Technology and Nutrition. Miller earned a PhD in nutrition from Cornell, an MS in biochemistry from the University of Washington, and a B.A. in chemistry from Augsburg College in Minnesota. Miller's research and teaching programs are focused on the relationships between nutrition, food science, and agriculture. He believes that the greatest challenge we face in the 21st century is to provide a sustainable, nutritionally balanced, and safe food supply to meet the needs of every person on earth without jeopardizing the future needs of an expanding world population. Miller teaches courses in food chemistry, nutrition, and sustainability. His research focuses on iron fortification of foods, iron bioavailability from diets, and the regulation of iron absorption in the intestine.

## Research Focus

Iron deficiency is the most prevalent nutrient deficiency in the world, affecting as many as 2 billion people worldwide. In the United States, iron deficiency is most common among toddlers, adolescent girls and women of childbearing age with prevalences in these groups ranging from 9% to 11%. Consequences of iron deficiency include impaired work performance, poor educational performance, compromised immune function, and adverse pregnancy outcomes.

The overall objectives of Miller's research program are to increase knowledge about factors that influence the nutritional bioavailability of iron in foods. A variety of techniques are used including in vitro gastrointestinal digestion, cell culture, and animal models.

One of the most promising approaches for preventing iron deficiency in populations is fortification of staple foods with iron. Unfortunately, however, it is often difficult to chemically fortify foods in poor countries where centralized food processing operations are lacking. An alternative to chemical fortification is being developed by a new program called HarvestPlus. HarvestPlus is a global alliance of research institutions working together to develop and distribute nutritionally enhanced staple food crops with the goal of reducing prevalences of micronutrient malnutrition in developing countries. The primary strategy of HarvestPlus is to use "biofortification" to enhance the content of bioavailable nutrients in selected crops. Biofortification involves the application of plant breeding to develop varieties of crops that contain high levels of target nutrients. Once promising varieties have been identified, nutritionists will evaluate them for nutrient bioavailability and test the best ones for nutritional efficacy in field trials. The most promising varieties will then be distributed to farmers for planting. In the first phase of the project 6 crops (wheat, rice, maize, cassava, orange-flesh sweet potato, and beans) and 3 micronutrients (iron, zinc, and beta-carotene) are being targeted. Local collaborators on the project include Ray Glahn and Ross Welch of the Robert Holley Center for Agriculture and Health, Xingen Lei of the Department of Animal Science, and Dennis Miller of the Department of Food Science.

## Teaching Focus

Miller's teaching philosophy is to help students develop learning strategies that will prepare them for achieving an in-depth understanding of principles and concepts in their disciplines and that will provide a foundation for life-long learning. Our Food Choices and Issues class is targeted for non-majors with little or no background in nutrition or food science. The goal for this large class is to help students understand the popular literature on food science and nutrition and to motivate them improve the nutritional quality of their diets. Food Chemistry Laboratory is designed for junior and senior food science majors. Students learn laboratory techniques through

hands-on lab exercises and they develop research skills by conducting an independent research project. This involves selecting a problem, developing a hypothesis, writing a research proposal, conducting lab experiments, analyzing data, and writing a final paper in the format of an article in a peer-reviewed journal.

## Additional Links

- [Department](#)

## Awards and Honors

- Elected Fellow of the International Academy of Food Science and Technology (2012) The International Academy of Food Science and Technology
- Outstanding Faculty Award - Presented by the College of Agriculture and Life Sciences (2011) CALS Alumni Association

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## Concentrations

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University of Washington  
1969
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Augsburg College  
1967