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Sustainability and Agricultural and Food Chemistry

"Sustainability" is a word often used these days, perhaps even overused, to the extent that a clear definition is illusive. A dictionary definition of sustainability relevant to our discussion is "a method of harvesting or using a resource so that the resource is not depleted or permanently damaged", or, as it relates to society at large, "a lifestyle involving the use of sustainable methods" (1). Thus, we speak of sustainable agricultural systems that do not deplete the soil, water, and biotic resources; of sustainable food supplies closely related to sustainable agriculture but with the dimensions of health, nutrition, and proximity to markets so that population segments or whole populations are sustainably served; and of framework systems such as sustainable lifestyle, financial, and political systems that maintain the population in balance with its available resources. There are connotations and perceptions, not necessarily supported with scientific data, associated with sustainable terminology, such as that green or organic agriculture is superior to manufactured, synthetic, or industrial agriculture with its use of synthetic pest control, fertilizers, etc., and that locally produced is superior to imported or transported agricultural produce. In agriculture and food production, sustainability is frequently associated with minimal use of limiting resources—tillable land, fresh water, and fuel and energy usage with associated requirements of preservation, packaging, and distribution, carbon footprint, and fuel usage.

Agricultural and food chemistry is, arguably, at the center of sustainability in agriculture and food. Although *JAFAC* does not use the term in describing its scope or its categories, the notion of sustainability is a driving force for such advancing fields as biorational pest control, green or renewable energy sources, biofuel and biobased product development, minimal or recycled water use, no-till conservation farming, development and use of new cover crops or even new food crops, and advances in food and feed processing that result in improved safety, quality, and efficiency. A quick look through the table of contents of any recent *JAFAC* issue will reveal many papers that exemplify research which may impact sustainability.

A Biofuels Special Virtual Issue was recently published at the ACS Publications Web site (2), highlighting papers that appeared during 2009–2010 on chemical advances in such areas as characterization of new biomass sources, new pretreatment and conversion technologies, and byproduct development in the general scheme of biorefining for fuel, food/feed, and coproduct utilization. The Virtual Issue describes a selection of eight significant publications appearing in *JAFAC*, and like numbers from the sister ACS journals *Environmental Science & Technology* and *Energy & Fuels*.

Casting a somewhat broader net finds recent *JAFAC* papers that report on several areas related to sustainability, such as the new QuEChERS method for multiresidue determination of pesticides and related toxicants using reduced amounts of solvents and chemical reagents (3), discovery of new natural products with potential to replace some uses of synthetics (4–8), the



Figure 1. Associate Editor Yoshinori Mine, Department of Food Science, University of Guelph. Prof. Mine has expertise in animal proteins, especially eggs. His current research interests include gut health and immunity, food allergy, antioxidant oxidative stress and anti-inflammatory peptides/amino acids, enhancement of the mucosal innate immune system, and intestinal absorption of egg allergens and bioactive peptides.

exploration of new products for use in conservation tillage systems (9), food processing techniques that use less energy, such as nonthermal processing of fruits and vegetables (10), more effective treatment of processing wastes, such as cheese whey wastewater (11), recovery of valuable products from olive mill wastes, grape seeds, chicken feathers, or recombinant corn raised for pharmaceuticals (12–16), and enhancement of vitamin D levels in mushrooms by a simple UV treatment during postharvest processing (17).

In fact, one could argue that most research published in *JAFAC* contributes in some way to sustainability in agriculture, particularly in food production, food processing, food delivery, and byproduct utilization, by creating or improving agricultural products and processes in a nutritionally healthful and health-sustaining way. We just do not use the word "sustainable" as a label for what is published in the *Journal of Agricultural and Food Chemistry*. Maybe we should.

Let me take the liberty of extending the word "sustainability" to our publishing enterprise. We have added two new Associate Editors in 2010, Yoshinori Mine (Figure 1) and Hanne Christine