



# Food UPDATE

Novel Foods - Food Additives - Functional Foods - Food Ingredients

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## Factors Affecting the Safety of Foods and Supplements for the Elderly

As of January 2010, the population of Earth was approximately 6.8 billion people, 10 percent of which are elderly (*i.e.*, at least 65 years old). The elderly population worldwide is expected to grow at a rate faster than any other age group, increasing at least 3-fold to approximately 2 billion people, between the years 2000 and 2050 (WHO, 2006; HRSD Canada, 2010). Due to improvements in global health and health care, the majority of the growth in the elderly population is expected to occur in developing countries (HRSD Canada, 2010; WHO, 2007). Despite the apparent improvements in global health, the elderly represent a vulnerable population group, with health care expenditures increasing steadily with age (WHO, 2007).

Aging may be defined as a complex and ongoing accumulation of sub-lethal injury that compromises cell function (Katzung, 2004). Despite the existence of many theories regarding the physiological mechanisms underlying aging, it remains poorly understood.

On a cellular level, characteristic signs of aging include reduced capacity for cellular repair and regeneration, diminished capacity for nutrient uptake, accumulation of cellular waste, and cessation of normal cell division – the end result of which is a reduced capacity to cope with everyday biological stressors (Katzung, 2004; Berhard and Laufer, 2008; FLI, 2008).

Diet can serve as a vector for essential and non-essential nutrients needed to keep the elderly body functioning optimally; however, it is also the main route of exposure to potentially toxic substances (NAS, 2009). Malnutrition (*i.e.*, caloric and/or nutrient insufficiency) is commonly observed in the elderly, yet it is not an inevitable result of aging (Hickson, 2006). Changes in nutritional status in the elderly may be caused by reduced income, accessibility of food, oral health (and difficulty chewing/swallowing), and appetite (due to loss of taste and smell or disease states that interfere with the ability or desire to eat); various psychosocial factors; and physiological states that interfere with the absorption and/or utilization of nutrients (Hickson, 2006).

As the average age of the population continues to increase, the popularity of nutritional supplements does also. The use of nutritional supplements by the elderly is likely to progress due to their apparent safety, and their potential to maintain optimal health, increase energy, improve memory, and help to treat/prevent chronic disease.

The elderly tend to be heavy consumers of both prescription medications and nutritional supplements. Since aging can significantly alter biological responses to the bioactive compounds in natural health products and pharmaceuticals, increased risk of interaction between nutritional supplements and

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# Mini Review: Luo Han Guo – The Sweet Taste of Health

Natural is in, and sweeteners are one category seeing rising demand. The extract of Luo Han Guo (also spelled as Luo Han Kuo), a fruit known for its unique natural sweetness, has recently made inroads in the U.S. for use as a natural sweetener. The fruits are derived from *Siraitia grosvenori*, an herbaceous perennial vine native to Southern China and Northern Thailand. The round, green fruit turns brown when dried, and is covered with fine pale and black hairs. Luo Han Guo fruits are generally sold in dried form as the fresh fruit has unattractive flavors and a tendency to easily form off-flavors by fermentation.

Luo Han Guo was purported to be first mentioned in old records as being consumed by monks, and the name in Mandarin literally means “monk’s fruit”. Infusions of this fruit have been used for centuries in China as a folk medicine to enhance the immune system and to treat lung congestion, cold, and sore throat.

The major component of Luo Han Guo is highly stable triterpene glycosides known as mogrosides, found in the skin and flesh of the fruit. The purified constituents are estimated to be about 250–300 times sweeter than sucrose. Though mogrosides delight our sweet taste buds, the glycosidic bonds in mogrosides are not broken by either human digestive enzymes or the action of intestinal microorganisms, suggesting that they can not be much absorbed or converted into energy. This will contribute to their lower caloric and glycemic index, which makes Luo Han Guo extract an attractive substitute for sugar.

Recent research has demonstrated that mogrosides could possess a wide range of pharmacologic and health-promoting

properties including antineoplastic, anti-inflammatory, and antioxidative effects. In addition to its natural sweetening characteristics, Luo Han Guo has exhibited antihyperglycemic effects. In particular, mogroside V, the most abundant of Mogrosides in Luo Han Guo, has been shown to exhibit free radical scavenging effects *in vitro* and strong antidiabetic activity *in vivo*. Results from other promising studies have demonstrated that mogrosides inhibit oxidation of low-density lipoproteins in a dose-dependent manner.

There are a number of commercially available Luo Han Guo products. The extracted fresh and dried fruit is usually processed into a powder, comprising at least 80% mogrosides. The powder easily dissolves in water and the taste is unaffected by cooking, making it an ideal natural replacement for artificial sweeteners.

BioVittoria, producer and processor of monk fruit Luo Han Guo has recently received a “no questions” letter from the U.S. Food and Drug Administration (FDA) concerning the Generally Recognized as Safe (GRAS) status of its branded monk fruit concentrate Fruit-Sweetness™, for use as a sweetener and flavor enhancer. Additionally, the purified, sweet principle, Mogroside V is approved as a high-intensity sweetening agent in Japan and New Zealand.

Considering its GRAS status and its properties, Luo Han Guo could offer consumers more choice in the growing movement toward natural sweeteners.

For a complete reference list please contact [food@cantox.com](mailto:food@cantox.com).

## Foods and Supplements for the Elderly... cont'd

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medications exists in anyone using large amounts of both, regardless of health status or age. When combined with generalized age-related functional cellular impairment and malnutrition, the risk of adverse effects due to combined supplement and pharmaceutical use has the potential to increase considerably with age.

The safety of the active ingredients in most nutritional supplements is not tested to the same degree as that of food or pharmaceutical ingredients. Studies examining the preclinical safety and efficacy of natural health products are almost exclusively conducted on young animals, and it has been suggested that studies in young models may not accurately predict efficacy or safety in older consumers. Thus, very little is known regarding the impact of aging on the safety and efficacy of natural health products and supplements.

Reduced capacity to cope with cellular stress and increased supplement and medication use, along with other metabolic changes, increase the susceptibility of the elderly to toxic injury. This is one of many likely causes of age-related chronic diseases, including cancer, metabolic syndrome, osteoporosis, and various neurodegenerative diseases (FLI, 2008).

At least 40% of elderly Americans use some form of herbal or specialty supplement, and nearly 75% consume multiple medications. Given the changes in cellular function and metabolic capacity associated with increasing age, it has been estimated that approximately 32% of older adults are at risk for adverse pharmaceutical-supplement interactions (Loya *et al.*, 2009). As the popularity of natural dietary supplements among the elderly, and the elderly population itself, grows, so does the need for research focusing on the safety of these products in elderly models and in combination with common medications and supplements.

## Regulatory News...

The Natural Health Products Directorate (NHPD) of Canada published a new monograph for conjugated linolenic acid (CLA), assisting and quickening the approval process for products containing CLA. The NHPD also has published a new chromium monograph, with chromium picolinate or chromium (III) picolinate as an approved source of chromium. The source material may be included to products at a level equivalent to 500 µg/day of chromium.

Health Canada is seeking comments on a proposed change to the listing of food colourings on ingredient tables. Currently, food manufacturers are only required to list "colour" to refer to all colours in the product. The proposed change will require the listing of all food colours contained in the product. This change is being proposed to address consumer allergies to certain food colours such as tartrazine and cochineal, as well as to improve transparency and consumer choice. Furthermore, Health Canada has stated that the listing of all food colours would bring Canadian regulations in line with international requirements. The comment period on the proposal is open until May 3, 2010.

The U.S. FDA published a guidance document describing the difference between liquid dietary supplements and beverages containing novel food ingredients. This document addresses the discrepancy between beverage products marketed as dietary supplements but labelled as conventional beverages. The FDA determined that novel and high-dose ingredients with no prior history of use in conventional foods are being included in beverages and therefore, may be unap-

proved food additives. The guidance document describes how to determine whether a liquid product may be labelled and marketed as a dietary supplement.

The European Food Standards Authority (EFSA) has published a second series of opinions on 416 health claims, issuing mostly negative opinions, including on; probiotics, green and black tea, lutein, beta-glucans, meso-zeaxanthin, *alpha*-lipoic acid, melatonin, peptides, gums (e.g., xanthan and sugar-free), *gamma*-linolenic acid, fermented whey, and linolenic acid. EFSA stated that these claims were issued negative opinions based on inadequate identification of the substance, lack of evidence that the claimed effect is beneficial, and/or the lack of human studies with measures of the claimed health benefit. However, EFSA issued positive opinions for the relationship between potassium consumption and blood pressure, the effects of melatonin on symptoms of jet lag, and improved immune function following vitamin D consumption.

Food Standards Australia New Zealand (FSANZ) recently reviewed data pertaining to bisphenol A (BPA) exposure from food packaging and the risk to infants and adults, and concluded that the levels of exposure are very low and do not pose a significant health risk. They will continue to monitor BPA research carefully. The Australian Competition and Consumer Commission (ACCC) regulates plastic baby bottles, and has been working closely with FSANZ to assess the safety of the migration of chemicals from plastic packaging into food.

## Hot Off the Press..

- Choi SS, Danielewska-Nikiel B, Ohdan K, Kojima I, Takata H, Kuriki T (2009). Safety evaluation of highly-branched cyclic dextrin and a 1,4- $\alpha$ -glucan branching enzyme from *Bacillus stearothermophilus*. *Regul Toxicol Pharmacol* 55(3):281-290.
- Magnuson BA (2009). Nanoscale materials in foods: Existing and potential sources (Chapter 4). In: Al-Taher F, Jackson L, DeVries JW, editors. *Intentional and Unintentional Contaminants in Food and Feed*. (ACS Symposium Series, Vol 1020). Washington (DC): American Cancer Society (ACS), pp. 47-55. **Book chapter.**

## Upcoming Events

### US and EU Consumer and Regulatory Acceptance of Functional Foods: Implications for Innovation

March 12, 2010  
Cork City, Ireland  
(<http://www.enterprise-ireland.com/FunctionalFood/>)

**IFT's Wellness 10**  
March 24-25, 2010  
Rosemont, IL, USA  
(<http://www.ift.org/cms/?pid=1001994>)

**SupplySide East 2010**  
April 26-28, 2010  
Secaucus, NJ, USA  
(<http://www.supplysideshow.com/2010/east/>)

**4<sup>th</sup> Food Technology, Innovation & Safety Forum 2010**  
May 11-12, 2010  
Chicago, IL, USA  
(<http://www.ift.org/cms/?pid=1001994>)

**Vitafoods 2010**  
May 18-20, 2010  
Geneva, Switzerland  
(<http://www.vitafoods.eu.com/>)

**IFIA Japan 2010 The 15<sup>th</sup> International Food & Additives Exhibition and Conference**  
May 19-21, 2010  
Tokyo, Japan  
(<http://www.ifiajapan.com/2010/en/index.html>)

**IFT 10 Annual Meeting & Food Expo**  
July 17-20, 2010  
Chicago, IL, USA  
(<http://www.am-fe.ift.org/cms/>)

## In Profile with...

**Kathy Musa-Veloso Ph.D.**  
**Associate Director**  
**Food & Nutrition Group**  
**Cantox Health Sciences**  
**International (Cantox)**



Globally, there are more than 1 billion overweight adults, at least 300 million of which are obese. Obesity is a known risk factor for a variety of chronic diseases. Reduced physical activity and increased consumption of energy-dense foods with poor nutritional quality are key causes of obesity. Effective weight management strategies for individuals at risk of becoming obese include regular physical activity and healthier food choices. The food industry has responded to the obesity epidemic by developing functional foods and by using health claims to communicate the efficacy of their products.

To learn about the critical factors in the design of weight loss research studies, as well as innovative solutions for overcoming the associated challenges, join us at the Institute of Food Technologists' Wellness 2010 where Dr. Musa-Veloso will be delivering a presentation entitled "Considerations in the Design of Weight Loss Clinical Studies".

Dr. Musa-Veloso has a wealth of experience in designing clinical trial protocols, monitoring and auditing clinical trials to ensure adherence to study protocols, and pre-qualifying clinical research facilities prior to the placement of clinical trials with a Contract Research Organization. Additionally, her areas of expertise include comprehensive evaluations of scientific data to determine sufficiency for health claim substantiation and identification of data limitations and gaps. With her extensive knowledge in food and nutrition, Dr. Musa-Veloso has authored many publications, presented at numerous conferences, and assisted companies with the compilation of health claim submissions to regulatory authorities in the United States, Canada, and European Union.

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## Helping Companies Do the Right Thing, the Right Way!

Dietary exposure estimates are an essential component of food or feed additive petitions, novel food submissions, GRAS determinations, and food contact material notifications, as a comparison of the estimated consumption of a substance to the estimated acceptable daily intake or available safety data forms a critical part of the risk assessment process. These intake assessments include the intake from proposed use levels, as well as background intake resulting from natural occurrence in food or existing approved levels. Additionally, accurate intake estimates are a critical component of health claims submissions as they are required to demonstrate that an efficacious dose of the ingredient can reasonably be consumed on a daily basis by the typical consumer.

Cantox's dedicated team of scientists have access to the latest publicly available dietary intake survey data in several jurisdictions, including Canada, U.S., Europe, Australia, and China. In the area of dietary exposure, Cantox:

- Selects the most appropriate food uses and representative food codes for your ingredient;
- Estimates dietary exposure resulting from all current and proposed sources of your ingredient based on a range of methodologies and the most up-to-date international food consumption databases;
- Determines acute and chronic estimates of dietary exposure for all age groups within the total population;
- Calculates theoretical mean and/or percentile dietary exposure; and
- Integrates dietary exposure estimates into safety assessments for product development or regulatory purposes.

Let Cantox help you accurately determine expected intakes as part of your successful regulatory submissions!

Food Update is a periodic newsletter published by the Food and Nutrition Group of Cantox Health Sciences International (Cantox) for the purpose of keeping our clients and other interested parties informed of items of interest in the changing food industry. Email us with your research news or upcoming events at [food@cantox.com](mailto:food@cantox.com).

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