

Functional Foods:

A new era in Nutrition

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Introduction

New food products designed to offer consumers specific health-promoting benefits are coming to Canadian supermarkets. Health-conscious food shoppers will likely welcome the expanded array of product choices. Some of these "functional foods" will carry health claims that can help to educate consumers about scientifically-established relationships between diet and disease.

Dietitians need to be ready for both the unique challenges and exciting opportunities in this new era of nutrition. Will the advent of food products that have been modified to contain specific biologically-active components such as lycopene or omega-3 fatty acids, for example, conflict with our long-standing messages of balance, moderation and variety? Should we be recommending functional foods to all consumers, or only specific groups at high risk of chronic disease? Where can we quickly get credible and up-to-date information about the science behind these functional foods? Will there be government regulations and monitoring to ensure these foods are safe, even if some consumers 'go overboard'?

This article provides examples of functional foods and discusses some of the relevant issues for dietitians. A brief summary of Health Canada's proposed regulatory framework for health claims as it might relate to functional foods is also presented.

What are functional foods?

In broad terms, all foods can be considered "functional", in that they provide the nutrients needed to sustain life and promote growth. However, some foods contain biologically active substances called phytochemicals that provide health benefits beyond basic nutrition. Functional foods have been defined as foods that, when consumed as part of a usual diet, would provide health benefits over and above basic nutritional value, such as preventing or reducing the risk of chronic disease¹. However, there is currently no regulatory definition for functional foods². One reason is that this term has been broadly used in marketing and the media to refer to foods and beverages that may or may not provide the implied health benefit². For example,

some drinks sold outside Canada are marketed as "functional beverages" and are claimed to enhance memory or boost energy, although these claims have not been substantiated. Secondly, according to Health Canada, a definition of a functional food, per se, is not required for the authorization of a health claim on a "product-specific" basis².

In this article, the term "functional foods" refers to foods characterized as having beneficial health effects over and above the role of nutrients in supporting normal growth and development and sustaining good health. It is important to understand that functional foods may be conventional foods (e.g., dietary fibre in wheat bran), foods that have been modified (e.g., margarine with added plant sterols, omega-3 eggs from hens fed

flaxseed) or foods with ingredients that have been synthesized (e.g., specialized carbohydrates)³. Table 1 lists a few examples of functional food components and their naturally occurring food sources. These food components can act as antioxidants, mimic hormones or suppress the development of chronic diseases⁵.

Table 1. Examples of functional food components and their naturally occurring sources

Category	Functional Component	Sources
Carotenoids	alpha-carotene beta-carotene lutein lycopene	carrots fruits, vegetables green vegetables tomato products
Dietary Fibre	insoluble fibre beta-glucan soluble fibre	wheat, corn bran, vegetables oats psyllium, fruits, oats, barley, legumes
Fatty Acids	omega-3 fatty acids conjugated linoleic acid	flaxseed oil, fish, fish oils cheese, meat products
Flavonoids	anthocyanidins catechins flavonones flavones	fruits tea citrus fruits, vegetables
Phytoestrogens	lignans genistein, daidzein	flaxseed, whole grains soybeans, soy products
Plant Sterols	beta-sitosterol, sitosterol campesterol, stigmasterol	corn, rice bran, and soybean oils, sunflower seeds
Pre/Probiotics	fructo-oligosaccharides lactobacillus and bifidobacterium	shallots, onion powder yogurt, other dairy products
Tannins	proanthocyanidins	cranberries, cocoa, chocolate

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What factors have influenced the development of functional foods? — Consumers

Consumer interest is one of the main drivers behind the development of functional foods. Results from a recent survey by the National Institute of Nutrition suggested that Canadians are interested and receptive to the idea of functional foods: 63% strongly agreed that certain foods have health benefits that go beyond basic nutrition and may reduce the risk of disease⁷. In the same survey, 80% of respondents thought food and nutrition played a "great" role in maintaining or improving health and almost 60% believed they have a "great amount of control" over their own health⁷. Consumers are taking more responsibility for their own health care, perhaps as a result of an increased understanding of the links between diet and disease. Today's aging consumer wants to maintain health and enjoy a better quality of life in retirement. Functional foods, as part of a healthy diet, are seen as a way of achieving those goals. The popular press undoubtedly contributes to a growing public awareness of, and demand for functional foods⁸.

Economics

Consumer demand is translating into economic potential for the agricultural and food industry. Companies are experiencing new market opportunities with "value-added foods" that can address public health nutrition issues or fulfill specific consumer needs⁹. Strategic alliances are being formed among food ingredient specialists, food manufacturers and academic researchers⁹. Opportunities for functional foods will continue to grow as products increasingly become tailored to the nutritional needs of specific market segments, such as seniors, recreational athletes and menopausal women¹⁰.

New sources of functional ingredients may offer the possibility of crop diversification for farmers currently suffering from high operating costs, low incomes and years of drought. An example is sea buckthorn, a drought-tolerant deciduous shrub grown in dry areas of Saskatchewan¹¹. Berries from the sea buckthorn contain large amounts of vitamin C, vitamin E, beta-carotene, flavonoids and other phytochemicals, and are valued for their antioxidant properties. The oil is described as having "anti-inflammatory, antimicrobial, analgesic properties"¹¹. These potential health benefits have created considerable interest in this unusual crop.

The economic toll of multiple chronic diseases in an aging population has spurred interest in the possibility that foods may lower health care costs through disease prevention, although the potential savings have not yet been assessed¹². Thus, ever increasing health care costs are another economic factor related to the interest in functional foods.

Science

Advances in analytical techniques, such as high-performance liquid chromatography and mass spectrometry, have made it possible for food scientists to identify biologically active chemicals associated with the flavours, colours and aromas of foods. Once identified, these phytochemicals need to be isolated, extracted and purified in ways that preserve their biological activity, which has led to new expertise in extraction and processing techniques. Finally, clinical evidence verifying the direct and measurable effect of the food component on the body and establishing its role in the prevention of chronic disease is required. More clinical studies are needed to develop dietary guidelines for functional foods and their biologically active components.

How are functional foods related to food and health claims? —

Health Canada describes a claim on foods as "a statement in product labelling or advertising regarding the character, value, quantity, composition, merit or safety of the product"². Biological role claims are currently permitted for known nutrients that have generally-recognized biological roles (e.g., "Calcium aids in the growth and maintenance of bones and teeth") and these claims do not require pre-market assessment². The term "health claim" includes structure/function claims (e.g., "Calcium helps build strong bones"), chronic disease risk reduction claims (e.g., "Diets high in calcium may help reduce the risk of osteoporosis") and therapeutic claims (for the cure, treatment or prevention of a disease)¹⁴.

It might be useful to visualize health claims as falling along a continuum, from generic health claims that relate to whole food groups or dietary patterns known to lower the risk of disease, to product-specific health claims associated with innovative specific food products³. Health Canada is currently in the final stages of preparing regulations that would allow five generic diet-related health claims (e.g., "A healthy diet rich in fruits and vegetables may reduce the risk of some types of cancer"; "A healthy diet low in saturated and trans fats may reduce the risk of heart disease")¹⁵.

The proposed regulatory framework for product-specific health claims would apply to all foods and beverages that (a) people view as food products, (b) consume as they would any foods or according to instructions, and (c) are presented as having "a direct, measurable effect on a body function or structure beyond normal growth and development", or "reducing the risk of diseases or health-related conditions"¹⁴. Thus, a conventional food that has been modified to become a functional food would require a product-specific authorization in order to carry a health claim on its label².

For a health claim to be permitted, there must be strong evidence that the product is safe (i.e. there is reasonable assurance of no adverse effects), the quality is assured (e.g. through good manufacturing practices), and the claim is valid (i.e., eating the food product produces the health effect)³. To assess the latter, Health Canada will use an evidence-based approach that includes all available scientific findings (not only findings supporting the claim), high quality studies that demonstrate the biologically active phytochemical results in the health benefit, and evidence that new scientific findings are unlikely to contradict these results³.

The regulatory challenge will be to acknowledge the consumer's right of access to products that may provide benefits beyond basic nutrition, while ensuring that the purported health benefits are substantiated³.

What are some of the relevant issues for dietitians?

Dietitians and other health professionals will be expected to critically appraise the research behind the health claims in order to respond to questions from their clients about product safety and efficacy. While clinical dietitians may see functional foods as new options for their clients, the challenge will be to recommend the use of functional foods without dietary guidelines that include safe levels of consumption¹⁷ or detailed food composition databases with which to analyze dietary intake¹⁸. Health Canada recognizes that "not all individuals will benefit equally from the increased intake of specific foods or bioactive substances"³.

Information on current dietary intakes will also be required to be able to provide guidelines on the use of functional foods¹⁹. However, since there is no national food and nutrition surveillance program in Canada, there are no data on the current consumption patterns of either conventional or functional foods. Similarly, without a national surveillance program in place, Health Canada may not be able to conduct post-market surveillance¹⁶.

Specifically for functional foods, little is currently known about the bioavailability of many functional food components, well-validated biomarkers for many biologically active components are lacking, and information about the safety of large amounts of these components in

foods or food products is scarce²⁰. Dietitians will want to understand the possible positive or negative interactions among nutrients, their associations with an individual's genetic makeup and the effect that processing can have on the availability of nutrients²⁰.

Dietitians will need to address the challenge of communicating the health benefits of individual functional foods, without undermining the importance of the total diet³. Describing this trend towards functional foods as "an approach to optimized nutrition"²⁰ may help to avoid a "good" versus "bad" food dichotomy in the minds of consumers.

Dietitians have the opportunity to work with the food industry, regulatory agencies and the research sector to ensure that (a) functional foods are marketed with validated health claims, (b) a functional foods regulatory framework protects consumers, and (c) scientific research to support health claims is convincing and impartial. By participating in this process, dietitians will be ready for this new era in nutrition with the knowledge needed "to ensure that our publics are informed of the nature of any nutritional treatment or advice and its possible effects"²¹.

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If you think about it, dietitians and health professionals have been recommending “functional foods” for decades. Take for example, the virtues of eating lots of fruits and vegetables rich in vitamins, minerals and disease fighting antioxidants. Do we not promote the benefits of choosing high fibre foods, such as wheat bran, to promote regularity? What about milk products for calcium to help prevent osteoporosis? All these foods can be deemed as functional foods, providing health benefits beyond basic nutrition. As a profession, do we feel ready to take on the challenge of educating consumers about functional foods and their potential to reduce the risk of chronic diseases? Let’s look at some of the top 10 functional foods that are already in the minds of consumers.

Food	Functionality
Psyllium	Soluble fibre that helps lower serum cholesterol levels and manage blood glucose levels
Soy	Contains isoflavones that may reduce the risk of heart disease and certain types of cancer
Wheat Bran	Helps promote regularity
Nuts such as Almonds and Walnuts	Help decrease blood lipid levels
Fish	Contains omega-3 fatty acids that may reduce the risk of heart disease
Blueberries	Provide antioxidants
Oats	Contains soluble fibre that helps lower serum cholesterol levels
Tomatoes	One of the best sources of lycopene, which may reduce the risk of developing certain cancers
Flax Seed	May improve immune system defenses
Milk	Contains calcium that helps prevent osteoporosis

Why promote functional foods to consumers? Science has proven that many of these foods are good for health. Consumers are also telling us that they like to know about ways to manage their health, and seem receptive to adding such foods to their diet. This new era of functional foods is opening doors for dietitians to become targeted with their nutrition messages. Can the messages not focus on promoting foods to eat rather than foods to avoid for achieving long-term benefits? What kind of nutrition messages would be positive and motivating for consumers? All foods fit, but there is no question certain foods offer a “bigger punch.” As food science evolves so can our roles as nutrition communicators. Dietitians hold positions of credibility and trust. Isn’t it an opportunity for us as a whole profession to first understand, and then simplify and communicate on a continuum the benefits of the foods we eat and their role in influencing long-term health?



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