

Editorial

Functional Food

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Traditionally, the healthiness of food has been linked to a nutritionally healthy diet recommended by nutrition specialists and the role of diet as a whole has been emphasized instead of emphasizing individual food items. Lately, new kinds of foods, so-called functional foods, have been developed and launched. They provide a novel approach to the idea of healthy eating by linking a single component with a certain health effect in a single product.

Conventionally, food healthiness has been associated with nutritional factors such as fat, fiber, salt and vitamin content. In addition to this conventional or traditional healthiness, food may contain other components that may have a positive impact on our well-being. Products that are claimed to have special beneficial physiological effects in the body have been called nutraceuticals, pharma foods, designer foods, nutritional foods, medical foods or super foods. More usually they are named as functional foods.

The concept of functional foods is often considered to have emerged in Japan in the late 1980s. However, functional foods actually have a quite long history. Belief in the medicine power of foods is not a recent event but has been a widely accepted philosophy for generations. Although Hippocrates may not have started the functional foods movement, he stated "Let food be the medicine and medicine be the food". The realization that attention to diet as part of a healthy lifestyle can reduce considerably the risk of disease and promote health has created a lucrative market for a whole range of new products called "functional foods", "nutraceuticals", etc.

Nutraceuticals are natural, bioactive chemical compounds that are characterized by health promoting, disease-preventing and medicinal properties. The scope of nutraceuticals is substantially different from that of functional foods. Although the prevention and treatment of disease (i.e. medical claims) are related to nutraceuticals, only the reduction of disease is involved with functional foods. In contrast to nutraceuticals, including dietary supplement as well as other type of foods, functional foods are expected to be in the form of ordinary food. Dietary supplement stands for "a food, not in its conventional form, providing a component to supplement the diet by increasing the total dietary intake of that component". The term "functional food" is surfacing as a generic descriptor of the benefits that accompany ingesting foods that go beyond those accounted for merely by the nutritive provided.

The target of functional foods is seen as clearly different from that

of drugs, which are aimed at preventing or curing diseases.

Functional foods have been broadly defined as "foods similar in appearance to conventional foods that are consumed as part of a normal diet and have demonstrated physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions."

The prominent types of functional foods:

- Fortified product: A food fortified with additional nutrients.
- Enriched products: A food with added new nutrients or components not normally found in a particular food.
- Altered products: A food, from which a deleterious component has been removed, reduced or replaced with another substance with beneficial effects.
- Enhanced commodities: A food in which one of the components has been naturally enhanced through special growing conditions, new feed composition, genetic manipulation, or otherwise.

The unique features of a 'functional food' are : "A conventional or everyday food, consumed as part of the normal/usual diet, composed of naturally occurring (as opposed to synthetic) components, perhaps in unnatural concentrations or present in foods that would not normally supply them, having a positive effect on target function(s) beyond nutritive value/basic nutrition, that may enhance well-being and health and/or reduce the risk of disease or provide health benefit so as to improve the quality of life including physical, psychological and behavioral performances and have authorized and scientifically based claims".

Briefly, the functional foods are endowed with specific physiological benefits that discriminate them from traditional foods. The functionality of functional foods is derived from bioactive ingredients and depends on several technological factors. Bioactive ingredients in functional foods may, e.g., help in the prevention of (chronic) diseases or the enhancement of performance and well-being of the individual beyond their established role in nutritional function. Bioactive ingredients may, therefore, be considered as potentially health enhancing components of our diet.

Bioactive compounds

The interest in functional foods continues to grow, powered by progressive research efforts to identify properties and potential applications of bioactive substances, and coupled with public interest and consumer demand. In the past decade, substantial progress has been made concerning our knowledge of bioactive components in plant foods and their links to health. Human diets of plant origin contain many hundreds of compounds which cannot be considered as nutrients, but appear to play a role in the maintenance of health. Evidence for the existence of bioactive compounds is based primarily on observational studies that demonstrate the beneficial effects of

certain dietary patterns that include vegetarianism, high whole-grain consumption, the “prudent” diet, the Mediterranean diet, and the traditional Japanese diet. The traditional Japanese diet has a high content of soybean products and vegetables. The Mediterranean diet has a high content of olive oil, fruits and vegetables, and whole-grain breads. The “prudent” diet is characterized by high intakes of fruits and vegetables, fish, poultry, whole-grain products, and legumes. Many of the characteristic components of the traditional Mediterranean diet are known to have positive effects on health, capacity and well-being, and can be used to design functional foods. Vegetables, fruits and nuts are all rich in flavonoids, isoflavonoids, phytosterols and essential bioactive compounds providing health benefits. The polyunsaturated fatty acids found in fish effectively regulate haemostatic factors, protect against cardiac arrhythmias, cancer and hypertension, and play a vital role in the maintenance of neural functions and the prevention of certain psychiatric disorders.

Bioactive components include a range of chemical compounds with varying structures such as carotenoids, flavonoids, phytosterols, omega-3 fatty acids (n-3), allyl and diallyl sulfides, indoles (benzopyrroles), and polyphenols

Analytical determination of polyphenols in food samples

Food quality control and food nutritional value have become major topics of public interest. Effects of growing conditions, processing, transport, storage, genetics, and other factors on the levels of chemical and biochemical components are also important issues in food science and because food processing industries create large quantities of by-products, plant material wastes from these industries contain high levels of phenolic compounds. In the evaluation of the quality of any kind of food sample the quantity of phenolic compounds is an important parameter to bear in mind.

The analysis of phenolic compounds is very challenging due to the great variety of these compounds. On the other hand,

polyphenols are suitable compounds for analysis using modern separation and detection methods, such as hyphenated techniques of high performance liquid chromatography (HPLC) with mass spectrometry (MS), ultraviolet-visible light (UV/Vis), or nuclear magnetic resonance (NMR) spectroscopy.

Finally, Functional foods are those that provide some health benefits, for this reason the chemical characterization of its bioactive compounds is very important. Among the bioactive compounds are phenolic. These compounds have great interest due to its antioxidant properties, chemo preventive effect in humans, and influence on the oxidation stability that presented food and effect in the organoleptic properties. On other hand, food processing industries create large quantities of by-products and some plant material wastes from these industries can contain high levels of phenolic compounds and the isolation of these bioactive compounds from these by-products can be of interest to the food industry.

For this reason, the aim of my research study is to characterize the phenolic composition from different vegetables and its by-product generated by the food industry, such as tomato, olive (fruits and leaves), potato Spinach and any types of vegetables available in Palestine. To carry out the chemical characterization, the use of advanced analytical techniques to develop rapid, robust and reliable methods for the determination of these compounds is proposed. The combination of separative techniques such as capillary electrophoresis (CE) or high performance liquid chromatography (HPLC) coupled to mass spectrometry (MS) detectors such as time-of-flight (TOF) and ion-trap (IT) permits the development of potent analytical methods to carry out a detailed characterization of phenolic compounds in the different selected samples.