



**NutriScene**  
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## Are functional foods just hype or based on sound nutrition science?

I HAD shared with readers highlights of an international conference on functional foods in Malta in early May in the last issue of this column (June 2, 2007).

Discussions in the conference included what are functional foods, scientific substantiation of health claims, and consumer perception.

In this article, I would like to discuss some examples of functional foods that we encounter in our daily lives. I will attempt to highlight the functional properties or purported benefits of these foods. Is there scientific substantiation for the claims made? Can functional foods indeed help to promote health?

### What are functional foods?

Aren't all foods functional? Aren't they supposed to provide nourishment for the body?

All foods do indeed provide different types of nutrients in varying proportions needed by the body. These could be energy, protein, carbohydrate, fat, vitamins or minerals.

In recent years, it has been recognised that in addition to nutrients, certain foods also contain numerous bioactive components. These bioactive components are thought to possess physiological and health benefits beyond basic nutritional properties. These components are termed functional components and foods containing them are known as functional foods.

Functional foods must be in conventional food forms and possess sensory characteristics including appearance, colour, texture, consistencies and flavours. Herbs and other botanicals used as traditional medicine are not considered to be functional foods in this write-up.

There is a great deal of interest amongst consumers of the potential role of functional foods in promoting health and even in reducing risk to chronic diseases such as hypertension, diabetes, coronary heart diseases.

In the following paragraphs, I will provide some actual examples of functional foods, many of which are commonly consumed foods. A large amount of research has been undertaken on these foods and many have been scientifically proven to possess physiological benefits. There are also many other foods that lack scientific data to substantiate their claim to possess functional effects.

### Phytochemicals in soya bean

Soya bean has been recognised as an important source of protein in China for over two millennia. Emperor Shen Nung, in 2838 BCE, described the five principal and sacred crops as rice, soybean, wheat, barley and millet.

A thousand years later, it reached Japan and SouthEast Asia, including Malaysia. In recent years, soya bean has become a very much acclaimed "health" food in Europe and the US.

Several bioactive components have been identified in soya bean, including phytoosterols, isoflavones, saponins, phenolic acids and phytic acid. These components have been found to possess important physiological benefits: isoflavones have been studied for their oestrogen-like properties and in relation to lowering blood cholesterol; soy protein and phytoosterols studied for their ability to lower blood LDL cholesterol; high soy intake associated with lowered risk to breast cancer, prostate cancer; high soy/isoflavone intake positively associated with bone mineral density.

Many of us have consumed soya bean and its products for many years, probably not knowing the health benefits of these foods. We take soya bean drink and *tofu-fah*, we use *tofu*, *tow-kua*, *fu-chok* and *tofu-pok* in our

# Functional hype?



Fruits and vegetables contain many functional components. – AFP

cooking; we use *tau-cheo* and soya sauce as condiments, and so on.

### Bioactive compounds in tea

Tea also has a long history of use, widely consumed by both Western and Eastern societies. It is probably the number one beverage in many parts of the world.

Many health benefits have been attributed to tea in ancient writings, including for digestion, asthma, nervous system and blood pressure, and cardiovascular function. Volumes have been published on the most important bioactive components in tea, the flavonoids. These are a group of polyphenol compounds in plant products – flavones, isoflavones, flavonols, flavanols.

The most important polyphenols in tea are flavanols and flavonols, widely studied for their antioxidant properties. The most widely researched possible effects of tea components are in lowering risk to coronary heart disease, via lowering of blood cholesterol and blood pressure, protection against LDL-cholesterol oxidation, and reduction of platelet aggregation. In vitro and animal studies have also showed linkage of tea components to cancer protection.

Here, I am referring to the green and black tea, the "real tea" from the plant *Camellia sinensis*. There are many other so-called herbal teas which may have medicinal properties, made from a variety of plant varieties. These have to be scientifically evaluated individually.

### Functional components in fruits and vegetables

We always tell our children to eat fruits and vegetables because they contain high concentrations of vitamins and minerals (in the case of vegetables). In addition, fruits and vegetables, especially the coloured varieties, are also good sources of a variety of bioactive components.

Carotenoids are an example of such a group of bioactive components in fruits and vegetables. These are orange-red pigments which are particularly obvious in coloured fruits, for example papaya, mangoes and watermelon. The most common of these carotenoids is beta-carotene.

Green leafy vegetables too may contain

high concentrations of beta-carotene, but the orange colour is masked by the chlorophyll in the leaves.

Beta-carotene is a provitamin A, ie it can be converted to vitamin A in the human body. It is an important source of this vitamin for communities which consume low amounts of pre-formed vitamin A, which is present in animal foods.

In addition to its vitamin A formation property, beta-carotene has also been actively studied for its antioxidant property and its potential to lower cancer risk.

There are many other carotenoids that cannot be converted to vitamin A, but are now known to possess other physiological properties, for example, performing as antioxidants. Lycopene is one such carotenoid and is found in high concentrations in tomato and papaya. It has been studied for its potential role in reducing cancer risk.

An interesting bioactive ingredient found in grapes is resveratrol. It is believed to be able to fight heart disease through its strong antioxidant activity. The compound has been shown to be able to inhibit both the development and growth of cancer cells as well as kill existing cancer cells. It has also been shown that resveratrol can act as a phytoestrogen, helping in the maintenance of normal oestrogen activity, thereby helping control menopausal symptoms.

There has been a great deal of excitement in the scientific community about the possibility that consuming cruciferous vegetables may lower risk of certain cancers. These vegetables are of the Brassica family and include cabbage, cauliflower, kai-lan, Chinese cabbage, *pak-choy*, and brussel sprouts.

The bioactive compounds in these vegetables, known as glucosinolates, are sulphur-containing compounds and are converted to a variety of hydrolysis products including isothiocyanates and indoles. These compounds have been investigated for their ability to reduce cancer risk, particularly lung and colorectal cancer.

### Undigestible carbohydrates

Dietary fibres are the undigestible component of plants. Hence, they have a lower energy (ie less than 4 kilocalories per gram) value compared with carbohydrates. They are fer-

mentable in the colon, producing short chain fatty acids.

Several of these fibres can function as a prebiotic, ie promote the growth of "good" bacteria in the gut, thereby promoting bowel health and possibly lowering cancer risk.

Several dietary fibres have also been studied for their effects in lowering blood LDL-cholesterol and blood sugar, promoting bowel regularity, improving calcium bioavailability, and immune functions.

Examples of these dietary fibres are non-digestible oligosaccharides or polysaccharides such as fructooligosaccharide, inulin, polydextrose, resistant starch, acacia gum and resistant dextrin. Several of these fibres are suitable for addition to a variety of foods, including milk products, beverages, flour confections, thereby increasing the dietary fibre content of these foods and hence the nutritional value.

### Functional foods can help in promoting health

It is certainly most beneficial for people to derive their nutritional needs from such foods as they also obtain a variety of "other food components" besides nutrients.

Indeed, functional foods and functional ingredients may be health promoting. However, these foods should be taken in appropriate amounts, in the context of the total diet. It must be emphasised that no single food or one particular type of food should be eaten at the exclusion of others for the purpose of maintaining health or preventing a disease.

It must be remembered that taking these foods alone is not a guaranteed protection against diseases; these are not magic bullets. Functional foods or any food for that matter, are certainly not meant to be for therapeutic purposes. Overall satisfactory dietary pattern and lifestyle is of utmost importance.

For many of these functional foods, scientific evidence of their beneficial effects is rather strong, whilst for others, data proving their health effects are still lacking.

Research and development on functional foods is still a very hot topic in nutrition science. Scientific substantiation of their effects, especially based on human studies, must be obtained for many of these ingredients/foods before specific claims can be made.

It must also be highlighted that when scientific evidence supports the claimed beneficial effects of a functional food, it does not necessarily follow that the same effects can be obtained when consuming extracted and purified forms of the identified functional ingredient.

What all this means is that you should strive to eat a variety of foods to get the nutrients they provide, as well as functional ingredients. Variety becomes extremely important as different foods will supply varying amounts of the different nutrients and functional components. This will be the way to nutritional well-being.

■ *NutriScene* is a fortnightly column by Dr Tee E Siong, who pens his thoughts as a nutritionist with over 30 years of experience in the research and public health arena. For further information, e-mail starhealth@thestar.com.my.

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