

ScienceTalk

# Food as medicine

Foods with health benefits beyond basic nutrition may be key in the war on diabetes

Zhou Weibiao

Singapore has declared war on diabetes. Among the initiatives to combat the disease, the Ministry of Health has set aside \$15 million to support the food industry in developing lower-sugar desserts, sauces and beverages, while the Health Promotion Board aims to help Singaporeans cut their sugar intake by nearly a quarter by 2020.

It is interesting that both recent efforts focus on battling diabetes on the food front.

While there are multiple risk factors leading to the development of diabetes, dietary choices are undisputedly a key contributor. Unlike genetic factors, diet is an area that people can take charge of. Making healthier food choices has been widely advocated for years.

However, healthy food is not always readily accessible and available.

Changing dietary habits does not always mean certain ingredients that make dishes tastier have to be taken out, or that people have to totally avoid some foods which are deemed unhealthy. A viable alternative is to use ingredients that function favourably, and perhaps more desirably, to effectively mitigate risk. This is where the concept of functional foods comes in.

Functional foods are foods that provide health benefits beyond basic nutrition. They are not drugs, although they contain biologically active components that could enhance health and reduce the risks of certain diseases, or address specific nutritional needs.

Functional foods are eaten as part of a person's normal diet. One example is breakfast cereals which have been fortified with beta-glucan, a type of soluble fibre that has been shown to lower low-density lipoprotein cholesterol, or the "bad" form of cholesterol, in blood.

The term "functional foods" first came about in 1993 in an article in prestigious scientific journal *Nature* which described an effort by the Japanese government to explore the interface between food and medical sciences in the 1980s.

In scientific literature, the concept of functional foods can be traced back to the "father of medicine", Greek physician Hippocrates, who once said: "Let food be thy medicine and medicine be thy food." The written record of this statement first appeared in the second century.

Interestingly, this notion of food as medicine appeared even earlier in oriental culture and philosophy. It was documented that in ancient China's Western Zhou dynasty (1,000BC), the royal family was served by four different doctors and the first one listed was a "dietary physician". Around 500BC, in the famous medical text *Inner Canon Of Yellow Emperor*, it is stated clearly that food and medicine were the same.

In other parts of the world, folk or traditional medicines are often closely related to the broad concept of functional foods, such as *jamu* in Indonesian and Malay cultures, and *ayurveda* in Indian culture.

However, it is wrong to assume that all the recipes developed thousands of years ago are valid and can be fully trusted. Many may not be, yet there are also many that have been handed down through generations and have proven effective.

Herein lies the intriguing challenge for today's food scientists. At the Food Science and Technology Programme at the National University of Singapore (NUS), we place a strong emphasis on developing nutritious food products with safe and sustainable techniques. In our quest to develop modern functional foods that are scientifically proven to be beneficial to health, what clues and directions can we draw from the wisdom of recipes invented long ago?

Several years ago, my team found that a type of natural plant pigment called anthocyanin, which gives black rice its black-purple colour, can slow down the digestion of starch. The medicinal functions of black rice were documented in a traditional Chinese medicine book *Compendium Of Materia Medica*, which was completed in 1578, although those documented functions are not diabetes-related. We formulated a recipe to make diabetic-friendly bread with anthocyanins. This purplish bread tastes like white bread but can be digested at a slower rate, hence improving blood glucose control. It is also high in antioxidants. Late last year, NUS licensed the rights to market the bread to a local food technology start-up.

Today, diabetes affects one in nine Singaporeans. As consumers become increasingly more health-conscious and have a deeper appreciation of the adage "you are what you eat", demand for functional foods is gaining momentum. Many food manufacturers are intensifying their research and development efforts to meet these preferences.

Concerted efforts by various stakeholders – food scientists, food manufacturers, governments and educators, as well as consumers themselves – are needed to fully reap the health benefits of functional foods.

While food scientists play a core role in creating next-generation, evidence-based functional foods, we need responsible food manufacturers to produce them.

Government regulations have to be in place to ensure that only credible functional food products are available in the market, and this will raise consumer confidence. Through education, consumers are more well informed about the benefits of functional foods and hence, are likely to include more of such foods in their diet.

In recent years, we have seen a growing interest in functional foods, especially in South-east Asia. The development of the functional food sector worldwide is also going in the right direction.

In future, consuming food as medicine could well become ingrained in many of us.

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Professor Zhou Weibiao with diabetic-friendly bread that contains a natural plant pigment called anthocyanin. This purplish bread tastes like white bread but can be digested at a slower rate, hence improving blood glucose control. PHOTO: NATIONAL UNIVERSITY OF SINGAPORE