

Soya redraws the food map

Soya is riding a wave of success thanks to ever-growing interest in so-called functional foods and soya's versatile properties as an ingredient. *Food Technology International* spoke to Mark R McLellan, president of the Institute of Food Technologists and director of Texas A&M University's Food Protein Research and Development Center, about where the food industry is heading.

Burgers and chips have fallen into disfavour in the USA. The concern about obesity is driving many people to change their diet – in short, they want healthier food. Simultaneously, consumers demand more from the taste and appearance of food. Consequently, the food industry needs to focus on how to meet these changing consumer requirements.

'Scientists are increasingly teaming up with nutritionists to deliver functionality in ingredients – in terms of texture, shelf life and so on – while addressing the obesity issue by reducing caloric intake,' says Mark R McLellan, president of the Institute of Food Technologists (IFT) and director of Texas A&M University's Food Protein Research and Development Center.

The demand for a more nutritious diet is spurring the development of bioactive functional ingredients, that is, ingredients with consumer health benefits, for example: phytochemicals, prebiotics, probiotics and healthy oil products. Phytochemicals are derived from fruits and vegetables, including soya. They act as natural antioxidants and, as such, help protect consumers from various conditions, such as cancer.

Functional properties, such as solubility, water absorption, emulsification, viscosity and elasticity, can also be achieved with soya, especially soya protein. Thus, soya is a highly interesting research area.

'There are incredible opportunities in the ingredients sector,' claims McLellan. 'The ultimate challenge, however, is to deliver functionality and quality at the same time.'

The success of soya

A particularly progressive area in the ingredients sector is oils and lipids. New methods for, for example, oilseed crushing, solvent extraction and oil processing are being developed. Here, again, soya plays an important role.

McLellan says: 'At Texas A&M University, there is one centre focused on soya research. There is ongoing, extensive work in fabrication and fabrication design of soya products, with a focus on extrusion. We also look at extraction systems, alternate extraction systems, efficiencies and environmental waste. It is a continuous project delivering available intellectual property.'



*Soya is constantly reaping the benefit of scientific advances.
Photo courtesy of Fred S Witte, USDA Photo.*

Thanks to science and technology, the number of applications for soya is soaring. The many different types of soya derivatives – including lecithin, proteins, isoflavones and oils – can now help enhance anything from nutritional bars and supplements to meat analogues, salad dressings and baked goods.

'The success of soya is down to the fact that it contains such a large amount of functional components,' says McLellan. 'Seeds can be designed for a variety of purposes, such as raising livestock or fish in a controlled manner. Extracts have special nutritional benefits, and soya can also be shaped, designed and texturised for food products for human consumption.'

Health claim brings benefits

In December 2002, the US Food and Drug Administration (FDA) announced a new policy towards the so-called health claim labelling of functional foods, placing them on the same footing as food supplements. The IFT believes that the food industry benefits from this opportunity to make a health claim, but emphasises that regulatory agencies must monitor the use of the claim closely, inform people of it and reward the industry.

McLellan says: 'Health claim labelling provides people with an incentive to explore, to search for the connection between health and diet. This benefits consumers as well as the industry.'

In 1999, the FDA authorised the use, in food labelling, of health claims linking consumption of soya protein to a reduced risk of coronary heart disease. This meant that labels could declare that 'diets low in saturated fat and cholesterol that include 25g of soya protein a day may reduce the risk of heart disease'. As a result, soya became an attractive investment for food manufacturers. The USA's largest ingredient companies ADM, Cargill and the DuPont Protein Technologies/Bunge venture Solae are among those who have been marketing soya aggressively. Belgian Acatris is one European company that has followed suit, branding soya germ concentrates and extracts rich in soya isoflavones as 'Soy Life'.

The world market for soya proteins is reported to be worth around \$1500m to \$2000m a year, with Europe and the USA accounting for around 40 per cent each.

Ease of GM stand-off

About 80 per cent of the US soya crop is genetically modified. This could imply that Europe – with its, in general, more reserved attitude towards GM food – would be a poor export market. However, increasing export figures for US-grown soya seems to indicate the opposite. Nevertheless, GM is still a cause for battle between the USA and Europe. Admittedly, EU recently lifted the ban on GM food, but, in return, food containing any ingredient with more than 0.9 per cent GM DNA will have to be labelled: 'This product is produced from GMOs' – a ruling likely to anger the USA.

'I understand the worry that exists in the European community regarding GM food,' says McLellan. 'Where there has been a lack of strong governmental control and assurance, the population is worried and unsure of whether they are really being protected against the possible dangers of genetic modification.'

In the USA, three different, overlapping government agencies share the control of GM development: the FDA, the United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA). They pick up on problems and address them. In general, people have a strong trust and belief in this monitoring role, and there are high expectations of performance evaluation and testing.

'GM crops have been in place for a decade in the USA,' says McLellan. 'Consumers appreciate how much we save the environment thanks to these crops. In fact, there has been a dramatic drop in the use of pesticides. In the state of Texas, for example, the tanker loads of pesticides that were used for the cotton crops are no longer required.'

He continues: 'So far, GM research has been focused on the farmer and the environment. Next-generation research will embrace functionality; it will aim to deliver more environmentally friendly and consumer-beneficial products.'

Scepticism about organic food

Organic food is another sector that has benefited from a special labelling policy. The USDA's National Organic Programme is

promoting organic food by grading it on how organic it is and giving special 'organic seals' to products that are over 95 per cent organic. It appears, however, that there are mixed opinions on the policy on organic food. The IFT states that organic foods are not necessarily higher in nutritional quality or safety compared to conventional foods.



The USDA's 'organic seal.'

'When the USDA created this organic standard, it was with the understanding that this is a marketing opportunity, not a scientific breakthrough,' says McLellan. 'Science substantiates not only that it is untrue that organic food is of higher quality than conventional food, but also that there are serious questions about safety, particularly regarding how organic crops are handled in the field. What is, for example, the effect of the natural fertilisers used?'

McLellan believes that people buy organic food for a number of different reasons, some of which may be that they want healthier food and that they want to support small farms. And for this, they are willing to pay extra.

'There are many misunderstandings surrounding organic food,' he says. 'For example, organic food is often produced by large corporate farms rather than small farms. People are also led to believe that organic food is superior in terms of nutritional benefits. The fact is, however, that when you buy organic food, you get a higher food bill, but no equivalent nutritional improvement.'

McLellan continues: 'If we want all consumers worldwide to have an abundant, healthy and affordable food supply, promoting organic food is wrong. If GM food were a lot more expensive than conventional food, I would certainly wonder if this was a smart way to feed the world. But in fact, farmers save money and the environment by growing GM foods.'

Demand for variety

One reason for the success of organic food is surely that Western consumers have more money to spend on food. As a result, people are also developing an appreciation for a wider array of food. Thus, the food industry is expected to find ways to deliver these foods.

'Compare any supermarket with what it looked like 15 years ago,' says McLellan. 'The dramatic change reflects the variety that consumers expect today. They are looking to enjoy the experience of eating. Rather than saying: "give me the caloric intake I need to survive", people say: "give me the experience of food". Instead of meat and potatoes, people want an explosion of flavours.'

A consequence of this trend is that the border between savoury and sweet food is beginning to blur, with cheese-flavoured ice cream and cayenne-flavoured chocolate appearing on the supermarket shelves.

Thus, with the food industry being a hive of activity, the future holds virtually endless opportunities. ❖