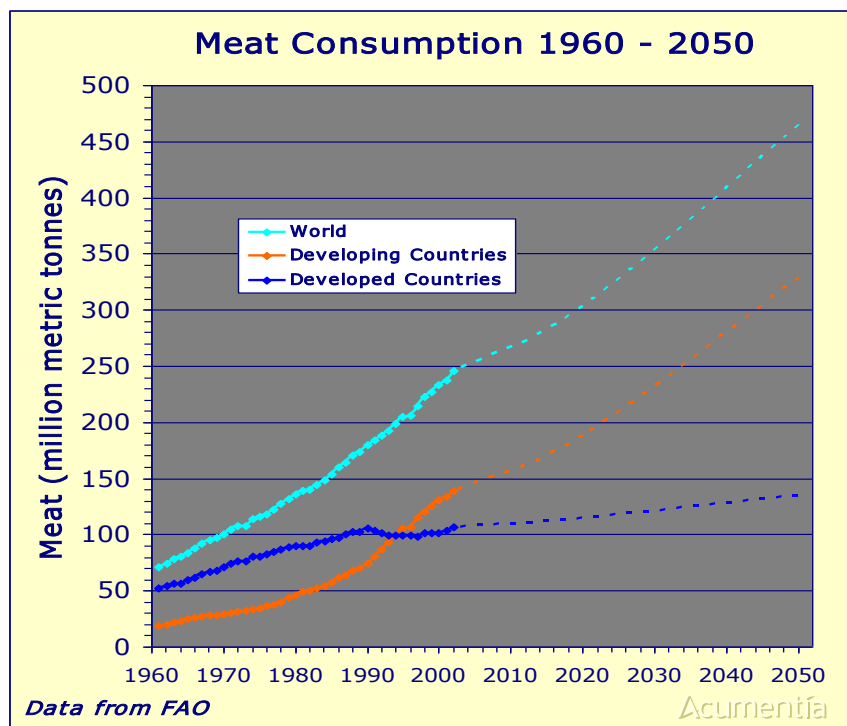


THE CHALLENGES FACING SAVOURY FLAVOUR FORMULATION

Savoury flavourings is a growth market which is predicted to increase significantly over the next 5 years in-line with the rapid growth of the consumption of meat products. The Food and Agriculture Organization (FAO) report^{1,2} that global consumption of meat is estimated to rise from 250 million tonnes per annum to 300 million tonnes by 2020 and over 450 million tonnes by 2050. The graph shows that most of this growth is in developing countries with meat consumption in developed countries levelling off. The supply of ingredients to support this market will grow in tandem with meat consumption and will have a major impact on savoury flavours.



A second factor which will influence the supply of savoury flavours is the soaring price of food products and the efficient use of meat will drive the market for

¹ Stenfeld, H. *et al.* (2006) *Livestock's Long Shadow – Environmental Issues and Options*. UN Food and Agriculture Organization, Rome.

² Delgado, C. *et al.* (1999) *Livestock to 2020: The Next Food Revolution*. 2020 Brief No. 61. International Food Policy Research Institute, Washington, DC. See www.ifpri.org/2020/BRIEFS/number61.htm

ingredients that can extend its application and make better use of off-cuts and parts of the animal that are currently out of vogue.

A third area of increasing importance is the growth of aquaculture and the farming of fish. This technology is going through a revolutionary phase with annual growth at 6% and in 2006 over one third of all fish consumed, representing around 46 million tonnes, was farmed. More species, both fresh and salt water, are being successfully added to the portfolio of fish being farmed and the FAO³ see this as crucial in the fight against hunger and estimate that production will need to double by 2030 to keep pace with a growing world population. By comparison around 90 million tonnes of caught fish is consumed globally and this has been stable since 1980 and, due to pressure on marine ecosystems, this is predicted to remain at this level for the foreseeable future. By 2030 meat and fish consumption will be around 500 million tonnes per annum.

The Growing Demand for Savoury Flavourings

The rapid growth in the consumption of meat in developing countries, especially China where pork and chicken are in great demand, will have a very positive knock-on effect on savoury flavourings and seasonings. Many of the world's flavour houses are building manufacturing capability at both ends of this great continent, in Singapore and Shanghai, to supply this market. The Indian sub-continent is another important developing region going through colossal economic growth. They now have a new middle class of around 350 million people who work long hours and at the end of a working day are looking for convenience foods. The 'modern trade' as they call it, i.e. supermarkets, are establishing themselves in India but at the moment only around 2% food is supplied through these outlets but this is predicted to grow to 50% within 10 years. In addition, there are all the relatively smaller countries in South East Asia which offer significant growth markets for savoury flavourings.

³ FAO (2006) State of World Aquaculture 2006. FAO Fisheries Technical Paper No. 500. UN Food and Agriculture Organization, Rome. See www.fao.org/docrep/009/a0874e/a0874e00.htm

The challenges facing the supply and formulation of savoury food ingredients to these regions is immense and will place great demands on the creativity and skills of flavourists in both the flavours and the seasonings industries worldwide. Flavourist's will have to understand and respond to the regional variations in taste and develop products that meet market needs and to achieve this the ingredients in greatest demand will be process reaction flavours, natural extracts, yeast extracts, hydrolysed vegetable proteins, topnote flavourings, enzyme digests, fermented products, and spice and herb extracts and oleoresins.

Rising Food Prices

The sustainability of the global food supply and the food security of millions of people are under threat as the demand for food products outstrips supply. The rising costs of food and food ingredients are putting food manufacturing margins under pressure and excessive value engineering could end up damaging products and brands. This is a major challenge confronting flavourists whose role is to provide taste and character within new and tighter cost constraints. The demand for natural flavourings driving the market will be balanced against the high cost of these ingredients compared to more cost effective savoury ingredients such as nature identical topnotes and process reaction flavours. The technologies and food additives exist to help manufacturers to produce quality products at a lower price and pressure will be on them to reformulate existing products or develop new products with a lower cost base and possibly to compromise their natural claims.

Natural Savoury Flavourings

In the developed west the drive by the food industry led by the large retail groups for what are known as 'clean label' products will continue and the demand for natural flavourings will increase especially in developed countries and as retail groups spread globally. However, faced with an increasing demand for waste reduction, improved carbon footprint and rising prices, food manufacturers and

retailers will be faced with a requirement to reduce losses in the food chain and improve the shelf life and stability of consumer products. This may herald a return to cheaper food additives and preservatives for certain brands especially those which can claim a natural status. The formulation of natural savoury flavourings is a real challenge to flavourists, especially in Europe where process flavourings, for example, cannot be called natural and new legislation will exclude the term 'nature identical'. A very interesting phenomenon has developed in the world concerning the term 'nature identical'. It has recently been incorporated into new legislation in Australasia and South America but when the new European legislation is adopted we will find that south of the equator the term 'nature identical' will be in common use but north of the equator it will not be used at all.

Enzyme technology is being increasingly used to produce natural ingredients which can be flavours in their own right or raw materials for further use in process flavours or blending into compound flavourings. The growing sophistication of enzyme systems is providing new opportunities for creating natural flavours and this is where unique ingredients are also of great benefit. These may be local foods and ingredients which will add a regional influence into flavourings and will make it very difficult for competitors to copy and this is one way that smaller flavour companies can protect their local markets against the power of the big global players.

Matching Savoury Flavours

The savoury flavour market is highly competitive with the large global giants dominating and with smaller regional companies competing within their territories. The matching of flavours is now very much standard practice in the flavour industry and is leading to the erosion of flavour margins and profitability. The cost of the technology; mass spectrometry, is well within the grasp of the smallest of flavour companies and to protect against this, complex flavours such

as process flavours are being increasingly used to safeguard formulations. It is very difficult to copy a process flavour because the raw materials employed have largely been used up and the analytical profile is very complex containing hundreds of compounds formed in the reaction. Topnote flavours can be incorporated into process flavours protecting their identity and making them difficult to detect by analysis against the multitude of other compounds present. The flavourist's job then is not merely to achieve the flavour target and meet the customer's requirements it is also about protecting the identity of the formulation making it difficult to copy.

Legislation

Flavourists have no choice but to operate within the legislative framework operating within their target markets. Therefore it is imperative that they are fully informed and have a working understanding of the limitations that such legislation imposes upon their work. The savoury flavours course describes the legislation affecting the flavour industry and does so in a global context.

In the USA process flavours have not been legally defined and are considered as GRAS and manufacturers comply with the IOFI Code of Practice which provides detailed advice on the ingredients, processing conditions and labelling of process flavours. Under these guidelines process flavours are either natural or artificial depending on whether natural materials or artificial raw materials are used in their manufacture. In Europe the situation is very different and process flavours cannot be natural. They are defined in a special category as simply 'process flavourings' and the definition requires that they are manufactured using a source of amino nitrogen and a reducing sugar. New regulations expected to come into force by around 2012 will change the situation and 'thermal process flavourings', as they will then be called, will be either derived from 'food' and/or 'source material other than food'. If they contain any of the latter they will have to be approved and it is not yet known what this will entail but it is most likely to include

toxicological studies on animals and hence be very costly. The same conditions will also apply to new legislation concerning precursor flavours and the definition of food is therefore key to determining which ingredients will be classified as 'source materials other than food' and it is not yet clear which ingredients will fall into this category. Consequently, in advance of the new regulations manufacturers of process flavourings are converting them to flavouring preparations which by definition are natural. This will necessitate that natural materials are used in their manufacture and that the flavour is produced using a traditional food process such as cooking, roasting, grilling, baking or frying. There is also a very curious new definition of the conditions required to produce thermal process flavourings which could be interpreted to mean that they cannot be manufactured below 125°C. Clearly the proposed new legislation has not been thought through and this represents a real challenge facing the creativity and ingenuity of flavour chemists and flavourists in Europe and those supplying products into Europe.

One of the few other places in the world where process flavourings are regulated is in the Mercosur countries of South America; Argentina, Brazil, Paraguay and Uruguay which became law in December 2006. Their definition of process flavours is an amalgam of the European legislation and the IOFI Code of Practice and they can be either natural or synthetic depending on the raw materials used. The legislation being applied here takes the best from both worlds and is far in advance of the impending new European legislation.

Training Savoury Flavourists

The training of a savoury flavourist takes many years and is never really complete. To be successful the flavourist must rely on experience, judgement, flair and intuition plus an extra 'spark' of creativity. Unlocking the creative potential of a flavourist is crucial to all flavour companies and few training courses are available that provide some of the elements of the basic training

such as process reaction flavours, topnote blending and applications. A completely new course launched in 2008 in the UK will address this gap and span savoury flavours from the chemistry and technology through formulation to application covering all the essential ingredients used on the way. The course will give flavourists a chance to step outside their normal daily activities and really focus on the components and construction of a savoury flavour. They will have the opportunity to go back to basics to examine the interaction between the components and study synergies and clashes, understand how a flavour functions in the final food product and trace that performance back to the individual components within the formula. An essential element to this course is a session on creativity. There is much talk about the creativity required to become a successful flavourist – this course will offer techniques that the flavourists can take back to their company and enhance their development programmes with a fresh impetus.

Dave Baines and Richard Seal

May 2009

The next course in **Creating Savoury Flavours** hosted by Dr Baines and Richard Seal will run on **25 – 29 October 2010**. Places are strictly limited.

Contact Helen Moore at **Verner Wheelock Associates** on **01756 700802** or email office@vwa.co.uk for further information.

