A state-of-the-art packaging manufacturing plant is comparable with anything in the aerospace sector. David Burrows looks at some of the star innovations

A world of INNOVATION

Economic strains. Weather storms. Food scares. It's been a tough few years for fresh produce. But packaging can provide some solutions to these challenges. Indeed, the importance of punnets, pots and plastic were evident in a survey conducted at Fruit Focus 2013. Almost one in three respondents (32 per cent) said it is "vital" for packaging companies to support fruit businesses through innovation such as shelf-life longevity, new product design, improving ease of use and environmental positioning.

Ruth Price, UK produce manager at packaging company Sharpak Aylesham, which carried out the research, is not surprised by the importance the sector places on packaging. "Not only can it enable businesses to better their overall offer through improved design, functionality and logistics, but it can also help to solve a number of associated problems," she says.

It can also secure the support of customers. Retailers seek packaging that uses the minimal amount of material, is lightweight, more sustainable, recyclable and effectively protects, preserves and presents food to a high standard. In no other section of the supermarket is this more of a challenge than in fresh produce. But this perhaps explains the sophistication, if not the sexiness, of today's packaging sector. "There are lots of different areas within this industry, all very high tech," says Richard Bateman, an engineering lecturer at Brunel University. "The technology and complexity of a state-of-the-art packaging manufacturing plant is comparable with anything in the aerospace sector but for some reason packaging is not seen as exciting by new engineers entering the jobs market."

Until now. Food packaging companies will have to work smarter in order to satisfy retailer and public desires, designing products that meet exacting environmental, commercial, regulatory and social standards. So what are the big trends in packaging today, and what might 2014 bring?

> The idea that anyone can come up with a single meaningful definition of sustainable packaging has been consigned to history

Incpen's 'The Good, the Bad and the Spudly' campaign

SUSTAINABILITY

Sustainable packaging is a myth and is "no longer relevant" as a term, at least according to a report by PricewaterhouseCoopers last year. The firm concluded that the debate surrounding 'good versus bad packaging' has moved on: "The idea that anyone from the key stakeholder groups can come up with a single meaningful definition of sustainable packaging [...] has been consigned to history," it reads. "The reality is that it has been substituted with a more balanced view of efficient packaging."

The arguments about lightweighting, recycled content or recyclability as the ultimate measures of sustainable packaging have been replaced by a more holistic debate concerning the product: green packaging is, in fact, a red herring. Packaging that improves and enhances the sustainability of a product is now the Holy Grail – whether that's in the field, on the road, in the store or at home.

"It is not about whether there is too much or too little packaging," explains Linpac Packaging VP for marketing

and innovation, Joanna Stephenson. "It is about ensuring that a particular product is packed in the best way to reduce the chances of it being wasted while acknowledging the need for lighter, more sustainable solutions. That is the challenge for packaging manufacturers."

Waitrose is particularly keen to reduce the environmental footprint of its packaging "through whatever means possible", according to head of sustainability Quentin Clarke. "Lightweighting and recyclability are very important trends," he says. "Biodegradable packaging based on pulp or paper is another trend but biodegradable plastics pose significant issues with regard to contamination of recyclate streams."

Indeed, however light or low impact packaging is, the benefits are lost if consumers don't know how to recycle it (see box). Simon Drury, resource efficiency knowledge leader at environmental consultants Ricardo-AEA, says the use of the "wrong materials" is a big issue. High value, easily recovered materials, which facilitate high quality or retained value recovery are what's needed, he adds.

Worse still is if consumers simply don't buy into it: packaging may not be top of the purchase decision tree for shoppers, but some innovation can be a turn off. Take the »

WHEN THE GRASS REALLY IS GREENER

Prototype trials are underway in a project to convert Welsh ryegrass into sustainable food packaging. Using cutting-edge pulp moulding equipment, researchers at Bangor University have begun a process of heating mixtures of ryegrass to press and mould into prototype fruit and vegetable packaging products.

Funding of almost £600,000 from the Welsh Government's Academic Expertise for Business programme is facilitating the so-called 'Sustainable Products from Ryegrass' project, a collaborative programme of research between Bangor and Aberystwyth Universities and six industrial partners including Waitrose and packaging company Adare.

Adare already has an extensive range of fibre-based trays and punnets marketed under its Fibellus brand, while Waitrose is keen to move to easily recycled fibre-based packaging for foods. "It is something we're keen

to develop and a key element of this project will be engaging with the public from an early stage to ensure we are delivering solutions that meet their needs," says the retailer's head of sustainability, Quentin Clarke.

IT'S ALL ABOUT BIODEGRADABLE

"Biodegradable plastic will become even more popular as consumers and environmentalists become more concerned about plastic waste, and manufacturers and retailers look for an answer to critics who say that their plastic products will lie or float around in the environment for decades," says Michael Laurier, CEO of Symphony Environmental Technologies.

"There are two main types of biodegradable plastic. One is d2w oxo-biodegradable, which is ordinary plastic with a pre-set approximate lifespan and which will degrade completely in the presence of oxygen on land or water. It is not for composting and will not emit methane deep in landfill. The other is bio-based (or 'compostable') plastic, made partly from vegetable resources. It is designed to biodegrade in an industrial composting plant, but cannot actually be converted into compost. It can generate methane in landfill, it cannot be recycled with ordinary plastic, and is much more expensive.

"Of the two, oxo-biodegradable is experiencing a surge because it was specifically designed to cope with plastic litter in the environment. It will degrade at the end of its useful life, but can be recycled with ordinary plastics during its useful life. Oxo-bio is being used for more and more types of food packaging.

low footprint, lightweight Jugit bag developed to replace bottles and cartons: Sainsbury's customers loved it, while at Waitrose milk turned sour on the shelves as its (often eco-conscious) shoppers turned their noses up at buying milk in a pouch. Indeed, packaging is a world where the best environmentally optimised solution is converted into the worst if food is left on shelf and wasted. Waitrose's Clarke adds: "We sell a lot of fresh fruit and vegetables loose, where the customer uses a very lightweight bag to hold their chosen produce, but there are cases where packaging offers great benefits to the customer in terms of protection, ease of selection and indeed increased shelf life and quality.

All of these are very important, but where packaging is used it must do the job, be easy to open and in some cases re-close and give the customer the minimum difficulty when it comes to disposal. From our point of view the cost should be realistic to enable competitive prices which we know are appreciated by customers," he adds.

> Consumers must accept the distribution and logistics costs do not necessarily adjust proportionally so a 100g bag is only a little less expensive than 200g

FRESHNESS

Shoppers are not willing to pay a premium for green packaging. In fact, many of the packaging innovations are undetectable. On the punnets used by vegetable and salad supplier Freshtime, for instance, the film has been reduced by 27 per cent. This involved extensive trials and machine investment to ensure the packaging did its job, but "the customer would hardly notice the difference", says UK procurement manager John Stokes.

Though thinner packaging can drive down costs, the trend for portion control could require some adjustments in the other direction. "Consumers need to accept that the distribution and logistics costs do not necessarily adjust proportionally so a 100g bag will come in only a little less expensive than a 200g bag," says David Howlett, strategic planning director at MMR Research Worldwide. The big focus into 2014 will be shelf-life extension – not least in light of food waste's recent infamy. The packaging industry has come a long way in designing and developing functional designs for the particularly sensitive fresh produce market. It continues to address the need for modified or controlled atmospheres, investigate the use of anti-microbial solutions to extend shelf life and ergonomically design packaging to minimise damage and waste as far as possible.

Simple developments such as side-vented punnets from Infia for strawberries have extended shelf life by a day or two for vulnerable soft fruit. "This enables consumers to see ripe, red strawberries delivered from across the globe, all year round – a feat that could not have even been thought of just a few years ago," says Stephenson.

Modified atmosphere packaging (MAP) isn't a new innovation, but receives a lot of criticism – much of it unfair, according to Ricardo-AEA packaging expert Jenni Donato. "The packaging extends the shelf life of the product both within the shop [so they sell more] and within the fridge [so less goes in the bin]; a little bit of extra packaging therefore goes a long way in reducing environmental impact."

Newer kit on the block includes ethylene liners, which absorb ethylene – a potent agent in the ageing process of fruit and vegetable – and anti-microbial food bags. The latter, developed over two years by Symphony Environmental Technologies and Janssen Pharmaceutica NV, involves a combined anti-microbial and anti-fungal additive on plastic packaging that protects against mould, fungus, bacteria and the like. Tests have indicated that the product will increase the shelf life of bread and cheese, with the potential to do the same for fruit and vegetables. The companies are now in discussions with a number of food manufacturers and supermarkets about using the technology in their packaging. Michael Laurier, CEO at Symphony, is sure that keeping food fresh will become one of the major growth trends and that fresher-for-longer packaging technology will become "the norm". FPJ

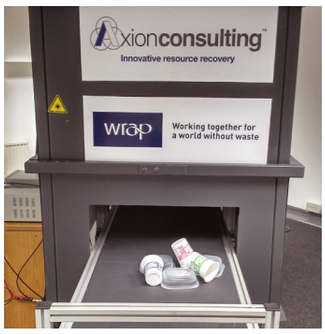
SORTING THE RECYCLING PROBLEM

One of the big packaging challenges comes after the material has served its primary purpose and is destined for the bin. Retailers and manufacturers are keen to improve the recycled content of the packaging they use, but collection and separation of materials like polypropylene (PP) pots, tubs and trays at the kerbside tends to bring councils out in a sweat. This means over 100,000 tonnes of valuable packaging resources are lost from the system every year.

European food packaging regulations can explain a lot: under these laws, the starting material for the recycling process must be 99 per cent food contact.

But the UK's PP packaging stream is only 60-70 per cent food contact. That means the two PP streams have to be separated. Doing it by hand is expensive, but one company has found another way.

Axion has developed an automatic sorting process that uses 'lines' to identify and separate PP that has been in contact with food from that which has not. Food contact PP is marked with the lines (called a diffraction grating)



that can be scanned by a laser to reflect a specific pattern. The image is photographed and then analysed by a recognition system. It is the first time such a concept has been used in this type of sorting application – it worked well and could "revolutionise" any food contact plastic recycling, according to Axion.