

19. Convenience Foods and the revolution in produce marketing

Recognised by TIME magazine (29 Nov. 2004) as being one of *the world's most amazing inventions in 2004*, **ripeSense™** is the world's first intelligent ripeness indicator label. This development is but one of many innovations New Zealand organisations are pursuing to meet three trends.



Trend 1: Consumer Power: increasingly consumer power will influence products and services provided by supermarkets worldwide.

Trend 2: Convenience rules: to a large degree snacks and meals have become interchangeable and where 'convenience food' is associated with eating while moving and also quick home cooking. Increasingly there are concerns that convenience foods should also be healthier.

Trend 3: Increasing Customisation of Food: the need for 'customisation' comes from people increasingly expecting to use food to suit time, energy and health or leisure needs. Customisation is driving the development innovations such as indicator labels for shelf-life and product composition as consumer requirements become increasingly dynamic.

To meet these challenges, producers, scientists, processors and exporters are working in four main areas of ready-to-eat and ready-to-use technologies with the following examples:

- A. Packaging technologies:** the *ripeSense™* is the world's first intelligent ripeness indicator label system developed in New Zealand by HortResearch, and commercialised in partnership with Jenkins Group, a supplier to New Zealand's horticultural labelling industry. This cutting edge innovation is the start of a new evolution in fresh produce marketing.
- B. Cultivars for more convenient foods:** Some *Actinidia* species such as *arguta* produce fruit resembling grapes with smooth, hairless skin and many large grape-sized fruits hanging in bunches – but with an interior appearance and taste similar to kiwifruit (*Actinidia deliciosa* or *A chinensis*). The major advantage with this fruit is that it does not require preparation such as cutting or peeling. It is instantly a ready-to-eat healthy food.
- C. Technologies for semi-processed foods:** fresh sliced apples that stay fresh for extended periods are the result of an innovative technology developed by HortResearch that is now marketed globally in a joint venture company Fresh Appeal Ltd with an exclusive world-wide licence. Several years of research by HortResearch scientists has gone into the development of this unique method to retain the freshness of produce after it has been sliced. This is a leading-edge food processing and disinfection technology that could be used for a wide range of fruit and vegetables.
- D. Technologies for fully processed foods:** in 2004, New Zealand exported \$265.5m (fob) of processed vegetables of which \$66.4m was as processed potatoes. Scientists at Crop & Food Research have long-time potato breeding programmes under which they have analysed over 100 varieties, and developed some unique potato varieties. They are confident that they can identify an improved processing potato variety for New Zealand conditions – if they can convince brand owners of the benefits.

R&D and Convenience foods: the quality of research and development is recognised as critical to the future prosperity of New Zealand's specialty foods industry. Both Government-owned and private sector institutes and research organisations work closely with the industry to ensure New Zealand remains at the forefront of production and processing technology. The 'Next generation' snack foods with taste appeal and specific health benefits are the first target of a new \$18.4 million six-year co-operative research programme.

In this case study, we give several examples of technological advancement and a final section focussing upon New Zealand's research and development as applied to convenience foods.

A. Packaging technologies

ripeSense™ evolved from the simple idea of making a fruit label that is capable of more than just branding product and this has led to the next revolution in fresh produce marketing.

Once fruit is picked from orchards, the challenge to present fruit in top condition increases with distance from markets, more sophisticated consumer demands and the need for year-round supply. In the past, loose fruit, often unripe, was sold from bins where it was easily bruised, squeezed and prodded to determine its ripeness. Then came 'ready to eat' fruit, bundled and pre-packaged, but in a manner whereby it is still difficult to determine its ripeness.

Not knowing if, or when, the fruit has reached their preferred state of ripeness frustrates consumers and becomes a barrier to purchase. *ripeSense™* eliminates this problem by using a sensor label that reacts to the aromas released by fruit as it ripens. The sensor is initially red and graduates to orange and finally yellow. By viewing the colour of the sensor, consumers choose fruit which is at their preferred ripeness.



ripeSense™ packaging on display at Fruit Logistica, Berlin; the world's largest fruit fair.

Damage and shrinkage are reduced as *ripeSense™* significantly reduces damage by consumers as they inspect fruit before purchase; and the recyclable *ripeSense™* pack provides improved hygiene security. Extra handling can lead to high levels of shrinkage in store.

ripeSense™ for pears is already on the market and developments are well advanced on *ripeSense™* indicator labels for kiwifruit, melon, mango, avocado and stone fruit.

The *ripeSense™* is the world's first intelligent ripeness indicator label system was developed in New Zealand by HortResearch, a New Zealand Crown Research Institute. The commercial production and marketing is undertaken in partnership with Jenkins Group, a supplier to New Zealand's horticultural labelling industry.

This cutting edge innovation is the start of a new evolution in fresh produce marketing.

B. Cultivars for more convenient foods

Arguta

Arguta 'kiwifruit look much the same as normal kiwifruit, but the fruit themselves resemble grapes with smooth, hairless skin and many large grape-sized fruits hanging in bunches. The interior appearance and taste is similar to kiwifruit. The major advantage with this fruit is that it requires no preparation such as cutting or peeling. It is instantly a ready-to-eat healthy food.



Arguta Industry Profile

- New Zealand developed varieties are crosses with dominant ones being: *Takaka Green* and *Marju Red*.
- Newly formed association of growers (2004) NZ KiwiBerry.
- 37 hectares in Arguta (in varying stages of development): Bay of Plenty (80%), Nelson, Blenheim and Canterbury

Current volumes (exports)

2002: 8 tonnes; 2003: 24 tonnes; 2004: 72 tonnes

Potential volume

- 37 hectares @ 500 vines / hectare and 50 to 60kg / vine = 1,000 tonnes
- currently producing up to 30kg / vine.

Markets

- Domestic market
- Exports, (mostly small quantities) to: Australia (dominant), Japan, North America, Honk Kong, Taiwan and UK

Dialogue

Sales were developing well, but price competition from Chilean production has slowed market uptake.

Research

HortResearch have three new varieties under assessment as well as continuing strategic and crop management research (e.g. optimum time for picking).

C. Technologies for semi-processed foods

Fresh cut technology; a challenge from fruit and vegetable marketers has been how to produce ready-to-use fruit and vegetables whilst maintaining fresh appearance and flavour.

Sliced apples that stay fresh for extended periods are the result of an innovative technology developed by HortResearch that is to be marketed globally in a joint venture with Logistic Solutions Ltd of Auckland. A company Fresh Appeal Ltd, has been formed to take the technology to the market place. Logistic Solutions brings complementary technologies to the partnership and HortResearch has issued Fresh Appeal Ltd with an exclusive world-wide licence to commercialise the technology.

Several years of research by HortResearch scientists has gone into the development of the unique method to retain the freshness of produce after it has been sliced. The research has produced a leading-edge food processing and disinfection technology that could be used for a wide range of fruit and vegetables.

Scientist Roger Stanley said that the technology is a robust, simple and effective physical process to wash the sliced produce and at the same time kill pathogens and spoilage microbes.

"It is a special challenge to ensure safety and quality of fresh fruit and vegetables that are eaten without cooking. We had to develop a process that solved potential safety issues as well as keep apple slices in a fresh condition and with no preservatives," said Dr Stanley. "The process is suitable for organic applications," he said.

"This technology produces fresh fruit slices with an extended shelf life that make an ideal snack food with many uses such as for school lunches."



HortResearch Group General Manager Michael Lay-Yee says that marketing activities for this technology would initially concentrate on the development of the North American market, where the US fresh produce market is valued at US\$100 billion in annual sales with a projected growth of 10-12 percent per annum. The fresh-cut sector is the produce market's strongest growth sector, and represents significant opportunities for the new venture.

D. Technologies for fully-processed foods.

In 2004, New Zealand exported \$265.5m (fob) of processed vegetables. Of this volume, \$66.4 m was as processed potatoes. 'Processing' includes freezing, canning, drying and vegetable preparations.

McCains, who have 70 to 80% of New Zealand french fries markets carried out an Australasian-wide survey for locations to grow potatoes for processing. They selected Timaru in South Canterbury as the best area. Contracted growers are however required to produce Russet Burbank variety as that is the variety is specified by end buyers and brand owners.

Russet Burbank was not developed for New Zealand conditions and growers experience several production issues such as irrigation management, nitrogen management, disease control (difficult to control). Processors require an even distribution of dry matter within the potato and prefer a long shape.

Some potato processors use Agria variety for chip processing.

Scientists at Crop & Food Research have a long-time potato breeding programme and have developed several unique varieties of potato; e.g. Gladiato.

Having analysed over 100 varieties, Crop & Food Research are confident that they can identify an improved processing potato variety which will perform well under New Zealand conditions, and which is less susceptible to powdery scab. A challenge remains in convincing processing brand owners of the benefits of using New Zealand bred varieties. At present the risk of productivity losses is largely with growers.

E: R&D and Convenience foods

The quality of research and development is recognised as critical to the future prosperity of New Zealand's specialty foods industry. Both Government-owned and private sector institutes and research organisations work closely with the industry to ensure New Zealand remains at the forefront of production and processing technology.

Postharvest

Freshness is an important attribute of fruit and vegetables which guides purchase decisions. Products such as bunched carrots are sold at a premium because they contain a visual indicator of 'freshness'. Most produce responds favourably to being stored in a perforated plastic bag at low temperature, but more advanced innovations are being investigated.

Crop & Food Research are unraveling the control of senescence in plant tissue (i.e. the process of death and dying), which underlies the wilting and yellowing that are such obvious signals of a loss of freshness. They are also examining the role of different genes in controlling the pathway of senescence.

Further research is determining how nutritional value changes during storage. All of this information will be used to design the next generation of storage technologies that will target the retention of fresh appearance and nutritional quality for an extended period after harvest. These attributes will confer greater marketing flexibility on what are currently highly perishable products.

HortResearch, has developed several profitable, science-based solutions for the specialty foods sector. Among these is an enzyme-peeled fruit technology that replaces the labour-intensive hand peel process - including a heat pump drying process that reduces the use of preservatives in fruit and other preparations such as jam. The institute has also conducted innovative research into a safe, extended shelf life for high-quality fruit juices, which maintains the flavour and appearance of fresh juice.

Elsewhere in this case study reference is made to the *ripeSense™* development applied to pears, for which it is difficult to determine their ripeness state from appearance. This work required integrated and effective research in three key parts:

1. Sensors: an application system for applying reagents onto labels
2. Physiology
3. Clamshell packaging

The *ripeSense™* development will help consumers to assess value. A new development uses a similar packaging to help retailers maximise value.

New research for 'next generation' snack foods

'Next generation' snack foods with taste appeal and specific health benefits are the first target of a new \$18.4 million six-year research programme.

Crop & Food Research will lead the research, which will be overseen by a panel of food industry leaders. The programme is being funded by the Foundation for Research, Science and Technology (FRST) with the food industry contributing a further \$3.4 million over the six years.

Crop & Food Research chief executive, Paul Tocker, says foods that fit the convenience lifestyle market and which are good for you, offer exciting growth opportunities for industry. *“At the moment such snacks have a short shelf life and this limits their export potential. Removing the technical barriers to exporting these high value convenience foods to the Asia Pacific region will enable New Zealand’s food manufacturers to significantly boost export earnings.”*

The research programme will focus on foods that rely on New Zealand’s arable and vegetable industries for raw ingredients. *“We have a strong arable and vegetable tradition in New Zealand and by producing higher value foods we can add significant value to these crops,”* he says.

“While vegetables and grain-based foods are inherently healthy, we must understand the science behind these raw materials. With this information we can help design foods with a greater ability to inhibit disease and promote health and well-being.”

Industry-based coordinator for the project, Annette Campbell, is delighted with the funding received. *“This gives industry an opportunity to drive valuable science that will ultimately result in exciting new opportunities in the export food arena.”*

The industry panel overseeing the research includes the leaders of major companies such as Goodman Fielder New Zealand, Griffins Foods, Weston Milling, Allied Foods and Wrightson.

These companies, along with Cadbury Schweppes, Harraways and Quality Foods Southland, are also supporting the research. Other organisations involved include the New Zealand Baking Industry Research Trust, the New Zealand Flour Millers Research Trust, and the Vital Vegetables programme.

Research collaborations will involve the Nutrition Department at the University of Otago, the Food Engineering Department at the University of Manchester Institute of Science and Technology, and the companies supporting the programme.

Sources:

Interviews, data search and reports from

- *Crop & Food Research*
 - *HortResearch*
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This case study is one of a 21-part case study series aimed at demonstrating the value of science and innovation in New Zealand's leading edge bio-science industries... and their significance to New Zealand.

Martech Consulting Group is a strategic consultancy based in New Zealand. The growingfutures case study series was in part based upon Martech's extensive work with sector representative groups, science providers and organisations that interact with science providers to achieve consensus on co-ordinated actions, improve governance, develop sector-based strategies and improve innovation processes.

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