



# Vegetables: is fresh best?

Dr Hazel MacTavish-West  
May, 2014

# Dr Hazel MacTavish-West



**Director, Plant & Food Science** BSc (Agric) (Hons, Syd); PhD(Tas)

MacTavish West is an innovative scientific consultancy working in both Australia and the UK ([www.mactavishwest.com.au](http://www.mactavishwest.com.au)).

We work with small and large producers, processors and retailers of fresh and extracted produce, developing and optimising new products and communicating the benefits.

## IFST Presentation, May 2014 Vegetables: is fresh best?

**Disclaimer:** As a freelance consultant, Dr Hazel MacTavish-West undertakes projects on behalf of producers of both fresh and frozen vegetables in the UK and Australia.

No commercial funds were offered, sought or received for making this presentation.





# Fresh vs processed (frozen)



Trends

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Vegetables: unique features

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Raw materials

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Processing & packaging

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Consumer usage & nutrition

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Environmental impact

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Waste

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Cost, retailing & purchasing

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Consumer perceptions

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New product development

# Trends



Vegetable consumption per capita is declining

Sales of frozen vegetables are increasing

What are the real & perceived differences between fresh and frozen vegetables?

# Vegetables: Unique Features



Significant dietary sources of vitamins, minerals, fibre, water and phytonutrients

‘sufficient’ fruit and vegetable consumption is one of 5 major routes to reduce global risk factors for disease (WHO)

Only 18% of children, 24% of men, and 29% of women achieving 5ADay in 2011



# Frozen vs Fresh: Raw Materials



Production methods are similar

Processing uses more of the crop.

UK supply of fresh veg AYR is by air or truck when UK-grown produce is not available

Frozen veg are transported by sea, which is more energy efficient. The gains more than compensate for refrigeration energy use

# Processing & Packaging



Vegetables actively respire until being cooked

Blanching stabilises colour, depletes heat sensitive and water-soluble vitamins by 25-50%, and may improve the extractability of fat-soluble carotenes

Nutrient changes in frozen vegetables are less over 12 months than in fresh produce stored at 4°C for 7 days



# Consumer Usage and Nutrition



Long cool chains and sub-optimal storage environments (especially at home) reduce vitamin content of 'fresh' produce

Cooking has the biggest impact on nutritional quality of vegetables

# Environmental Impact



Vegetables produce 1/3<sup>rd</sup> the greenhouse gas equivalents of fats, and 1/6<sup>th</sup> that of fish

Sorting, washing, packaging and transportation contribute to global warming potential for fresh vegetables

For frozen veg, its transportation, distribution, retail and consumer storage

Frozen veg have a lower carbon footprint than fresh, due to less in-home waste



# Waste



30% of all food is wasted

Farm waste:	20%
Processing waste:	15-30%
Retail waste (Europe):	45%
Consumer waste:	30%

To reduce environmental impact:  
reduce waste through the supply  
chain and encourage consumers  
to compost more

Switching from fresh to frozen  
vegetables to minimise in-home  
waste has less impact.

# Cost



Mixed frozen veg packs:  
£2.19/kg (N=16)

To make a comparative fresh  
product from whole veg:  
£2.96/kg (N=11; +35%)

Pre-prepared fresh vegetables:  
£4.40/kg (N=17; +100%)

Thus frozen vegetables are  
cheaper (Tesco online, full  
price, March, 2014)



# Retailing & Purchasing



Fresh and frozen vegetables are stocked in completely different sections of the supermarket

Fresh veg purchasing is linked with increased income, age, education levels and the number of adults at home

Processed veg purchasing is greater in larger households, but is not linked with age or education level

# Consumer Perceptions



40% of UK consumers believe frozen vegetables are as healthy as fresh (Mintel).

Perceptions of fresh veg:  
'farmer and local'

Perceptions of frozen veg:  
'convenience and off-shore'

Lack of time = huge barrier to sufficient (or greater) veg consumption

Differences in flavour and texture consistently put fresh vegetables ahead of frozen



# Product Development - Fresh



- Convenience
- Combinations
- Flavoured butters etc
- New format (salad bowls)
- New varieties with visual differences (colour, shape)
- New packaging options (to increase fresh shelf-life)
- Brands (Fresh & Naked, Albert Bartlett, Steve's Leaves)
- Farming provenance

# Product Development - Frozen



- New combinations (Mexican-style, stir-fry and microwaveable packs)
- Engage consumers in the meal preparation process
- Frozen salads
- Claims (convenience, health claims (low/no/reduced allergens, high in protein, fibre, wholegrains, and the number of vegetable servings)
- Seasonal offerings

# Summary & Conclusions

## **Fresh veg:**

- Air transportation from other countries, and in-home preparation waste increases the carbon footprint
- Inappropriate and prolonged storage depletes nutrients significantly
- Consumers value the provenance, flavour and texture, for salads, stir-frys and snacks

## **Frozen veg:**

- Blanching and freezing provides nutrient rich, relatively shelf-stable biomass that is convenient and cost effective
- Have a greater environmental impact in terms of processing and storage, however reduced in-home waste dramatically reduces the carbon footprint
- Consumers value the convenience and price, and for many meal options, frozen vegetables are equivalent to fresh (soups, stews, some stir-frys etc)



# Summary & Conclusions – all vegetables:



- Add flavour, colour and crunch to meals and snacks
- Are an important source of dietary fibre, vitamins & phytonutrients
- Education re optimal storage and cooking techniques is required
- **Vegetables: just eat more every day.**

# Thank you



We work with an international team of experts who are all outstanding in their fields. **Together we are more.**



**Director,  
Plant & Food Science**

**Hazel MacTavishWest**  
BSc (Agric) (Hons, Syd);  
PhD(Tas)



**Director,  
Technology**

**Darren West**  
BSc(Hons) MPhil  
(Cantab) Ceng MIET  
MIEAust CPEng FRSA



**Food  
Consultant**

**Judith Sweet,**  
food consultant,  
recipe creation



**Horticultural  
Technologist**

**Richard Binks,**  
B.Sc. (Hons) App.  
Bio.; Dip  
Crop Protection, PhD  
(Tropical Agriculture,  
Reading)



**Agribusiness  
Insights**

**Reetika Rekhy**  
B. Com (Hons) Post  
Grad Dip International  
Marketing MBA (UNSW),  
PhD (Agribusiness)  
Candidate (Syd Uni)



**Food  
Technologist**

**Lindsey Bagley,**  
BA CSci, FIFST



## Design & Marketing

Zest, a full-service creative agency, has worked with mactavish:west for over 4 years. Creating and developing new brands, product packaging and marketing materials, Zest's creative skills have been put to excellent use on a variety of projects for many of our clients. Areas of expertise include brand positioning, development and design, copywriting, print and digital, to name but a few, all under the watchful eye of Account Director Helen Wood.

**helen.wood@thinkzest.com | [www.thinkzest.com](http://www.thinkzest.com)**

## Contact us

MacTavish West Pty. Ltd.  
email: [hazel@mactavishwest.com.au](mailto:hazel@mactavishwest.com.au)  
Australia: +61 (0)3 6224 4905  
Mob: +61 (0) 4597 64859  
[www.mactavishwest.com.au](http://www.mactavishwest.com.au)

@vegdoctor