It’s Fresh! MAP Benefits and New Developments

March 2020

IT’S Fresh!™

as nature extended

THE AIM OF THIS PRESENTATION

Its Fresh has been redesigning its technology to be readily integrated onto and into existing packaging, to enable a new generation of Functional Packaging that fits the sustainability challenge of the entire supply chain, driving value and benefits for all stakeholders.

The aim of this presentation is to highlight the keys benefits of these developments, and show by integrating Its Fresh technology within the MAP environment of Berry fruit, the impact enables more extension of shelf life, further improve the quality of fruit, increase sales, improves the sustainability of the whole package delivering a leading MAP solution to the High Street.

WHO WE ARE?

The company It’s Fresh! was created in 2010, and is part of the FFT (Food Freshness Technology group).

The It’s Fresh! ethylene filters are a unique UK patented technology that extends freshness and quality in fresh food and flowers.

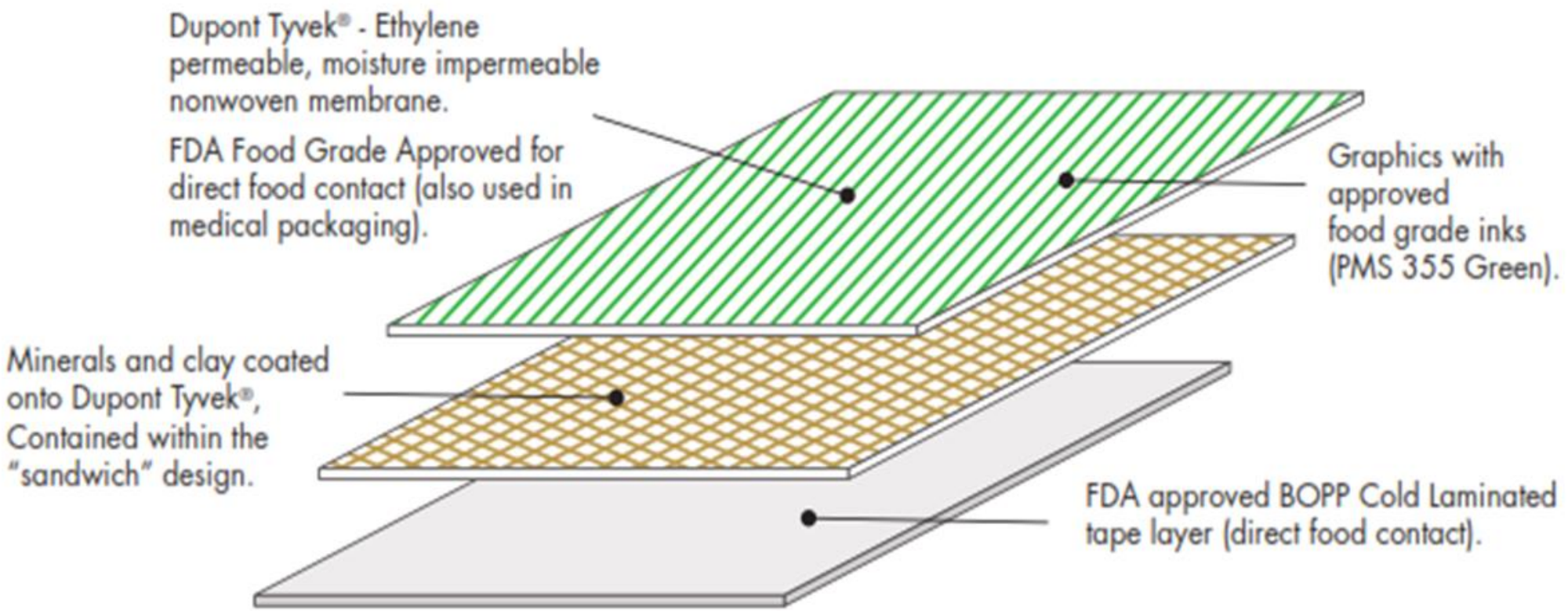
HOW THE TECHNOLOGY WORKS?

The It's Fresh! filters are different from other ethylene technologies:

- There are no oxidation reactions and therefore no secondary components are created.
- They do not change the atmosphere of the packs or the flavours / aromas of the product.
- They do not prevent the fruit from ripening, they only delay its development by absorbing the surrounding ethylene molecules.

This allows the fruit to continue to ripen naturally and retain its quality (colour, shine, firmness, flavours, smells) for longer.

CURRENT CONSTRUCTION



IMPORTANT DETAIL!

- Approved for use in contact with food according to FDA and European standards.
- Approved for use in organic farming.
- The filters do not tear.
- Disposable with household garbage.
- All filter components are non-toxic, non-corrosive and are not harmful to humans or the environment.

UNIQUE TECHNOLOGY ACROSS THE SUPPLY CHAIN

THE FILTER

The It's Fresh! Filter absorbs natural ripening gases, protecting the atmosphere and locking in freshness

THE FARM

The farmer uses the filter to protect the quality of freshly picked produce for its journey from farm to shop

THE SHOP

The retailer uses the filter to protect quality, extend freshness and reduce the problem of in-shop waste

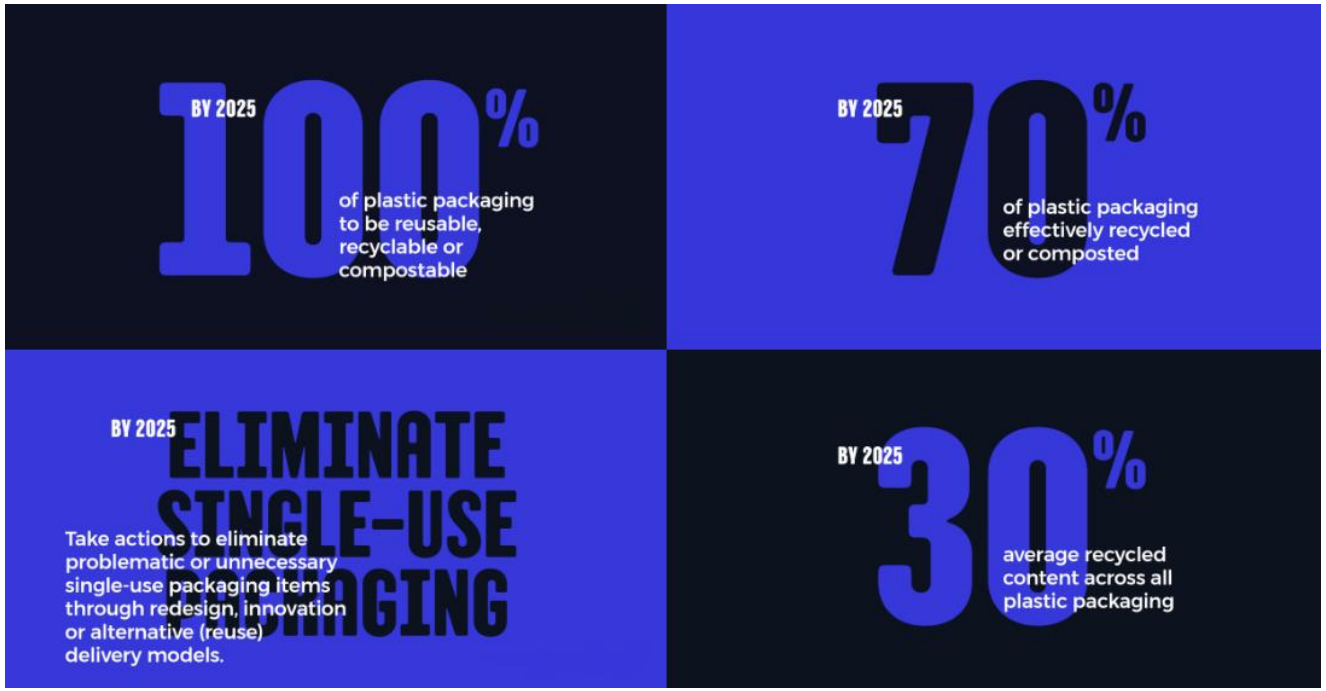
THE HOME

At home the filter continues to extend quality and freshness so you can enjoy more and waste less

from field to fork

THE DEVELOPMENT GOALS

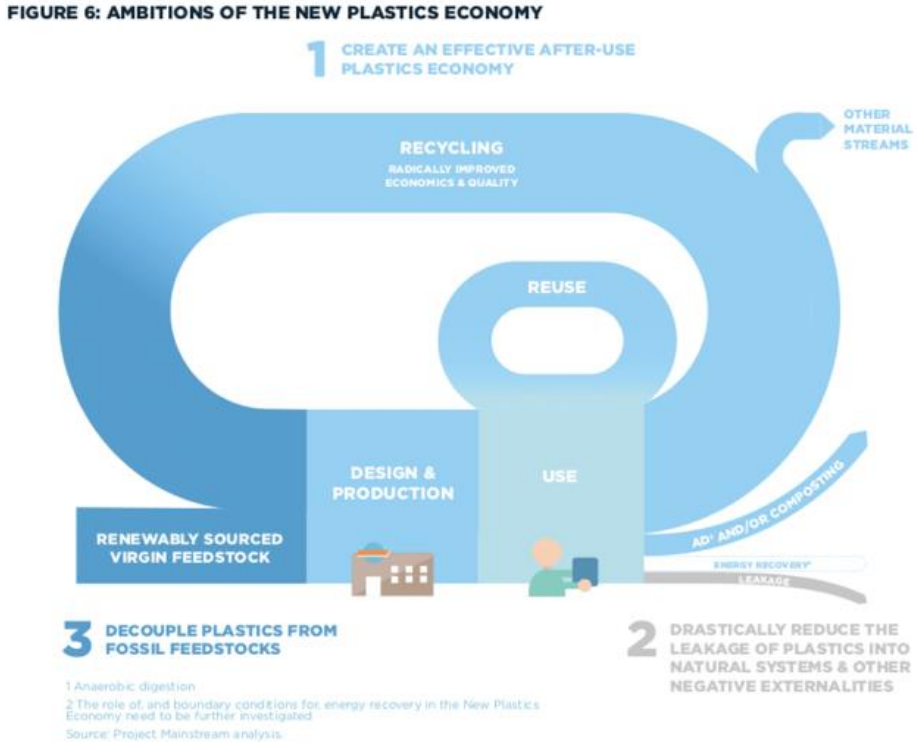
THE WRAP PRINCIPLES



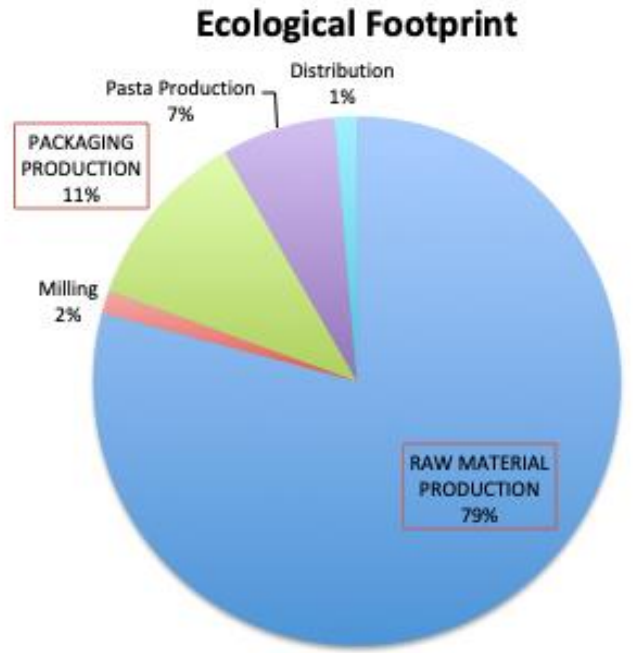
THE WRAP PLASTICS PACTS plus OPRL SCHEME

THE FUTURE – RECYCLABLE & POSITIVE IMPACT ON ECO FOOTPRINT

- **Around 90%** of the eco footprint of fresh produce is **associated** with its **production**, **10%** on **packaging**.
- By **extending shelf life** and **reducing food waste**, this has the **most impact** on the **eco foot print** overall.
- Recycling is a key solution to current plastics issue, and **our technology**, on its own, **will NOT impact** its **recyclability**.*



Recycling is the strategy for a new sustainable plastics economy- Ellen MacArthur Foundation



Typically 90% of a products eco foot print is in production not the packaging

Our advice provided by experts from WRAP

INTEGRATION OF MAP TECHNOLOGY WITH IT'S FRESH!

- The increased CO2 within MAP environments slows respiration rates of fresh products.
- MAP offers additional shelf life benefits and maximises the returns from chilled supply chains, reducing stock wastage and improving returns.
- Work previously with Total Berry highlights the opportunities in optimising the technology.

However:-

- A hidden issue of MAP is that ethylene does not escape the pack, and concentration builds within it. This can stimulate a higher respiration rate. Its Fresh can control this build up, enabling better MAP results and reduction of other issues associated with non ethylene control.

Using the new generation of Its Fresh filters, trials were arranged with Rupert Carter from WB Chambers to trial these on Adelita Raspberries over this winter and early Spring on Spanish fruit.

We are grateful to WB Chambers and their growers for assisting us.

THE TRIALS

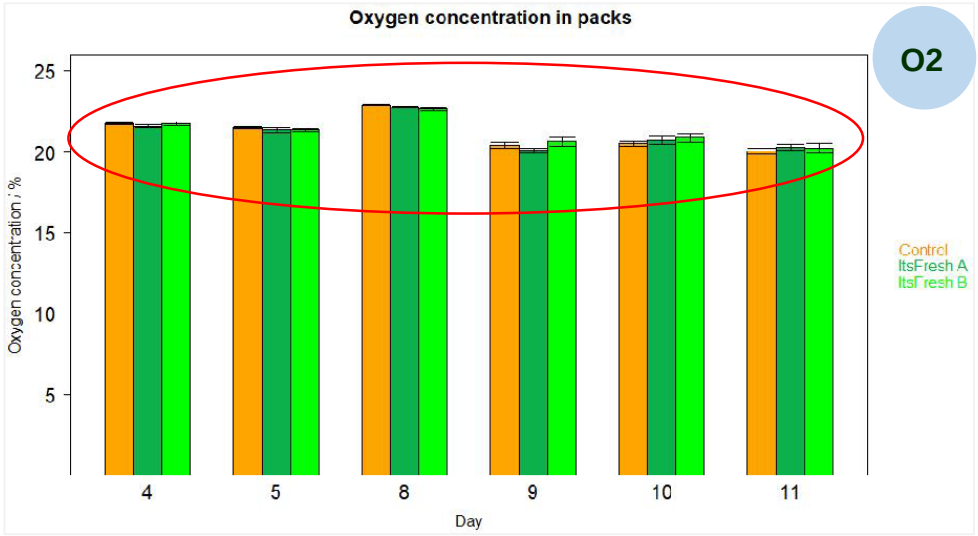
A detailed protocol was set up, initially using existing MAP film. Product was harvested as a control, and with It's Fresh New Filter A and New Substrate B. It was then packed in UK by WB Chambers, and collected and sent to our laboratory at Burntwood, Staffordshire where it was stored at 5C and visually, sensory and analytically tested for O2, CO2 and ethylene.

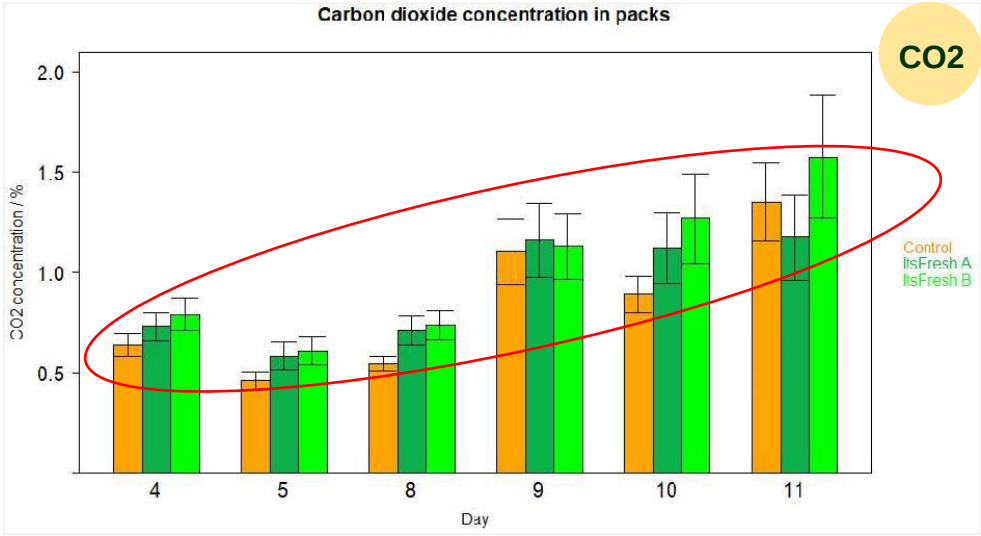
Fridges stocked with the produce trial set at 5C

Fridge stocked with the treatments prior to assessments

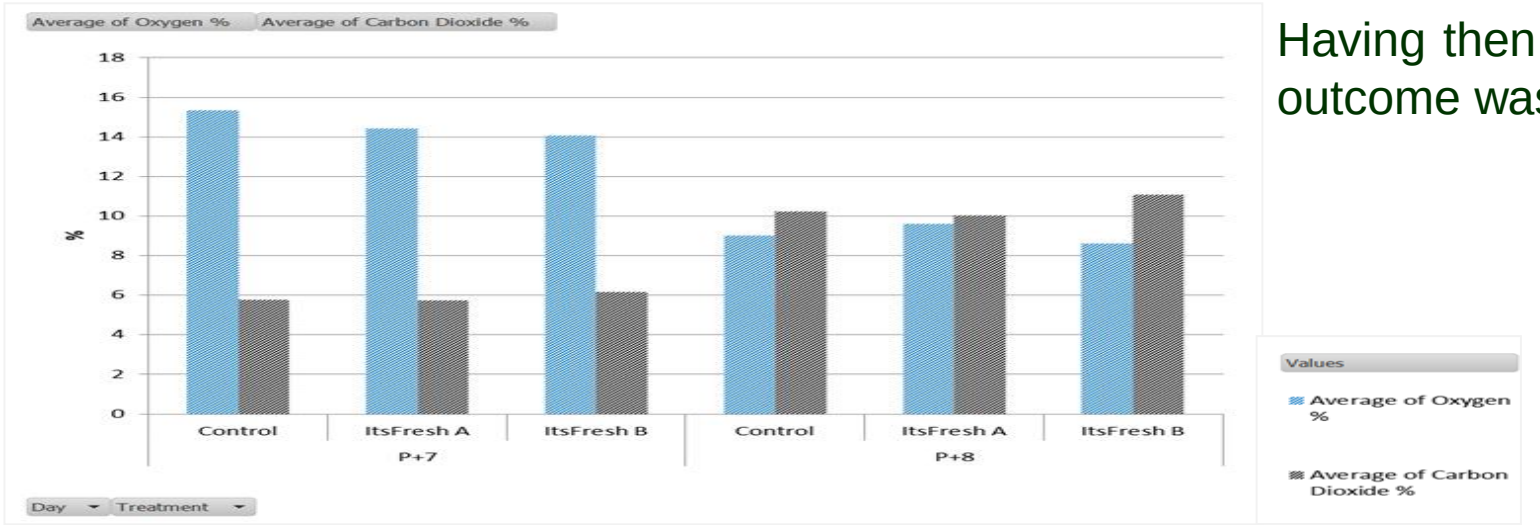
Agilent 6890 GC in the It'sFresh! Laboratory

1st TRIAL – THE RESULTS





Results showed, despite perfect seals, no MAP impact. Our GCs analysed oxygen at ambient levels and CO2 barely modified. The perf pattern showed around 35 holes per punnet.



Having then sealed all but 5 holes, a MAP outcome was achieved in 2 days.

2nd TRIAL – LAYOUT & RESULTS

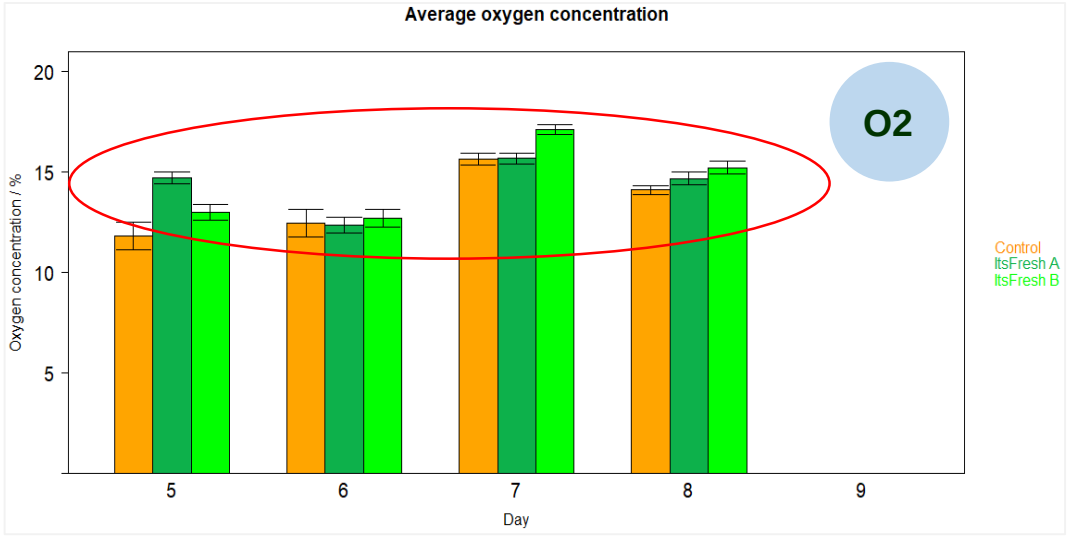
A second trial was then planned, with same grower and variety, and same new It's Fresh! treatments against a control.

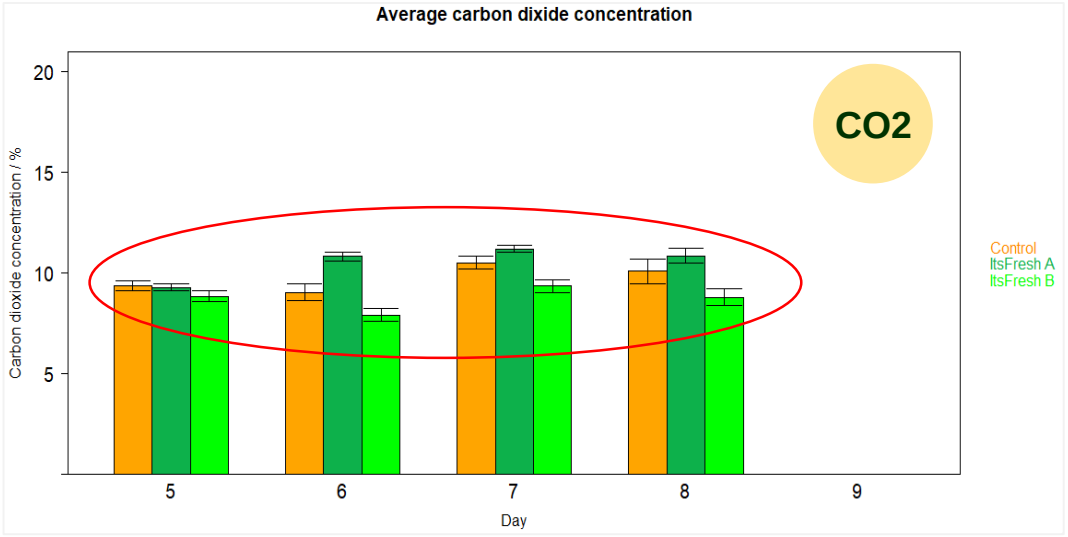
The new film was made to a new perforation pattern. The treatments again were put in place at time of harvest and the same protocol followed.

Date	Day	Event	Test day	Weekday
04/03/2020	0	Harvest / Transit		Wednesday
05/03/2020	1	Transit		Thursday
06/03/2020	2	Arrive UK / Packing / Arrive Burntwood		Friday
07/03/2020	3			Saturday
08/03/2020	4			Sunday
09/03/2020	5		Y	Monday
10/03/2020	6		Y	Tuesday
11/03/2020	7	BB	Y	Wednesday
12/03/2020	8		Y	Thursday
13/03/2020	9		Y	Friday

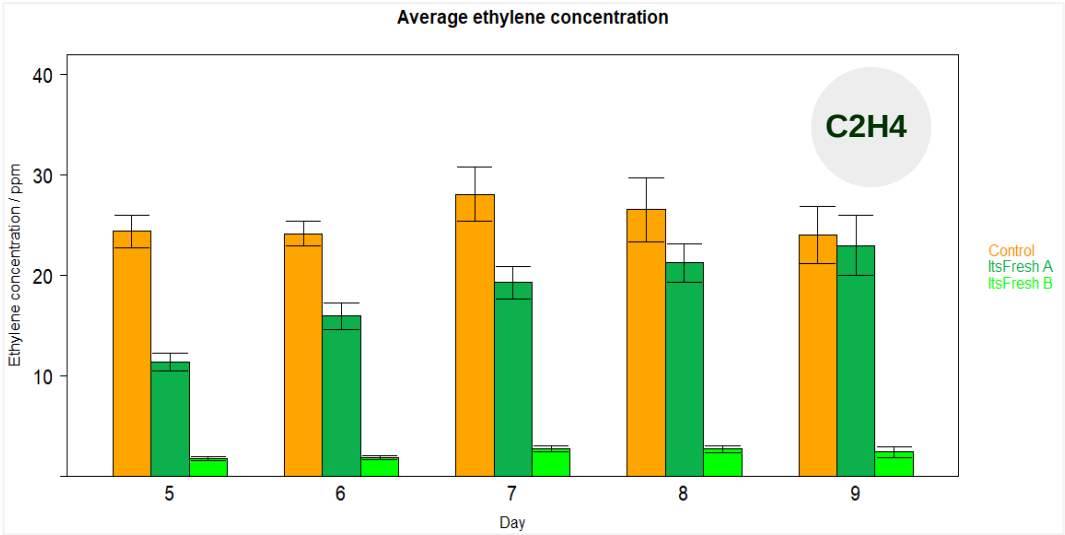
- Insert filters at base of punnet with green / white stripe facing upwards
- Treatments and coloured labels to be added to punnets immediately prior to fruit harvest.
- 160 punnets / treatment. 5 Assessment dates. 30 packs tested / treatment / assessment.
- Total of 640 punnets to be picked
- All 640 punnets to be randomised before being handed to pickers, ensuring each picker has a mixture of all treatments.
- The assessments made would be visual, sensory and analytical, with 10 packs assessed per treatment for O2, CO2 and ethylene during its shelf life.

2nd TRIAL – GAS RESULTS



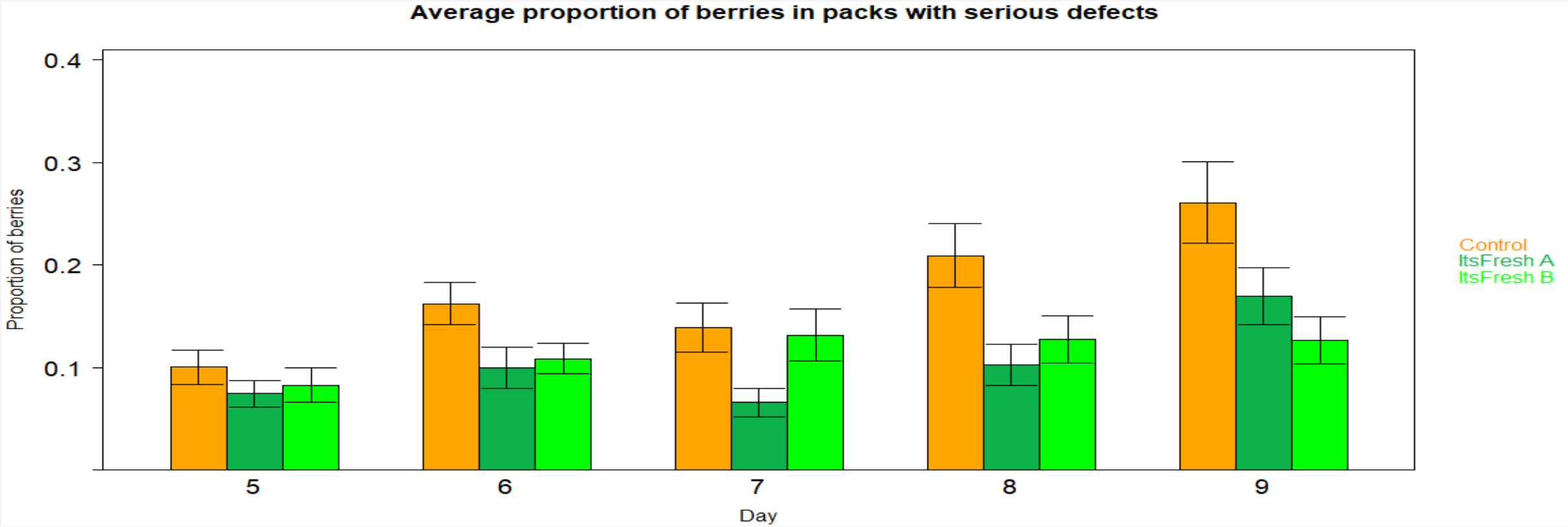


Solid MAP results found across treatments, indicating solid performance of new film.



Dramatic ethylene control achieved by Its Fresh filter technology, 30ppm in control to less than 2 ppm.

2nd TRIAL – QUALITY RESULTS



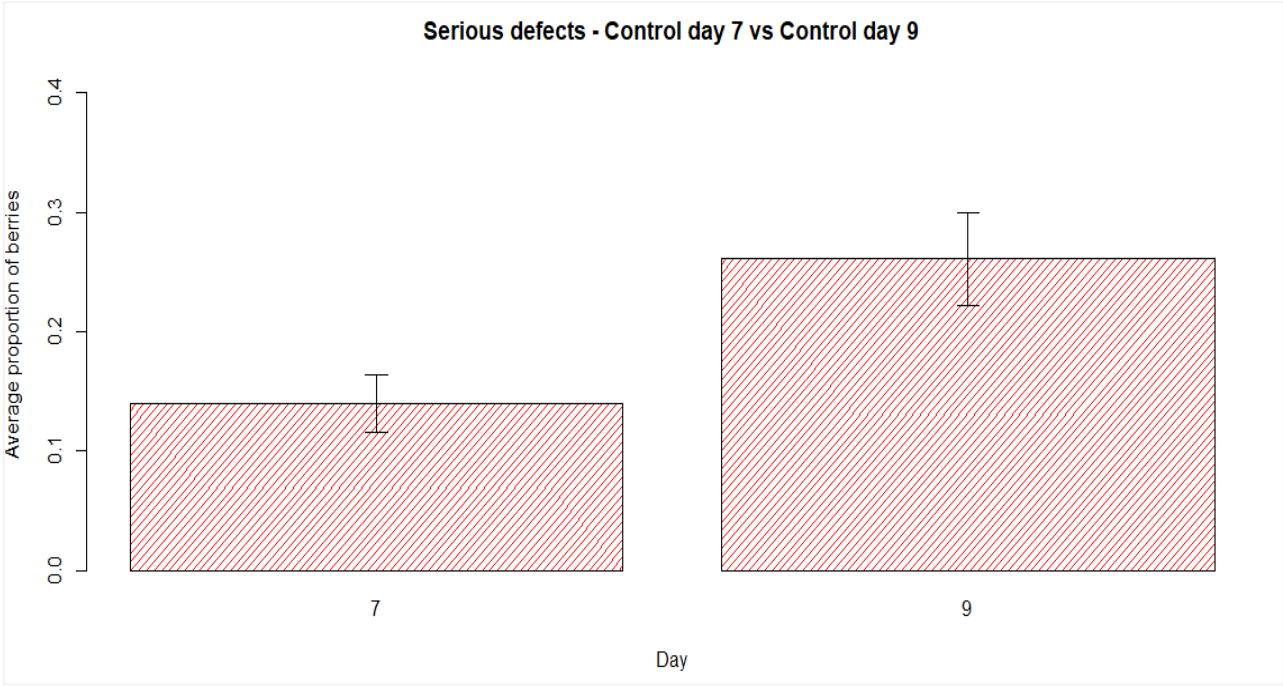
Observations:-

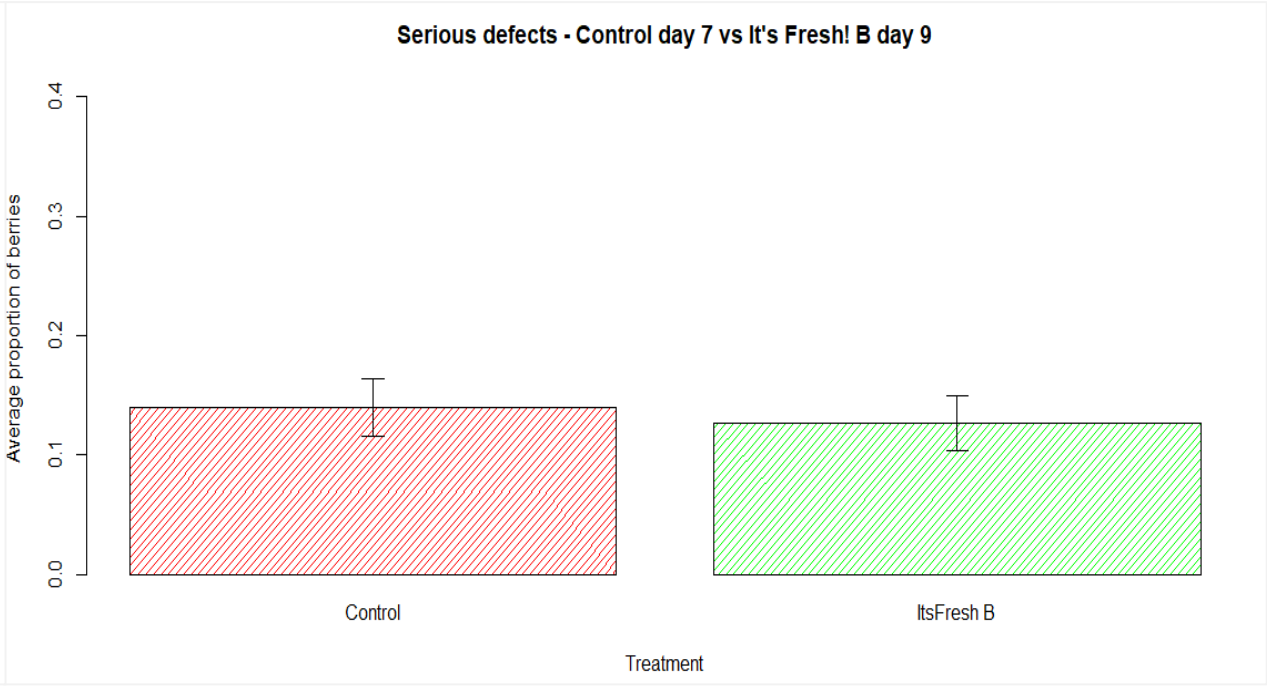
Significant reduction of serious defects shown by Its Fresh against control.
Level of serious defects does not radically change on Its Fresh filter B.

Opportunity:-

Dramatic reduction of serious defects that would inhibit purchase or lead to a customer complaint with implementation of Its Fresh Filter with large surface area.

2nd TRIAL – QUALITY PROGRESSION





Observations:-

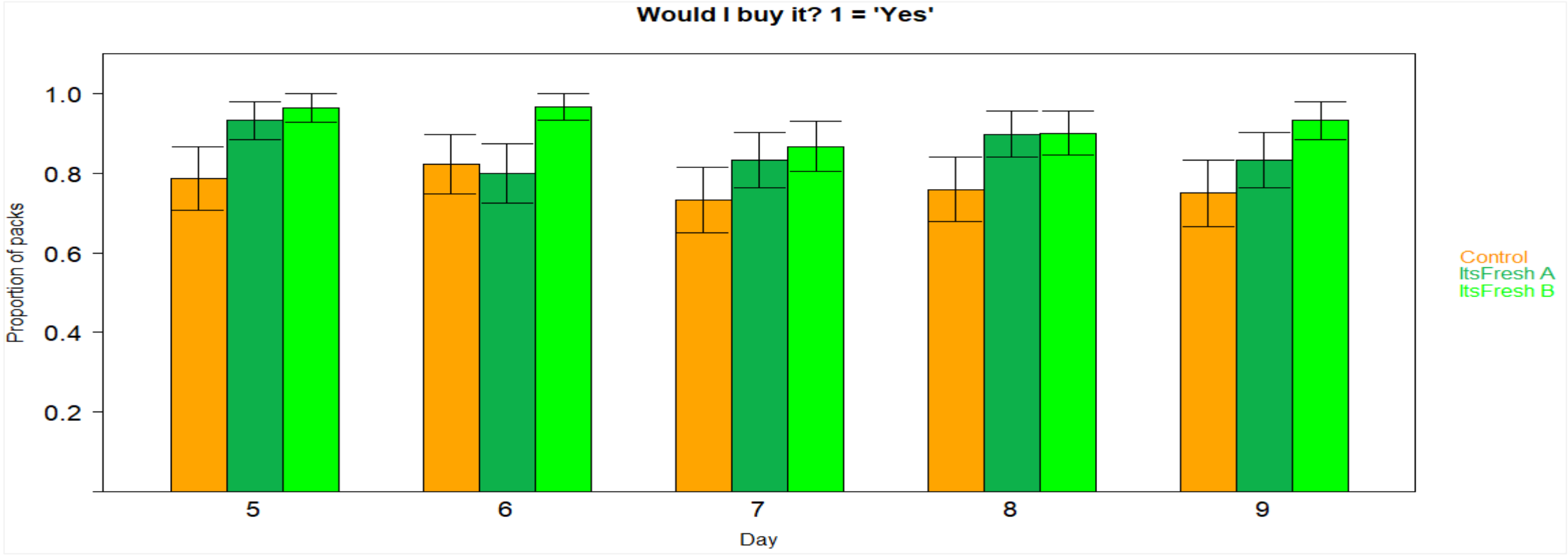
Significant increase in the number of Serious Defects (Defects likely to reduce the likelihood of Purchase) in Control Day 7 vs Control Day 9.

There is no significant difference of Serious Defects in Control Day 7 vs Its Fresh Filter on Day 9.

Opportunity:-

48 hours of extra shelf life available with Its Fresh integrated within an MAP environment.

2nd TRIAL – VISUAL RESULTS

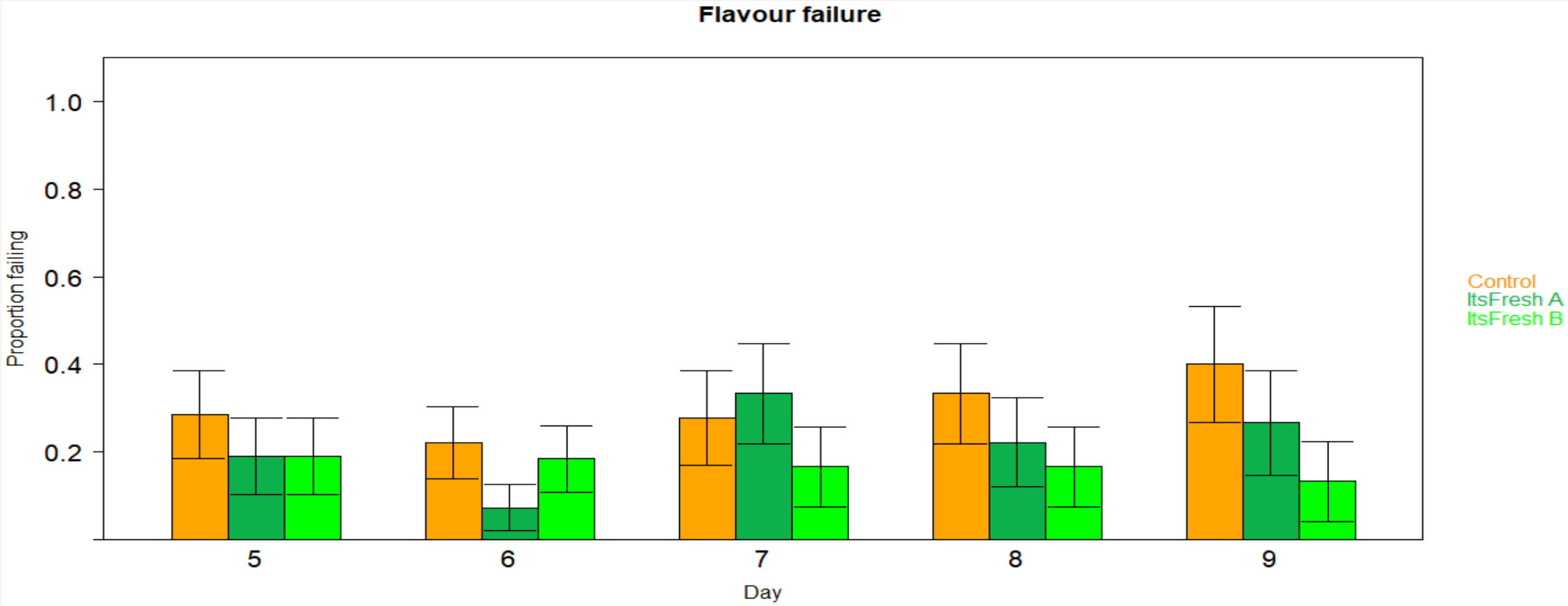


Each pack was assessed, prior to being opened, against whether or not the assessor would purchase it. It was made clear to each assessor to only "pass" a pack if they would be happy to pay full retail price for the pack and if they were confident it would last at least a day (preferably two) at home prior to being consumed. 1= Yes.

Observation:- The control was consistently and significantly scored lower than the Its Fresh filter.

Opportunity:- Additional sales opportunity as more packs are considerable saleable throughout shelf life, resulting in less waste and more sales.

2nd TRIAL – SENSORY RESULTS



Results from a blind sensory panel of 4-6 persons, carried out each assessment day.

Observation:- Clear picture of sensory profiles of Its Fresh treated product being favoured over shelf life by a sensory panel. Assessments were carried out blind.

Opportunity:- Sensory flavour profile supported by Its Fresh technology over shelf life from control.

CONCLUSIONS

- A good MAP delivers an extension to the shelf life of berries, reducing waste and extending sales opportunities, within the supplier and temperature controlled supply chain.
- Its Fresh technology within the MAP environment, enables control of the ethylene that otherwise builds up in a MAP environment.
- This additional benefit further extends shelf life by 2 days, and delivers a better eating outcome from these trials.
- By collaborating with the supply Chain, Its Fresh and the supply chain can add further benefit and quality improvement to fruit.
- By extending this collaboration further, we can target an optimised MAP film for berries, using an integrated Its Fresh filter system, delivering a world class sustainable packaging solution.

NEXT STEPS

- In the current background of Coronavirus, implementing change requires close collaboration and time.

- Its Fresh wishes to collaborate closely with the supply chain, utilising the extensive MAP knowledge and expertise of Total Berry and WB Chambers, and so further extend these opportunities by integrating the solution with Its Fresh!

- Combining our technology onto existing or new, sustainable designed pads like Tensei, are a big opportunity to create a new generation of functional packaging that delivers better operational ease in the supply chain, greater value by reducing waste, enhancing sales and delivering to consumers a better berry.

- Further collaboration on problem areas.


Together we can take better care of
our precious food & resources
IT'S Fresh!™
as nature extended

APPENDIX:

Benefits Obtained With It's Fresh!

Summary of the results from several pilot projects in the United Kingdom and the United States

Fruit	Reduction in Waste	Increase in Sales	Shelf life extension
Strawberries	50%	15%	2 days
Raspberries	48%	15%	2 days
Stone Fruits	32%	3%	2 days
Avocado	49%	33%	2 days
Tomato	38%	14%	4 days

Benefits Obtained With It's Fresh!

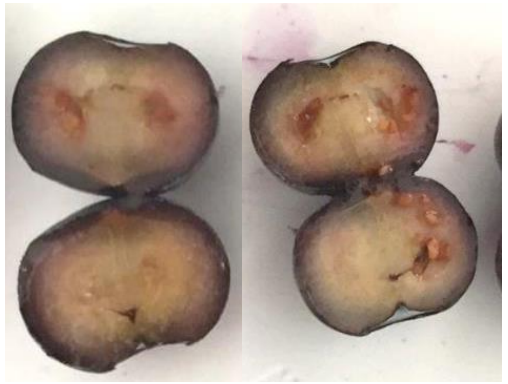
TOMATOES (2015)

AVOCADO (2016)

BLUEBERRIES (2016)

NECTARINES (2015)

CONTROL



After 8 days from packing ambient

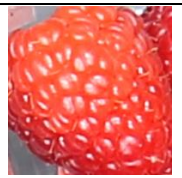
32 days cold store + 5 days ambient

21 days cold store + 3 days ambient

2 days chilled + 12h ambient + 4 days chilled

IT'S FRESH!

Its Fresh B

1	2	3	4	5	6	7
lighter						

Its Fresh A

Control

IT'S Fresh!™ infinite

the universal extra freshness wrap

- Our active coated in different packaging: top-seal, flow wrap, bags, liners.
- Recyclable film
- No additional product or labour costs
- It will be available for clear PET, PP, BOPP printed film or as an extruded infinite master-batch film
- Synergy with other technologies such as MAP (Modified Atmosphere Packaging).

Summary of retail work to date with It's Fresh!

Full commercial rollouts – UK, France and USA retail commercial performance

Packaging Type	Fruit type	Waste drop	Sales increase	Life extension
Punnets	Strawberry	50%	15%	2 days
Punnets	Raspberry	48%	15%	2 days
Flow pack ready to eat 4x fruit per pack	Stone fruit	32%	3%	2 days
Flow pack ready to eat 2-4 fruit per pack	Avocado	49%	33%	2 days
Flow pack	Tomato	38%	14%	4 days
Clamshell Ready to eat 4x fruit per pack	Pears	41%	3%	2 days

It’s Fresh! product portfolio

It's Fresh format	Size filter (C x L) (mm)	Size box (C x L x A) (mm)	Weight box	Quantity per box	Application	Example
Retail filter 	35.52 x 24.89	298.45 x 234.95 x 127	2.5 kg	22500	Perfect to be used with punnets and flow packs for retailers. Max 500g packs.	Strawberries, cherries, raspberries, blueberries, figs (4x fruit per punnet), Ready To Eat avocado (2x fruit per pack), RTE mango (2x fruit per pack), RTE peaches (4 fruit per pack), RTE nectarines (4 fruit per pack), RTE plums (6 fruit per pack), RTE Kiwi (4 fruit per pack)
Small transit filter 	72.39 x 111.12	482.6 x 304.8 x 127	7.5 kg	8000	Perfect to be used during transport by truck, sea and long storage in cartons with loose fruit.	18kg green banana box, 4kg blueberry box + MAP bag, 4kg kiwi box + MAP bag, 4kg cherry box + MAP bag, 4kg avocado (up to 8x fruit per box), 4kg figs (up to 20 fruit per box), 4kg mango (up to 8 fruit per box), 4kg nectarine / peaches (up to 10 fruit per box)
Large transit filter 	72.39 x 222.25	482.6 x 304.8 x 127	7.5 kg	4000	Perfect to be used during transport by truck, sea and long storage in cartons with loose fruit.	Boxes with apples, pears, persimons. Boxes with 2 layers or bushels. Normally over 6kg

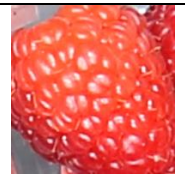
The It’s Fresh! filters are marked with a formal use by date of 18 months from date of manufacture (a stipulation of the insurers).

Assessments

The following assessments were conducted:

•Visual check of punnet for condensation
•Visual Would I Buy It
•Odour
•Colour score for each berry
•Count of defects (Rot, Mould, Bleed, Collapse, Shatter, Sooty Shoulders, Dehydration and Mechanical Damage)

From previous trials with raspberries we determined that a 4 point scoring system for colour was not sufficient, therefore we increased this to a 7 point system for this trial (see below)

1	2	3	4	5	6	7
lighter						

Assessors recorded a score for texture and a score for taste on a 1-5 scale as well as if they would eat the same berry again based on taste and separately on texture (i.e. a pass or fail based on taste and separately on texture). Table 4 shows the scoring system for taste and texture.

Score	Taste	Texture
1	Very sharp / bitter	Very hard - crunchy
2	Unbalanced - sharp / bitter	Slightly hard
3	Balanced flavour	Ideal texture
4	Unbalanced - sweet	Slightly soft
5	Off flavour / taint	Very soft – mushy

Table 4: the scoring system used for texture and taste profiling


What's Next?
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