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Improving the Shelf Life of Fresh-Cut Fruits and Vegetables

6 February, 2010 by [Anton Steeman](#)



According to information from the [AMI](#) (agricultural market information service) in Bonn/Germany, the world produces nearly 1.5 billion tonnes of fruit and vegetables, of which 800 million tonnes vegetables and nearly 700 million tonnes fruits.

Fruit and vegetable production levels have increased steadily over the past few years. Apples,

grapes, oranges, melons and bananas are the world's leading fruit varieties, accounting for around 60% of the global production. The range of vegetables is more diverse with the three leading varieties (tomatoes, head cabbage, cucumbers) accounting for only 30% of the total production volume. More than 10% of the global production of major fruit varieties are traded cross-border. For fresh vegetables, this figure is only 3% to 4%. The EU is the world's largest importing region for fresh fruit and, if trade between the EU member states is taken into account, for fresh vegetables as well. Otherwise, the EU ranks second to the USA as an importer of fresh vegetables.

The importance of the fresh produce market segment showed this week when Berlin was all set for the international fresh produce sector's premier event of the year, the "[Fruit Logistica](#)", the leading international meeting place of the fresh produce trade, which assembled some 2,300 exhibiting companies and 55,000 professional visitors from across the entire fresh produce chain, including global players as well as small and medium-sized suppliers from all around the world.

Fruit and vegetables play an important role in healthy nutrition and are high on the list of consumer priorities. However the major obstacle of purchasing ready-to-eat fresh-cut fruits and vegetables is their short shelf life, leading to quick degeneration and decomposition of the product and undesirable look and negative palatability.

Fruit and vegetables are living products undergoing a ripening and at the end an ageing process, in which the plant tissue is broken down. The products undergo various biological processes, which also continue after the products have been harvested. The processes cause gradual changes in the quality.



Innovations in packaging technology can overcome this challenge by providing extended shelf life and reducing accumulation of product decomposition liquids in the packaging bottom. An important part of the process is the product's respiration, in which the product consumes oxygen and expels carbon dioxide, water and heat. In this way, carbohydrates and other substances important to the product's freshness, taste and health quality are broken down.

Furthermore fruit and vegetables expel ethylene. Ethylene is a gas which accelerates the ripening process in fruit and vegetables, even in small quantities. The ethylene liberation and sensitivity to ethylene varies from product to product.

The correct packaging enables processors to pack fresh-cut fruit and vegetables and extend their shelf life. The important parameters for this shelf life extension are temperature, moisture and a modified atmosphere (oxygen, carbon dioxide and ethylene). Packaging can really make a difference. If both temperature and packaging are optimal, ageing of fruit and vegetables can be slowed down with up to more than 800%.



As was expected Fruit Logistica had some interesting packaging innovations on offer. I just made a selection of what I thought to be exceptional. Let's walk around the various booths and describe the best. Here we go, starting with fresh vegetables.

Some time ago I wrote on this blog an article: "[Artfully 'Green' Packages for Fresh Greens](#)" describing the innovations of two US (organic) fresh vegetables growers, namely [Tanimura & Antle Fresh Foods Inc](#) and [Earthbound Farm](#). As a consequence I will leave them out of this overview, although they certainly are worthwhile to look at.

Modified Atmosphere Packaging

[Modified Atmosphere Packaging](#) is a way of extending the shelf life of fresh food products. The technology substitutes the atmospheric air inside a package with a protective gas mix. The gas in the packaging helps ensure that the product will stay fresh for as long as possible.

The MAP process frequently decreases the oxygen in the package from 20% to 0% in order to slow down the growth of aerobic life forms and the speed of oxidation reactions. The removed oxygen can be replaced with a mixture of carbon dioxide, which can lower the pH and inhibit the growth of bacteria. MAP packaging is used for products as diverse as red meat, seafood, pasta, fresh cuts of fruits and salads and a wide variety of other food products.



The Israeli company [Hefestus Ltd.](#), established in 1993, takes the MAP technology a step further with its SLB – Shelf Life Booster technology. The Hefestus' MAP sealers have only one fully automatic vacuum-free SLB sealing head. Without creating a mechanical vacuum the system protects texture and appearance, so that even the most delicate "vacuum banned" goods can be handled, extending the product's shelf life without the need for preservatives or freezing, thereby enabling storage and delivery of goods chilled or at room temperature.

Longer shelf life with PeakFresh packaging

The Section Life Sciences & Technology of the [Noordelijke Hogeschool](#) in Leeuwarden/the Netherlands, did some research, commissioned by the Dutch company [Freeland](#), about the characteristics of the Peakfresh packaging. The research results showed that the vegetables tested (broccoli, butter lettuce and iceberg lettuce) stayed fresh, crisp and green for longer and the weight loss was limited compared to conventional packaging.



Difference in iceberg lettuce after 25 days between conventional and Freeland PeakFresh packaging



Difference in Broccoli between Freeland PeakFresh packaging and conventional packaging on day 29



Day 20 difference in Butter lettuce with Freeland PeakFresh packaging and conventional packaging

Peakfresh is said to be bio-degradable (no material specification is given) and has permission to also be used for organic and EKO products.

Considering that one third of all fresh vegetables never reach the consumer, PeakFresh might play an important role in improving this situation. Butter lettuce and iceberg lettuce will have a much longer shelf life in the shops, but also at home, where consumer might only use half of the lettuce and wants to save the rest for later. Butter lettuce has a bad name when it comes to shelf life.

Basically Peakfresh bags can be used for nearly all fruit and vegetables. Sorry to say, but there is little technical information available from the company, neither from the technical institute, which carried out the research. As a consequence I am not able to judge the correctness of what I'm stating here. It is just hearsay, mixed with third hand promotion.

So far this first part. I continue tomorrow with delicate vegetables as asparagus and fresh fruit packages.

sources among others: [Fruit Logistica](#), [FreshPlaza](#), [Danish Instiute Teknologiske](#) – 100115 – 100118

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[...] about the characteristics of the Peakfresh packaging. ... Originally posted here: [Improving the Shelf Life of Fresh-Cut Fruits and Vegetables « Best ... Share \[...\]](#)

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[...] February, 2010 by Anton Steeman The first part of this article described some innovations in fresh vegetables packaging. Before we go to the section of fresh [...]

3. on [3 March, 2010 at 6:17 am](#) | [Reply !\[\]\(e615ca91639aee4263e67e1cc9ac86eb_img.jpg\) Naveen Chawla](#)

Dear Sir/Madam,

We are S.N.S FRESH in New Delhi (INDIA), We are the elite supplier in this cut vegetables chain, we are really bollocks for same.

I am always to be search in many exhibitions to how i care about my cut Vegetables and fruits as well as there shelf life but all in a vein.

we can simply cut Vegetables and fruits in dito-eletrolux cutter then sentitize in Johnson diversy products and dry in dryer and then simply pack in normal vaccum machine without any gas and else.

I would be appreciate when you give us the chance to how we make the quality products.

Please do the needfull for us.

Thanks & Regards
S.N.S Fresh
Naveen Chawla
Operations & Marketing-Head
nc999@rediffmail.com
info@snsfresh.com

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