

# Bio-Fresh™

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# Well balanced atmosphere

O<sub>2</sub> is necessary to live.

Fruit is like people; they take in O<sub>2</sub> en breath out CO<sub>2</sub>.

Storage systems like CA and ULO are using this fact.

Optimal storage condition:

- ✓ Closed storage system
- ✓ Very low volume of O<sub>2</sub> and CO<sub>2</sub>
- ✓ Low temperature

Take care:

- Too low O<sub>2</sub> volume => anaerobic fermentation
- Too much CO<sub>2</sub> => CO<sub>2</sub> damage of the fruit skin.

A well balanced atmosphere is needed for a good storage result.



# Bio-Fresh™ copy the CA/ULO situation

It is not always possible to store fruit in a closed cell suitable for using CA or ULO storage.  
=> fruit and or vegetables are aging very fast.

**Solution => Bio-Fresh™ coating copies the CA/ULO situation.**

The Bio-Fresh™ coating is put on the fruit in a very thin film. →

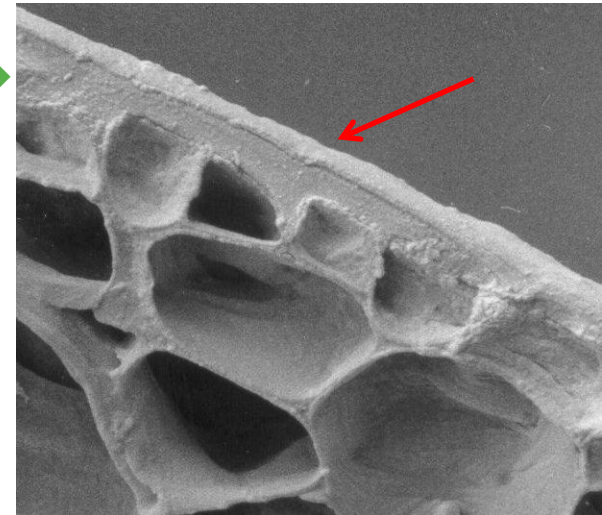
The film blocks the entry of  $O_2$  and has the possibility to let pass the  $CO_2$ .

So you have no problem with anaerobic fermentation.

Based on this gas exchange a microclimate is made inside the fruit. This retards the aging of the fruit by means of a slower respiration.

As a result of the slower respiration the shelf life of the treated fruit has been prolonged.

Storage at low temperature will support this action.



# Bio-Fresh™ coating



The Bio-Fresh™ coating is made of:

- ✓ Sucrose esters (E 473) => They are blocking the oxygen.
- ✓ CMC (E 466) => Connects the esters with the fruit skin.



Both E numbers are allowed in the EU for fresh fruit and the Turkish government is following this EU regulations .

For more information see our website: [www.Bio-Fresh.nl](http://www.Bio-Fresh.nl)

Or contact your dealer:



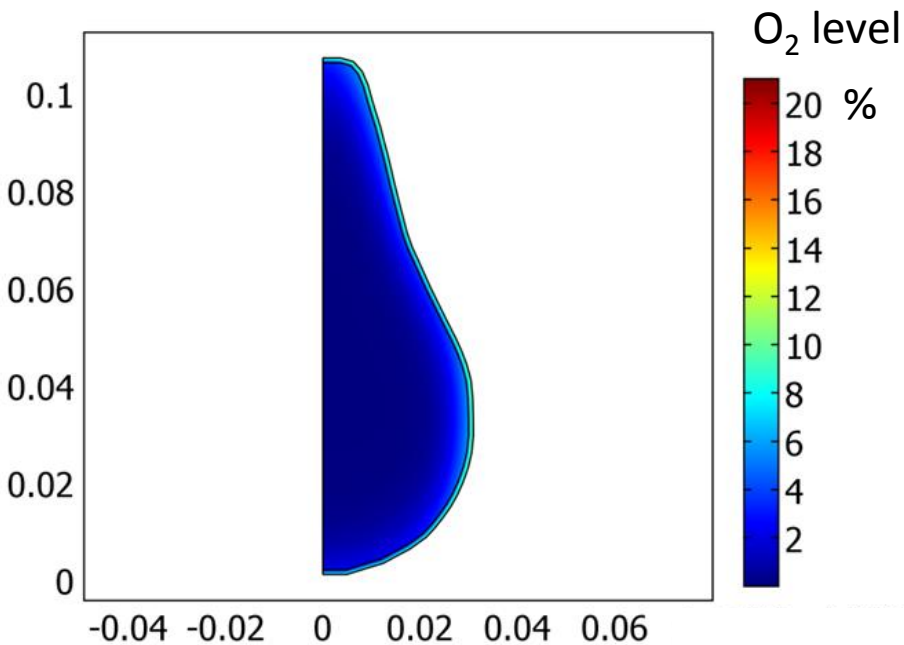
[www.3efetohum.com](http://www.3efetohum.com)



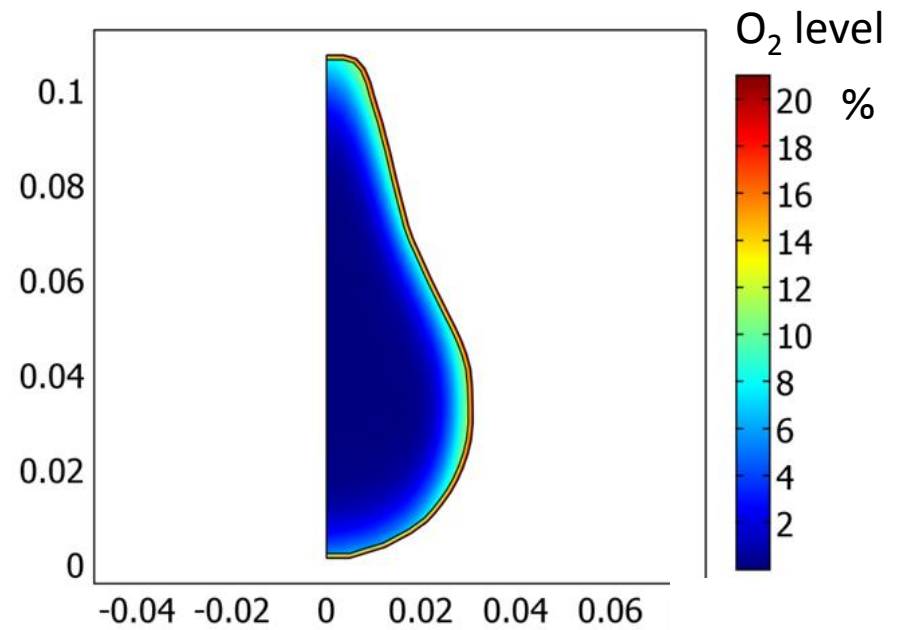
# Effect of Bio-Fresh coating

University Brussel: Bio-Fresh blocks the O<sub>2</sub> Transport.

Simulated O<sub>2</sub> Profile at 20°C



Bio-Fresh coated pear



Non coated pear

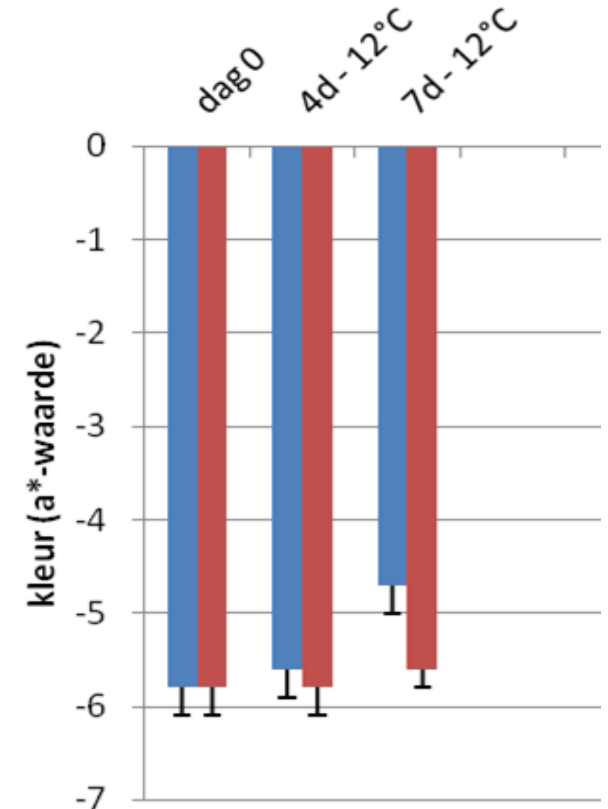
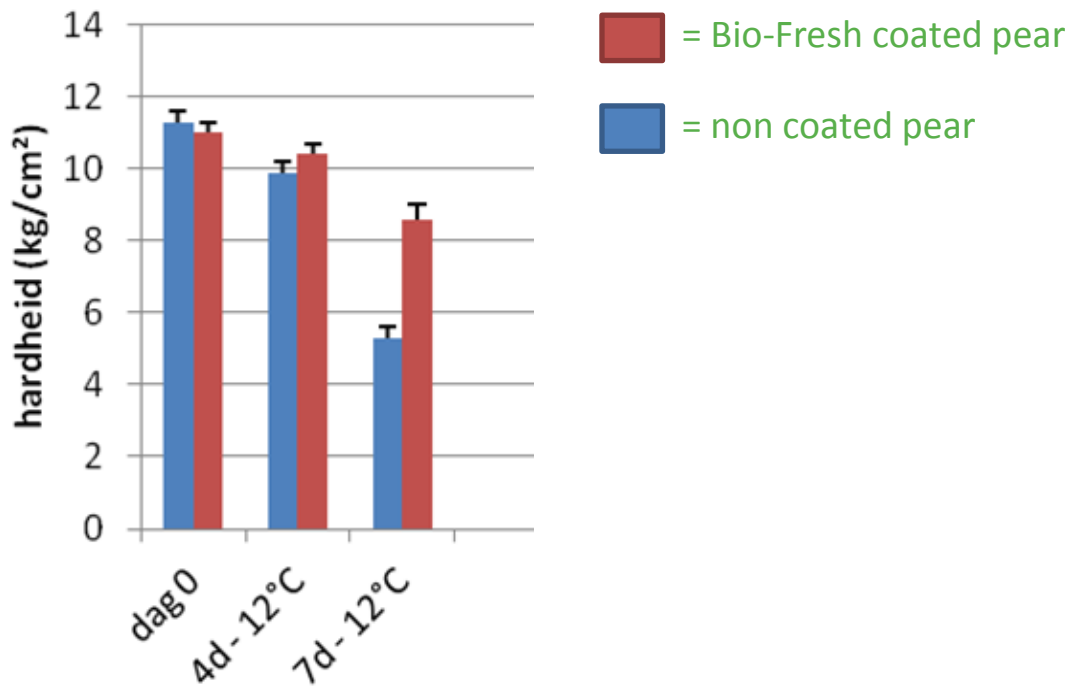




# Effect of Bio-Fresh coating

University Brussel:

Conference pears that were coated had better firmness and remained greener.



# When using the Bio-Fresh™ coating ?

As a grower/grader or exporter there is the need to deliver fruit and vegetables of:

- ✓ The highest quality
- ✓ A shelf life as long as possible.

Bio-Fresh™ is giving a good proposition and an advantage over un-treated food.

When:

- ✓ There is no suitable cell for CA or ULO
- ✓ Store for a shorter period of time in a standard cooled cell.
- ✓ Improving the shelf-life after the CA or ULO storage

In that case

=> the fruit must be coated after harvest and before shipment.



# Advantage of the Bio-Fresh™ coating ?



Using Bio-Fresh™ coating is an advantage because the oxygen exchange level will be much lower than in the un-treated circumstances:

- ✓ Less aging compared to un-treated fruit
- ✓ Fruit stored in a ULO/CA cell is susceptible for aging when it is coming out of storage and even more when the storage time was longer.
- ✓ Better quality in the store, on the fruit bowl or in the fridge at home.
- ✓ Bio-Fresh™ coating can also bring a better quality to a more far away country (long travel distances to the new growing markets like China.)

Supplier will be more and more responsible for sustainability and that includes also the delivery of sufficient quality to the retailer (read for 70 % supermarket).

This very moment we are working on a coating suitable for using in the ULO/AC cell during the storage time, together with a technique to remove fungi from fruit before they are doing harm to the stored fruit.





# Profit ? Costs?

Losses in storage, the shelf life period and during transportation are twofold.

Bio-Fresh helps:

- ✓ Less rotten and less colour change
- ✓ Less weight loss during storage and shelf life

Better prices can be asked when there is less weight loss.  
The retailer can sell what he has bought.



Depending on the type of fruit and the quality, these losses based on volume, can be between 5 and 8 %.

Based on kilogram price of € 0.70 for pears this will be a:

- ✓ weight and quality loss of 5 Eurocent per kilogram.
- ✓ treatment cost will be 2 Eurocent per kilogram.

**Profit => 3 Eurocent/Kg**

Apart from this advantage you deliver a superior quality compared to your competition and your fruit is less susceptible for diseases.



# How to use the coating ?

Bio-Fresh™ coating is delivered in buckets of 5 kilogram.

The coating is stirred in the bucket and 1.66 kg is mixed with 100 litre of water.

Based on the solid material of the Bio-Fresh™ we call this a 1 % solution.

The 100 litre water/Bio-Fresh™ solution can treat 20 tons of fruit.

To bring the coating upon the fruit there are two types of machine available:

## Middle coating unit

A unit available in different sizes depending on the size of the grading machine. The unit is positioned in the middle of the grading machine directly after the drying unit with the sponges. The dryer the fruit the better the effect of the Bio-Fresh™ treatment.

By means of a waterfall where the fruit passes by rotating, the fruit is wetted and dried afterwards with cold air blowers.

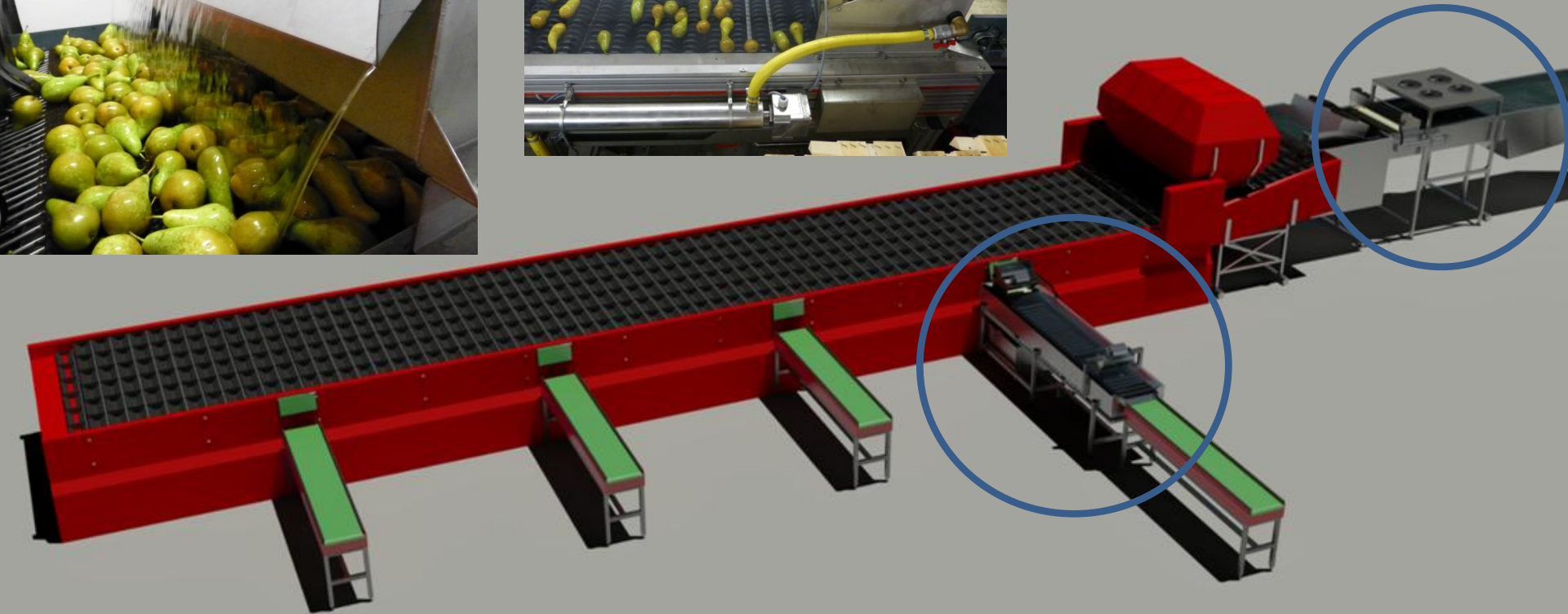
Fruits are treated with warm water to get the best possible coverage. The heating element is built in in the machine. After drying the fruit can be packed.

## End coating Unit

A smaller unit connected to the grading line and this gives the possibility to treat a specific fruit size. The rest of the procedure is the same as with machine type 1.



# How to use the coating ?





# Can I see the fruit is treated ?

Can I see that the fruit is treated?

No, not directly, immediately after treatment you can't see this.

Bio-Fresh™ is :

- ✓ Odourless
- ✓ Stainless
- ✓ Tasteless.

Also for diabetic people Bio-Fresh™ does no harm.

After some days you will see the difference :

Treated fruit has a better colour, higher firmness and the overall look will be better.



# Can I treat my fruit always ?

We have had customers who were thinking that with the coating or with other products you could improve the quality of the fruit. That is not correct.

You can't improve the quality of poor fruit or of fruit that is already declassified by aging or disease !

When the chance from starch into sugar has gone too far and the fruit has reached the pre climacteric phase, it is no longer use full to treat the fruit.

This can be easily controlled with iodine.  
Based on the card this will be no 7.





# Questions

