

Potato Storage with Ethylene

Dirk Garos

AGENDA

- History
- Company
- Why
- Benefits
- Fry colors
- Seed Potatoes
- Extend shelf life
- Questions

Potato Project since 1999 Since 2003 a Company

Major shareholders:

70% Greenvale AP

20% ICA

10% Others

Director: Dirk Garos

Operations, Support and Services supplied
by Shareholders

Pesticide Residues



- Pressure from Retail Customers
- Consumer Action Groups
- Food Standard Agency
- Legislation

Since 1930 known...

Apples stored with potatoes



No Sprouting!

....ETHYLENE...

Pack Sprout Control Trial 23/07/99

Variety:- Desiree
Harvested:- Sept 98
Storage:- Coldstored
Chemicals:- Non Post Harvest
Packed:- 16/07/99

TREATMENT

"P+": 7
Melanex:- No Hole
Banana



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Restrain today

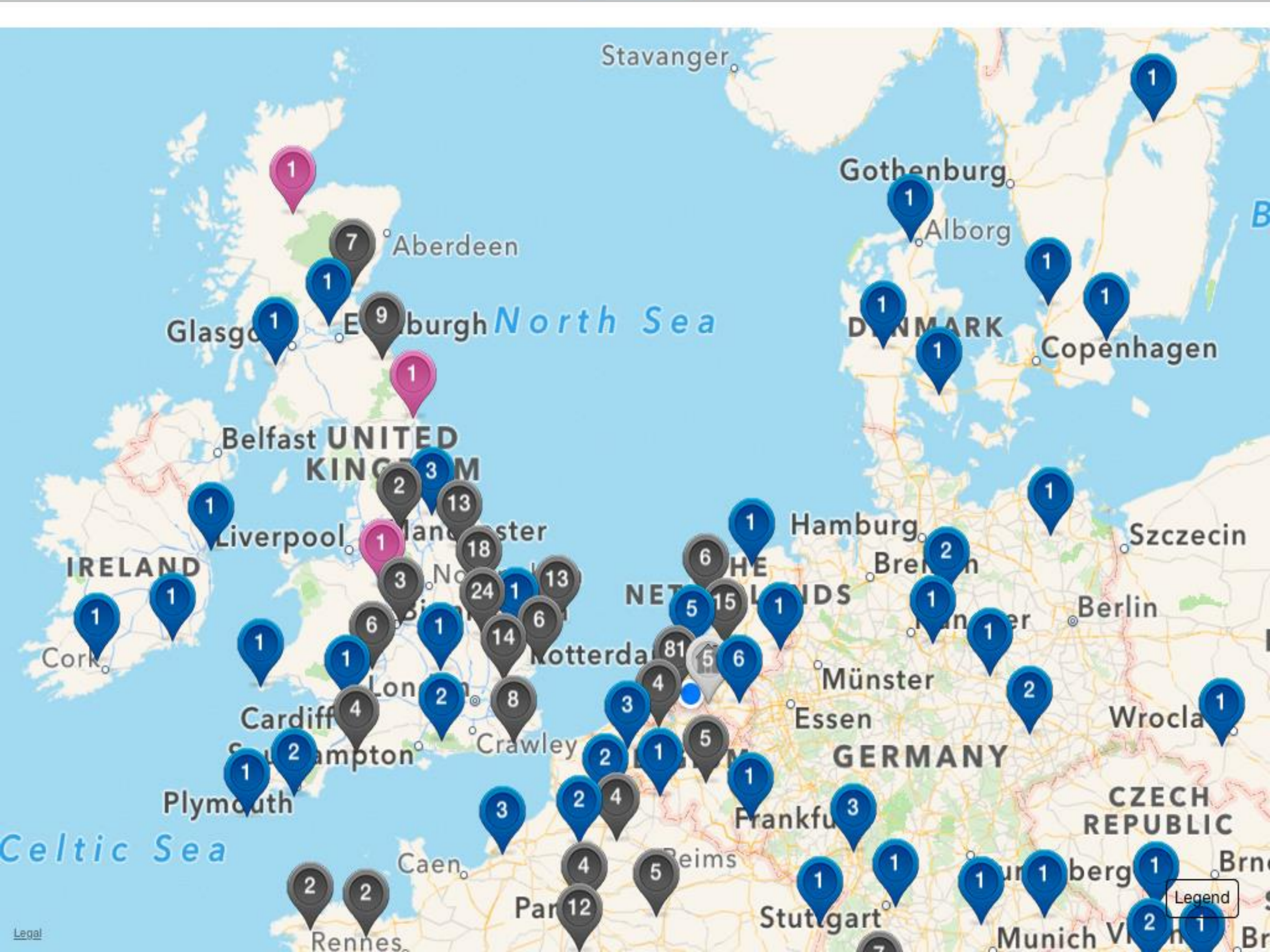
- More than 700 generators help to store:

1.000.000 tons potatoes

125.000 tons seed potatoes

30 countries

NO RESIDUE !!!



Legend

Restrain System

- Post Harvest
- Ethylene gas
- Generated in store

Restrain Generator

- Ethanol to convert into Ethylene gas



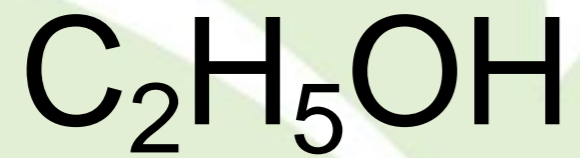
GENERATOR



SENSOR

20meter

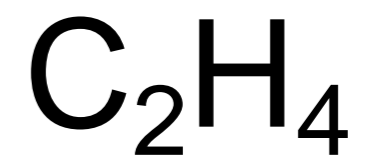
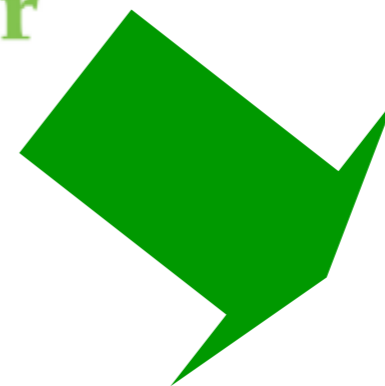
Restrained Fuel



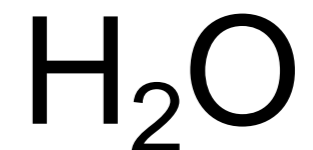
RESTRAIN



Generator



plus



Ethylene

- Natural Plant Hormone
Ripening Bananas, kiwis and kakis
- Blocks cell elongation in potatoes & onions
Sprout suppression
Positive effect on seed potatoes
ORGANIC APPROVAL



Benefits

- **Effective**
 - full storage season
- **Simple to use**
 - No Store modifications
 - Plug-and-play
 - Compact
- **Crop safety**
 - No internal sprouting
 - Weight loss - no adverse effect
- **Monitoring**
 - Respiration rates
 - Ventilation

Benefits

- Short Interval
 - 3 days
- Operator safety
 - ethylene atmosphere none hazardous at levels employed
- No distribution problems
 - Dynamic gas, moves like oxygen
- Store Safe
 - No store or box residues (any crop can be stored afterwards)
 - No effect on store structure (corrosion or deposits on fans, boxes etc.)
- Consumer safety
 - **No residue !**

Benefits

- **Flexible**
 - Store size 12 tonne to 6000 tonne
 - Store can be loaded/unloaded anytime
 - Short term loss of ethylene (days) no detrimental effect
- **Equipment Reliability**
 - No moving parts
 - > 700 in operation

Pootgoed en Restrain accumulator Resultaten 2010, 2011, 2012 en 2013

EDITIE AKKERBOUW

REPORTAGE

JOHANNES SIJTSMA GAAT VOOR KWALITEIT VIA STAMSELECTIE EN ETHYLEENBEWARING. DAARDOOR LUKT HET OM VOOR HET SEIZOEN PRIJSAFSPRAKEN VOOR ZIJN POOTGOED TE MAKEN.

Spectaculair meer tal met ethyleenbewaring

Uitgangsmateriaal in ethyleen

Sinds vier jaar bewaart Sijtsma zijn pootgoed met ethyleen. „Vooral Déstrée roept hier super op, maar ook de Han-

„Sinds ik pootgoed in de ethyleenbewaring opsliep, heb ik 8 tot 10 ton meer in de maat, terwijl ik minder pootgoed gebruik.”

sa doet het goed. De Pointière gaat er niet in.”

De akkerbouwer startte hiermee nadat zijn reëlbegeleider van Peka Kroef hem op dit spoor zette. In eerste instantie werd de cel met mechanische koeling ervoor ingericht. Een doel van de opslag moest hij wegens ruimtegebrek uitbesteden. Afgelopen jaar bouwde Sijtsma een

BOERENWET — 13.110 JANUARI 2013

Fry colors

- Test 2010 PPO Westmaas showed good results
- 2011 till 2014 tests with Sutton Bridge on French Fries and Chips varieties
- Very Promising!

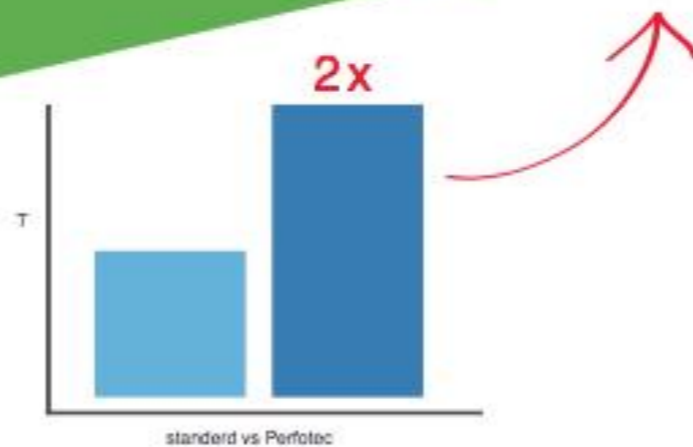
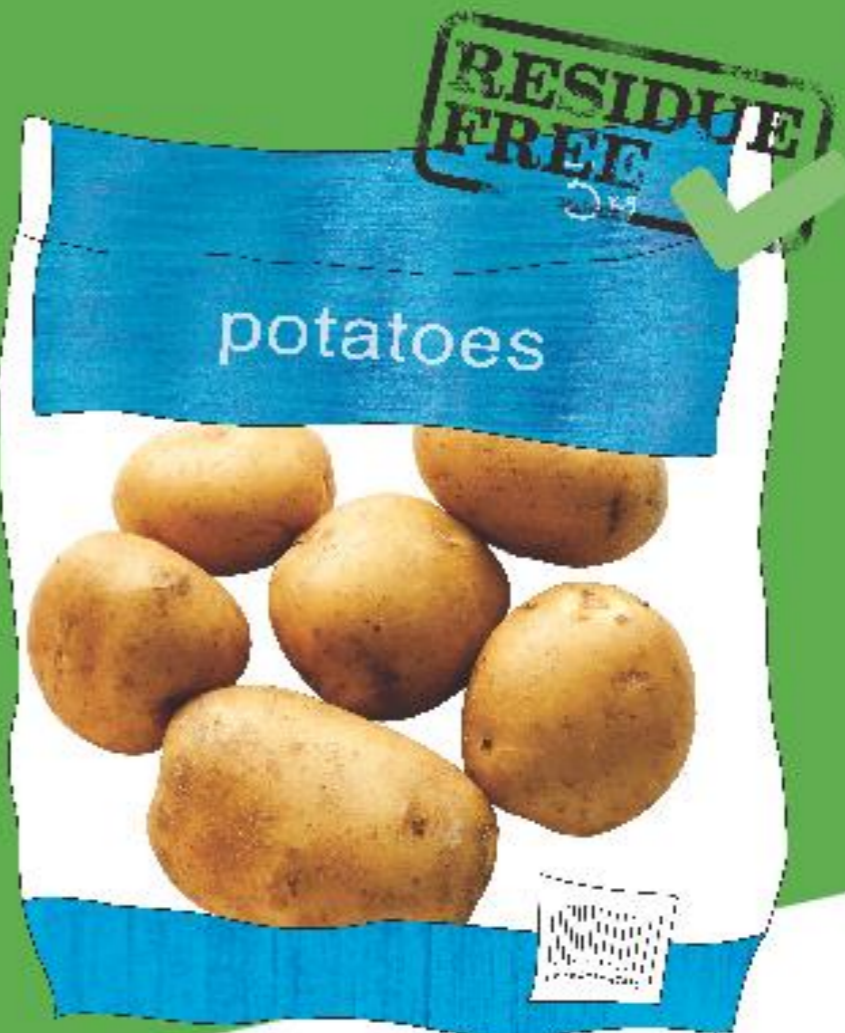
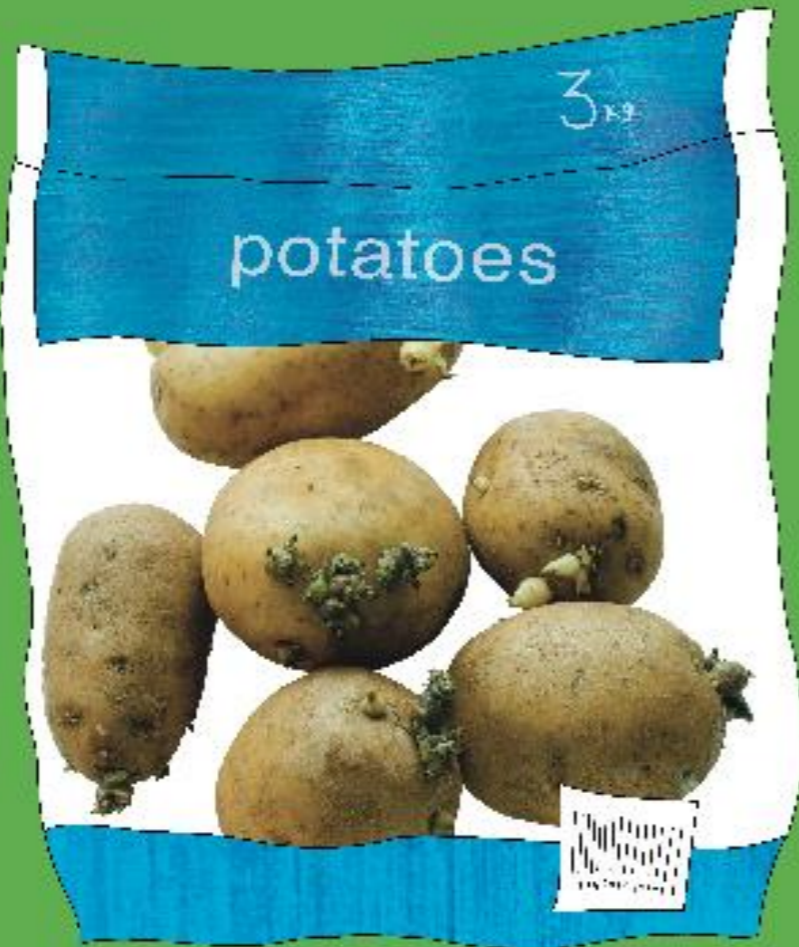
Differences in varieties



Smart Solutions for **extending** **the shelf life** of potatoes

Active **M**odified **A**tmosphere **P**ackaging **AMAP**

What would you choose?



Case Studies & Awards



Waste was reduced by 50% and significant sales growth



Won the 2012 M&S Food Suppliers award for great improvement of retail shelf life and product quality



Accenture Innovation Awards

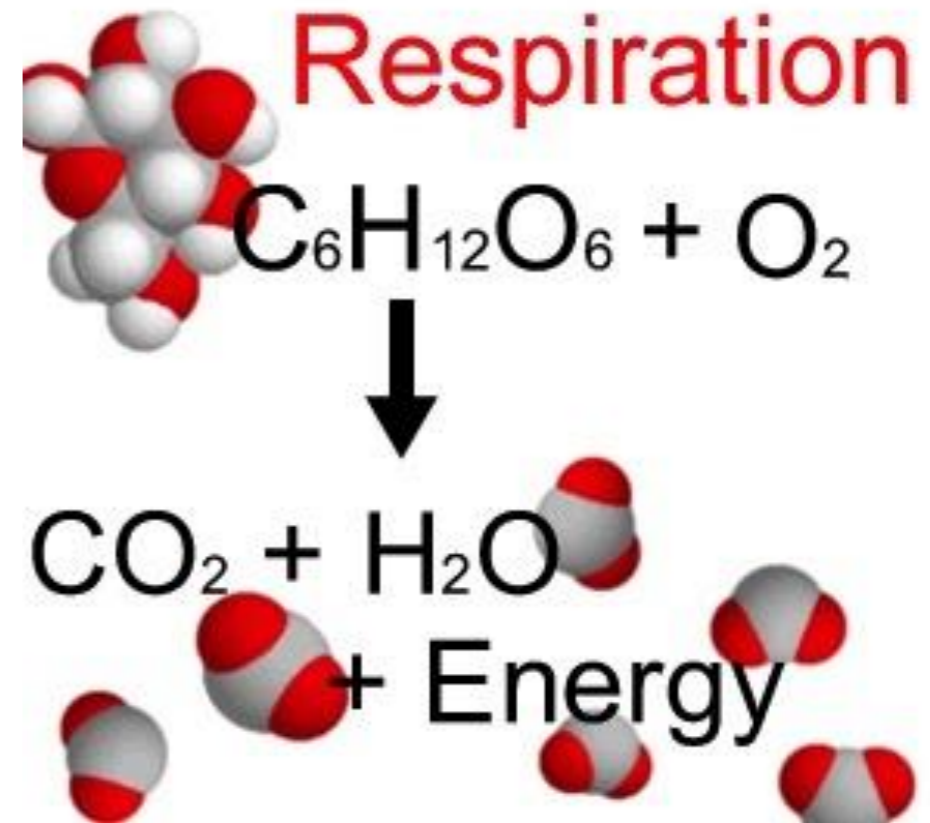
PerfoTec won the 2012
Accenture Innovation Award
Blue and Green Tulip

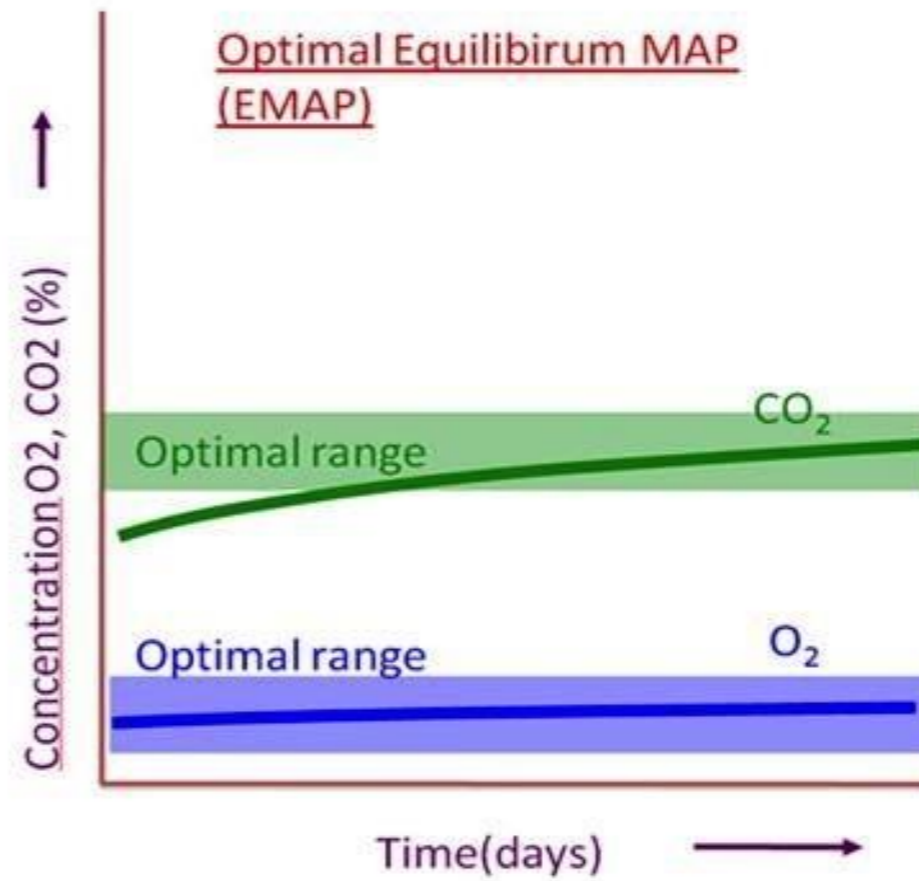
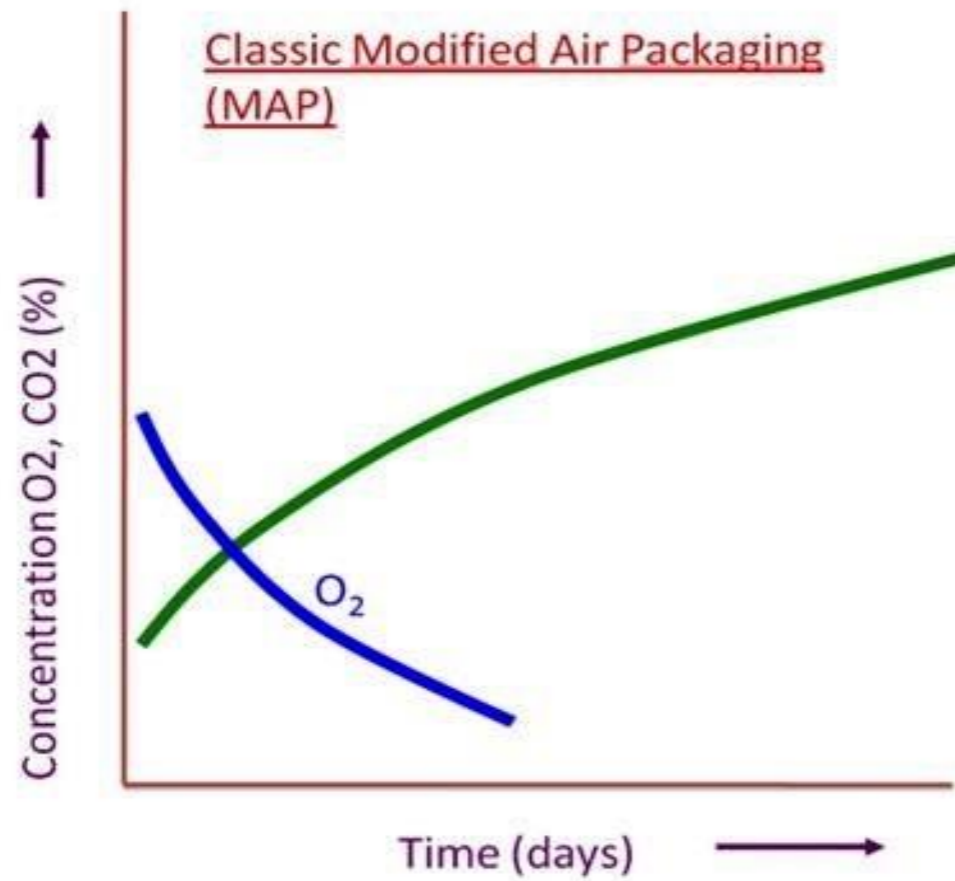
Potato Benefits

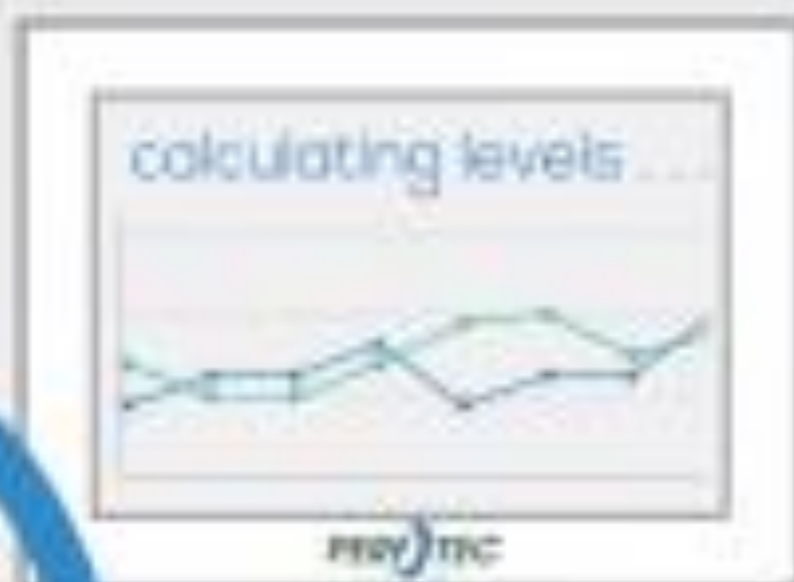
- Improves product appeal
 - less greening
 - blocks sprouts
- Reduces waste

Science of respiration

- Potatoes need oxygen to stay fresh
- The respiration rate varies by variety, origin and changes through the seasons





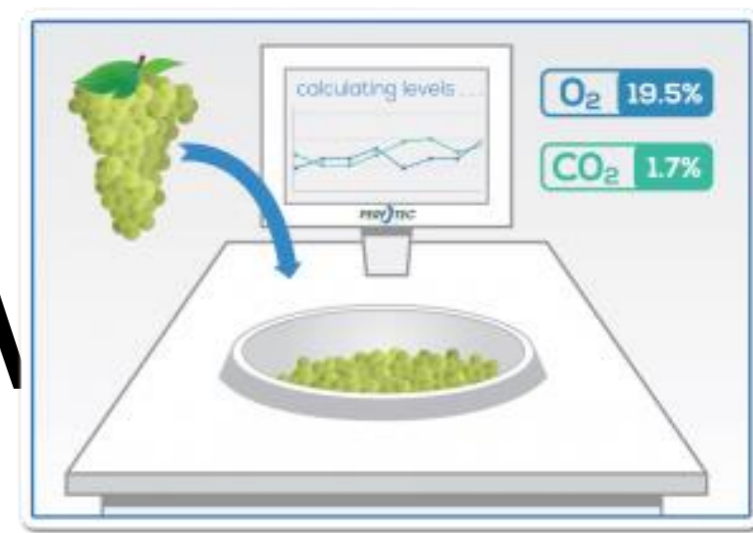


O₂ 19.5%

CO₂ 1.7%



Fast Respiration M



- Measures respiration rate of potatoes in only 4 hours
- Enables you to effectively respond to variations



Software



- Calculates the film permeability based on the results of the Fast Respiration Meter

AMAP technology active modified air packaging
top PERF TEC

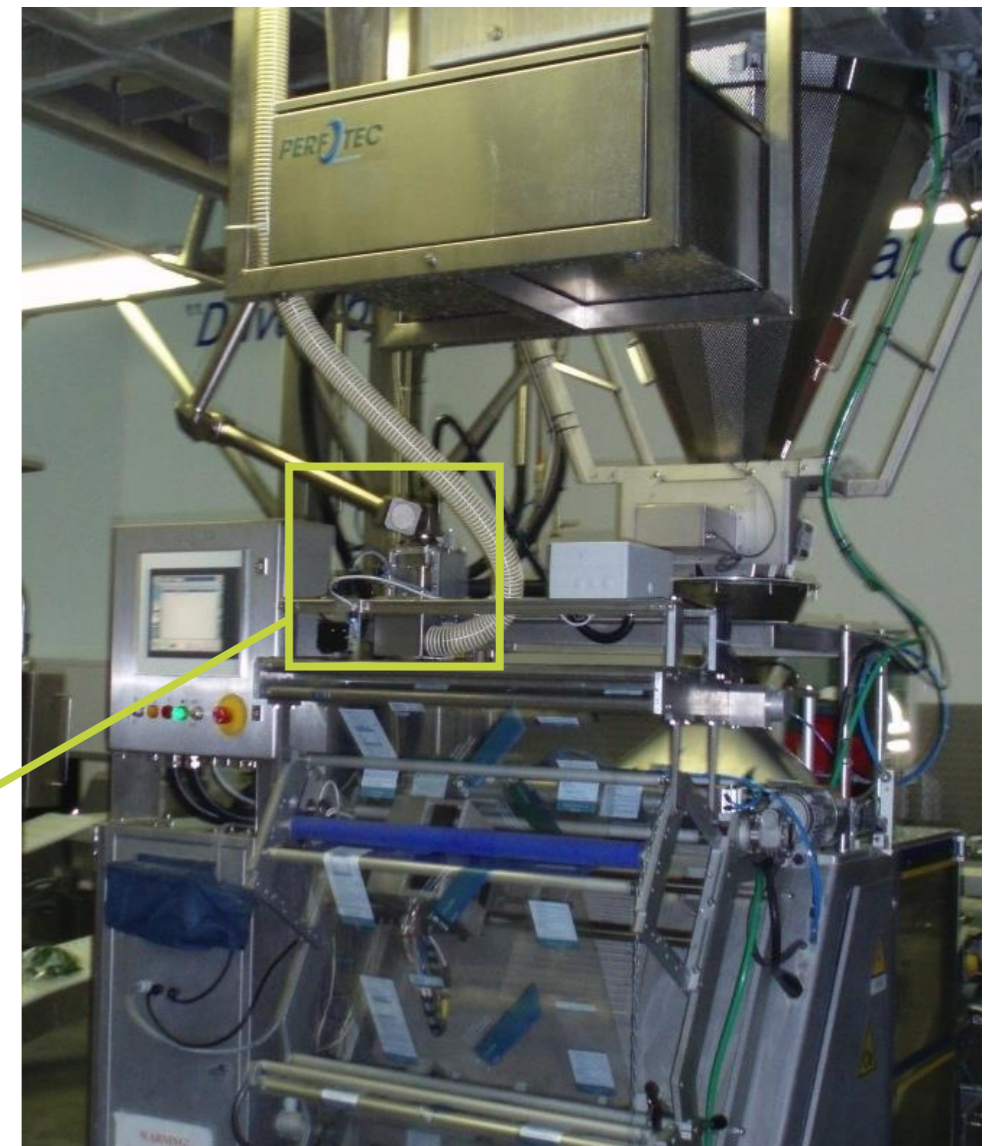
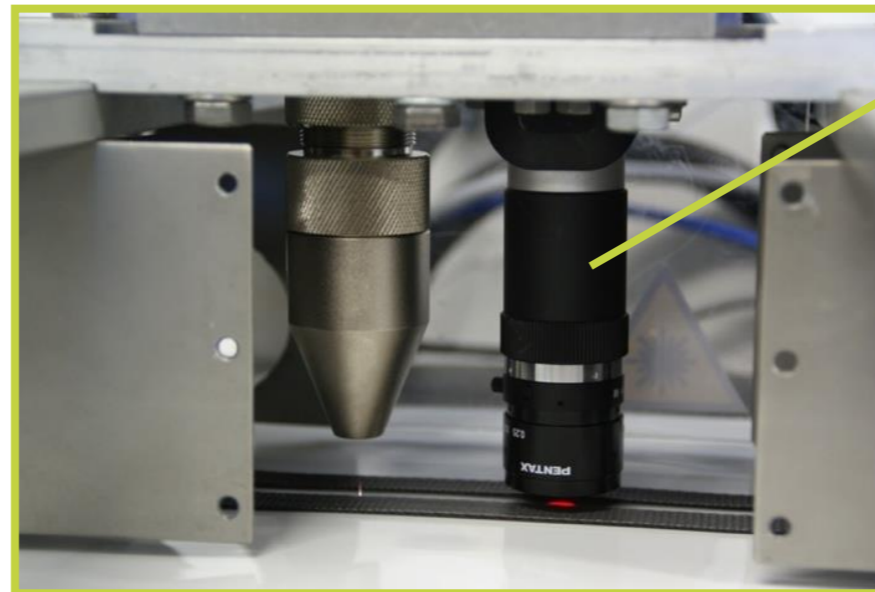
Home • Calculate • Technology Contact & Support

>> STEP 1/4 - Product input entry

1. Product name (min. 6 characters)
2. Age product (0 - 360 days)
3. Storage temperature (°C)
4. Snit, select from:
5. Thickness (mm), select from:
6. Product mass per packaging (gram), select from:
7. Length packaging (mm)
Length: smallest distance between two seal lines
8. Width packaging (mm)
Width: measured of a flat lying bag
9. Film thickness (µm), between 20 and 80
10. Initial O2 content when packing (%)
11. Initial CO2 content when packing (%)
12. Target O2 in packing (%), 0 - 21 steps of:
13. Target CO2 in packing (%), 0 - 20 steps of:
14. Mass put in RR meter (kg)
15. Number of filling discs
16. Upload Logfile (.dfl)
 geen bestand geselecteerd

Inline Laser Perforation System

- Adapts the film permeability during packing
- Developed to work under tough conditions



www.restrain.eu.com

- Ethylene
- Shelf life improvement

Thank you

- Any questions?

