Seminar
Recent Development in MAP Technology

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Denmark

Hari : JUM’AT
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Tempat : Ruang Salak;
SEAFAST Center
Kampus IPB-DARMAGA

www.seafast.ipb.ac.id

PBI-DANSENSOR
FULL OF FRESH IDEAS

25 years with MAP technology
World leader in MAP equipment
Presented at Seafast Center – IPB

Sept 30th, 2011

PBI-Dansensor

Full of fresh ideas

• Introduction
• PBI-Dansensor
• Why MAP packaging
• MAP equipment
• MAP applications
• Quality control (QC) versus quality assurance (QA)
• Questions
Seafast center - IPB seminar 2011
FULL OF FRESH IDEAS

• Food safety
• Food quality
• Food standards (HACCP and ISO)
• Health of people

MAP technology

Seafast Center - IPB Seminar 2011
PBI-Dansensor

• PBI-Dansensor is located in Ringsted, Denmark, and have 5 subsidiaries; in Germany, France, Spain, Italy and USA.
• PBI-Dansensor employs approximately 100 people in own organisation, and in total approximately 225 people globally inclusive distributors sales and technical staff.
• All PBI-Dansensor products are designed, manufactured and shipped at our premises in Ringsted, Denmark.
Seafast Center - IPB Seminar 2011

PBI-Dansensor

• More than 95% of PBI-Dansensor production are exported all over the World, which makes PBI-Dansensor the worldwide market leader within MAP equipment, with a market share of approximately 60-65%.
• PBI-Dansensor have a network of Distributors and Resellers in more than 50 different countries all over the World, who offers sale, installation, commissioning, after sales service, maintenance and calibration in own service facilities.

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BACK TO BASIC

• Atmospheric air
  20,9% Oxygen (O2)
  79,9% Nitrogen (N2)
  0,03% Carbondixoide (CO2)
• Modified atmosphere (MAP)
  100% Oxygen (O2)
  100% Nitrogen (N2)
  100% Carbondixoide (CO2)
Modified Atmosphere Packaging

What is MAP

- Food grade gasses are used in MAP instead of additives
- It keeps food fresh and prolong shelf life
- Food packed in MAP - it shall be visible to the consumers on the packages
- Carbon dioxide E 290
- Nitrogen E 941
- Oxygen E 948
- E-numbering is part of the EU food registration system

MAP gasses replaces the atmosphere air inside packages
- Reduces the use of artificial additives
- Less waste of product due to longer shelf life
- Increased distribution possibilities
- Better visual appeal
Modified Atmosphere Packaging

Why MAP

Modified Atmosphere Packing
can not make a poor product better 😊

However........

Modified Atmosphere Packing
Can make a poor product last longer 😊

MAP Gas Mixtures – A Guide

MAP Gas Mixtures – A Guide

- Bulk: Manufacturing
- Retail: Consumer Refrigeration

- Oxygen (O₂)
- Carbon Dioxide (CO₂)
- Nitrogen (N₂)

- Raw Red Meat
- Raw Offal
- Raw Poultry & Game Birds
- Poultry, Dark Portions & Cuts
- Raw Fish (Low Fat)
- Raw Fish (High Fat)
- Cured Meats & Molluscs

- Cooked & Cured Meat
- Cooked, Cured Fish & Seafood
- Cooked, Cured Poultry & Game
- Crock-Chili & Ready Meals
- Combination Products
- Western Products
- Bakery Products

- Grated 
- Grated & Soft Cheese
- Dried Food Products
- Cooked Vegetables
- Liquid Food Beverages
- Carbohydrate Soft Drinks
- Fresh Fruit Vegetables
# Modified Atmosphere Packaging

## Shelf life

<table>
<thead>
<tr>
<th></th>
<th>Non MAP</th>
<th>In MAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw red meat</td>
<td>2-4 days</td>
<td>5-8 days</td>
</tr>
<tr>
<td>Raw Poultry &amp; game birds</td>
<td>4-7 days</td>
<td>10-21 days</td>
</tr>
<tr>
<td>Raw fish &amp; seafood</td>
<td>2-3 days</td>
<td>4-6 days</td>
</tr>
<tr>
<td>Fresh pasta</td>
<td>1-2 weeks</td>
<td>3-4 weeks</td>
</tr>
<tr>
<td>Fresh fruit &amp; vegetable</td>
<td>2-7 days</td>
<td>5-35 days</td>
</tr>
<tr>
<td>Bakery products</td>
<td>4-14 days</td>
<td>4-12 weeks</td>
</tr>
<tr>
<td>Dairy products</td>
<td>1-4 weeks</td>
<td>2-12 weeks</td>
</tr>
<tr>
<td>Cooked &amp; ready meals</td>
<td>1-3 weeks</td>
<td>3-7 weeks</td>
</tr>
<tr>
<td>Cooked poultry &amp; game birds</td>
<td>5-10 days</td>
<td>7-21 days</td>
</tr>
<tr>
<td>Cooked fish &amp; seafood</td>
<td>5-10 days</td>
<td>7-21 days</td>
</tr>
<tr>
<td>Cooked vegetable</td>
<td>3-14 days</td>
<td>7-21 days</td>
</tr>
<tr>
<td>Dried food products</td>
<td>4-8 months</td>
<td>1-2 years</td>
</tr>
</tbody>
</table>

## Traceability

### European and US Legislation

Correct Quality Control or Quality Assurance ensures that the manufacturer can comply with EU/FDA and local regulations.

Everything is implemented in order to secure people’s health:

- Traceability regulations according to EU Regulation No. EC178/2002
- Gasses are an additive according to EU Regulation 952/EC
- HACCP requirements according to FDA Food Code 2005

HACCP is also an EU requirement
Modified Atmosphere Packaging

Traceability

What is traceability?

FDA – Food Code 2005

- “a complete description of the processing, packaging, and storage procedures designated as critical control points, with attendant critical limits, corrective action plans, monitoring and verification schemes, and records required.”

- Hazard Analysis and Critical Control Point
  HACCP ↔ EU Regulation No. 178/2002

USA and EU are regulated by law

Live stock animals → Slaughter house processing → Transportation → Retail Supermarket → Consumer End user
**Modified Atmosphere Packaging**

**Traceability**

**How do you perform traceability?**

- Random spot check analysing of the gas content in the packages (destructive test), and logging of the data
- On-line analysing of the gas content of the packages before sealing, and logging of the data
- Test packages for leakage after sealing and logging of the test results
- Making clear rules and regulations for your quality assurance management (QAM) at your production sites
- Keep all test data accessible as documentation for the quality of the products

**What does traceability give you?**

- Data with quality test results, to be presented to relevant authorities
- An important tool in your QM policy
- Certainty of the quality in the production
- A proof of quality control towards your customers
- One of the parameters which can help you secure your image
Modified Atmosphere Packaging

Traceability

What does traceability give you?

• Proof that you are following the demand of quality control
• A homogenous quality of your products
• Ensures that heterogeneity in the production and in your products are detected immediately
• Saves you unnecessary losses in the production
• Ensures that products leaving your factory are of good quality

Quality Control or Quality Assurance

Definitions

• Quality control of MAP = manual testing (headspace), e.g. testing of packages every 15 minutes
• Quality assurance of MAP = automatic testing (on-line) directly on the packaging machine
• There is an increasing QA trend in the market

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Quality Control or Quality Assurance

Moving towards on-line

Development in the use of on-line vs. off-line equipment

- Experts in equipment for Modified Atmosphere Packaging
- Off-line analysing (spot check)
- Quality control (QC)

25 years of experience
Quality Control or Quality Assurance
18 years of experience

• Experts in Equipment for Modified Atmosphere Packaging
• Moving from off-line (spot check) to on-line analysing
• Moving from quality control (QC) to quality assurance (QA)

Quality Control (QC)
• Off-line analysing
• Random analysing
• Destructive testing
• Risk of making mistakes
• Loss of production
• Needs attention of operators

Quality Assurance (QA)
• On-line analysing
• 100% analysing
• Non-destructive testing
• 100% data logging for QA
• No loss of production
• Automatically operated

• CheckMate 3
• CheckPoint II
• CheckPoint
• LeakPointer

• MAP Check Combi (II)
• TGC-2
• CMV-2
• Gas mixers
• LeakMatic
Quality Control or Quality Assurance

**QC vs. QA**

- **On-line = QA**
- **Off-line (spot test) = QC**
- 60 strokes/min x 15 min = 900 packages
- Average of 20 tests out of 3600 packages/hour

Where did it start?

- Packing in MAP – no control
- Headspace analyzing
- On-line analyzing, leak detection

Time line

- EU
- CIS
- NAFTA
- ASEAN

Why does it develop in Asia?
What is Off-line

Quality Control?

- QC is the easiest possible process control for modified atmosphere packages
- Off-line destructive testing
- Indirect measurement of the gas content in the packages
- Random indexes is measured
- Both oxygen and carbon dioxide can be measured

What is On-line

Quality Assurance?

- QA is the best possible process control for modified atmosphere packages
- Direct measurement of the gas content on the packaging machine
- Every index is measured
- Both oxygen and carbon dioxide can be measured
- Completely integrated with the packing machines
Quality Control or Quality Assurance

Costs for QC vs. QA

5 important focus areas in a MAP Audit:

- Quality Control or Quality Assurance
- Loss of production
- Costs for testing and repacking
- Costs for scrapping of packing material
- Cost of packing material
- Gas consumption

Benefits for the Customers

- Reduction in the use of artificial additives
- Less product waste
- Less packaging material waste
- Better process control
- Better traceability
- One-touch operation
- Increased throughput
- Less re-packaging

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Quality Control or Quality Assurance

Methods of testing

O₂ 100%
CO₂ 100%
N₂ 100%

Pre-mix

Quality Control or Quality Assurance

Impact on your employees

- The gas accumulates in the body
- Headache after a short while
- Hard to keep concentrated
- Lower efficiency

Which means:
- Lower profit for the company
- Less committed workers
- Risk of work-related injury
- Perhaps a green profile
Quality Assurance

Questions

Questions

PBI-Dansensor

Where do you find us

• Our Web site
  www.pbi-dansensor.com

• Find interesting news at
  www.modifiedatmospherepackaging.com

Thank you for your attention.
5 important focus areas in a MAP Audit:

**Cost of packing material**
- Cost of first packing (will be scrapped after testing)
- Cost of repacking

**Cost of scrapping packing material**
- Scrapping costs per metric ton
- Cost of transporting the waste

**Loss of production**
- Number of tested packages
- In case of failure between two manual tests

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5 important focus areas in a MAP Audit:

**Cost of testing and repacking**
- Approximately 1 minute per manual test including registration of test results
- Approximately 1 minute for opening the tested package, separating the product from the packing material and putting the product back on the packaging machine
- Handling of the scrapped packing material

**Cost of gas consumption**
- Extra costs for repacking
- No control of gas consumption when no on-line analyser with PFC is installed
Quality Control or Quality Assurance

Basic Factors for Calculation

- Flow packaging machine
- Size of package 20x12x10 cm = 2.4 litre per package
- Flush factor 3 = 7.2 litre per package
- 60 strokes per minute = 3600 packages per hour
- 8 production hours per day
- 240 production days per year

Quality Control or Quality Assurance

Basic Factors for Calculation

- 5 packages tested every 15 minutes = 20 per hour
- Testing takes 1 minute per package
- Repacking takes 1 minute per package
- Salary for employees € 25.00 per hour
- Packing material 0.0015 kg per package
- Scrapping costs € 200.00 per metric tons
- Cost of gas € 3.00 per m³ from batteries