Food Safety & Quality in Aseptic Packaging for liquid food

ABCE, Dubai, October 29th, 2017
Antonio Rendina – Aseptic Performance Management Director
Tetra Pak, DSO
I would argue that……

Good data collection and analytics are key to deliver Food Safety and Food Quality
Who are Tetra Pak – some quick facts & figures

We specialise in providing customers with complete packaging solutions for processing, packaging and distribution of food products.

END-TO-END SOLUTIONS
Processing, packaging and service solutions, maintaining the highest standards of food safety, operational performance and sustainability.
Who are Tetra Pak – some quick facts & figures

Processing units in operation: 76,000
Packaging machines in operation: 8,860
Downstream equipment in operation: 20,000
Carton packaging material, billions of packs: 188

Present in +175 countries around the globe

Antonio Rendina / Oct 29, 2017
Tetra Pak Public
“We commit to making food safe and available, everywhere”
Tetra Pak 2017 Sustainability Report

FOOD. PEOPLE. FUTURES.

Protecting food
Working with our customers and partners to make food safe and available everywhere through our innovative and market-leading food processing and packaging solutions.

Our commitment to the UN SDGs:

Protecting futures
Supporting the sustainable future of our planet and the long-term success of our customers.

Our commitment to the UN SDGs:

Protecting people
Safeguarding and enabling our people and supporting communities where we operate.

Our commitment to the UN SDGs:
Protecting Food

Working with our customers and partners to make food safe and available everywhere through our innovative and market-leading food processing and packaging solutions.

- Food safety
- Food quality
- Food availability
Food Protection

Bringing safe food to consumers

**Food Safety**
Assurance that food will not cause harm to consumers when it is prepared and/or eaten according to its intended use

- From FAO/WHO Codex Alimentarius
- It encompasses:
  - Microbiological safety of food
  - Chemical safety of our systems
  - Physical safety of our systems

**Food Quality**
Maintaining the quality characteristics of food that are acceptable to customers and consumers for the desired shelf-life

- It includes quality factors such as appearance, texture, flavour and nutritional elements
- It is a commercial enabler
- It is a performance attribute

**Food Availability**
Sustaining dairy value chain development, nutritional programmes, food categories expansion, and reduction of food waste

- Development of new product formulations
- School feeding programmes
- Food waste reduction
Food Safety
Assurance that food will not cause harm to consumers when it is prepared and/or eaten according to its intended use.

Food Quality
Maintaining the quality characteristics of food that are acceptable to customers and consumers for the desired shelf-life.
Why should we worry about Food Safety & Quality

Any specific reason for the food industry to worry?

► Social media attention
► Growing consumer awareness
► Retailers taking the lead
► Complex logistic and traceability
► Brand protection
► Business critical consequences of failure
Food safety and quality issues can damage your commercial strategy, your financial results, and your brand equity.

77% of Food Producers experienced recalls that had a financial impact up to $30 million.

Main costs come from business interruption, product disposal and customer reimbursement.

Source: Capturing Recall Costs - Measuring and Recovering the Losses, USA GMA and Ernst & Young 2011
So, what does this mean to Tetra Pak

- Food safety non-negotiable – no compromise
- Equipment has to be designed and automated to deliver of Food Safety
- In the next 30 min another 11 mio packages – crucially important that NONE of these have any Food Safety issue
Microbiological Food Safety and Quality

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<th>It is about</th>
<th>Aseptic Performance</th>
<th>Microbiological Food Safety</th>
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<td>Public Health and Compliance</td>
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Securing Microbiological Food Safety

Tetra Pak Type Validation Approach

- The process is defined by the manufacturer
- The user cannot change the process
- All critical parameters are measured by instruments
- Instruments provide feedback control
- Instruments stop the process if any critical parameter drifts outside the acceptable range

Validating the equipment delivers the process. Validating the process delivers the desired effect.
Equipment Filing to Food Authority

Establish a “master registration” with US FDA

Filling Machine System  ➤  Functional Specification  ➤  Microbiological Performance
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<td>Cost, waste, market acceptance</td>
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<td>What is produced</td>
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<td>Acceptable as per customer AQL</td>
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Aseptic Performance is the result of the whole line

CCP: Critical Control Points
PP: Process and Operation Parameters
QC: Quality Check
Many Factors influence Aseptic Performance

254 different factors

- **Raw material and end-product quality**: 20 factors
  - raw product, incubated results, storage control, consumer complains

- **Processing parameters**: 54 factors
  - Pre-processing, intermediate storage, UHT treatment, aseptic transfer, CIP

- **Filling machine**: 84 factors
  - Tube tightness, transversal sealing, pack-mat splices, etc

- **Soft factors**: 96 factors
  - Training, maintenance, hygienic awareness, quality management system, competence, workforce, motivation, quality mindset

Many Factors influence Aseptic Performance
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<th>Process</th>
<th>People Involvement</th>
<th>Example</th>
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<tr>
<td>Fully Automated</td>
<td>Only for maintenance and calibration</td>
<td>Air Sterilisation by Incineration</td>
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<tr>
<td>Automated</td>
<td>Pre-conditions assumed and preparation needed</td>
<td>Machine Sterilisation - Assumes clean surfaces -</td>
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<tr>
<td>Supervised</td>
<td>Evaluate result and perform adjustments</td>
<td>Package sealing</td>
</tr>
<tr>
<td>Manual</td>
<td>Is completely performed by people</td>
<td>Manual cleaning</td>
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Increasing human involvement

Increased risk of mistakes
All processes cannot be totally independent of manual operation and people skill

- Increase level of automation
- Improve operation management and control

IMPROVE QUALITY OUTPUT

AND / OR
Traditional sampling
Manually collected

Package check (shop) → Incubation → Package check (microbiological)

Blown Packs + Resampling (warehouse)

Claims (retailer / consumer)
Digital Quality Sampling System

What you can measure you can improve
Defective packs entered into system at these points. System helps automatically correlate events in production to quality issues.

Automatic sampling unit with confirmation

Package check (shop)

Package check (microbiological)

Blown Packs + Resampling (warehouse)

Claims (retailer / consumer)
DQSS: Tool for better monitoring of Aseptic Performance

- Tetra Pak toolkit for Aseptic Performance Monitoring
- Simpler data collection
- All data available for analysis and troubleshooting
- Historical trends readily available
Tetra Pak® DQSS

Comparison between lines

- Defect rate lowered 50%
- Reduction of lost of sales due to quality issues down 90%

Comparison between line events

Operators sampling accuracy

Antonio Rendina / Oct 29, 2017
Some real life results of Tetra Pak’s DQSS toolkit

Some substantial potential improvements*

* Please note that result may vary from customer to customer depending on their current level of Quality Control
Access to data will assist in managing people

- Training
- Documentation
- GMPs
- SOP & Work instructions
- World Class Manufacturing

Data will allow you to understand the gaps

- Supervision and control
- Empowerment & Responsibility
- Listening & Feedback
- Salary & Rewards
Concluding Remarks

- Microbiological Food Safety is non-negotiable and should be managed through automated process control.
- Food Quality however depends on many factors.
- Reliable, repeatable, predictable quality is achieved if key factors are understood and controlled which can be achieved through intelligent data collection and analysis.
I would argue that……

Good data collection and analytics are key to deliver Food Safety and Food Quality

“In god we trust, all others must bring data”
- W. Edwards Deming
Thank You