Workshop B
Sensory aspects of food packaging
Packagings improving the shelf life of products
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ESN Conference -
Sensory evaluation - More than just food
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EU regulation

‘Active and intelligent food packaging materials should not change the composition or sensory characteristics of food or give such information of the suitability of foods, which may misinform consumers …’

Product = Food & Packaging
Conventional interactions between packaging and food

<table>
<thead>
<tr>
<th>FOOD</th>
<th>PACKAGING</th>
<th>ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>Chemical components</td>
<td>CARRY-OVER: Flavour</td>
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<tr>
<td>Scalping</td>
<td>Flavour components</td>
<td>Light induced changes, oxygen, water, organic volatiles, impurities from environment</td>
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<td></td>
<td>Alcohol, fat, water etc.</td>
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<tr>
<td>Permeation</td>
<td>Flavour components</td>
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<td>water, carbon dioxide etc.</td>
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Advances of active packaging

- maintenance of quality without food additives
- efficient oxygen scavenging
- can be considered as 'smart weapons' & 'tailored technologies' to solve particular problems
- good solutions for SMEs

Advances of smart packaging

- improved control and maintenance of cold chain
- improved sensory quality and safety control
- quality labels as marketing tools

Examples of active and smart/ intelligent packaging concepts

Active packaging concepts commercially available or under development

- separate oxygen scavenging sachets
- oxygen scavenging labels
- separate ethanol emitting sachets
- oxygen scavenging packaging materials
- antimicrobial packaging materials

Smart packaging concepts commercially available or under development

- time-temperature indicators
- oxygen indicators
- leak indicators
- carbon dioxide indicators
- freshness indicators
Intelligent packaging - Improved quality control

**FRESHNESS INDICATOR**
- Deteriorated raw material quality
- Acceptable quality
- Rejectable quality

**LEAK INDICATOR**
- Package leakage
- Temperature increase

**TIME-TEMPERATURE INDICATOR**
- Shelf-life

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**TIME-TEMPERATURE INDICATOR**
Correlation between sensory quality of cold-smoked rainbow trout and TTI colour

Commercial time-temperature indicators

**Fresh-Check, LifeLines Technology**

**VITSAB**

\[ y = -0.125x + 1.1267 \]

\[ R^2 = 0.9493 \]
LEAK INDICATOR

Leak indicator suitable for modified atmosphere packages

- based on oxygen sensitive dye
- colour change from white to blue in the presence of a leakage (oxygen enters the package)

LEAK INDICATOR & OXYGEN SCAVENGER

Effect of package integrity /oxygen scavenger on the colour of cooked ham

- oxygen scavenger had a considerable effect of the sensory quality of cooked ham
- colour of the oxygen indicator correlated very well with microbiological and sensory quality of cooked ham when used together with oxygen scavenger
Attitudes and expectations of Finnish retailers towards intelligent packaging systems

- Commercially available indicators not yet widely adapted
- Knowledge about attitudes and expectations of retailers helps to direct the development of intelligent systems
- AIM: to explore the factors that retailers perceive as benefits or drawbacks in the application of intelligent packaging
- 33 personal interviews producing qualitative information on the application of intelligent packaging systems
Expected effect of intelligent packaging on the **product quality and safety**

- **TTI / consumer**
- **TTI / retailer**
- **FI / consumer**
- **FI / retailer**
- **LI / consumer**
- **LI / retailer**

Quality and safety of the food product would...
- improve
- not change
- decline

Expected **desirability** of intelligent packaging

- **TTI / consumer**
- **TTI / retailer**
- **FI / consumer**
- **FI / retailer**
- **LI / consumer**
- **LI / retailer**

Adaptation of intelligent packaging would...
- be desirable
- make no difference
- be undesirable

...in the own perspective of the interviewee
Retailers´ attitudes / Results

- Intelligent concepts expected to have positive effect on the quality and safety of packed food products
- Most beneficial as additional and complementing aids in the safety management of the retailers
- Consumers may value the information provided by intelligent systems; Intelligent systems may improve consumer service
- Many interviewees feared that intelligent systems in consumer packages might cause confusion, interpretation problems & wastage
- Problems more likely in consumer packages than in professional use at the retailer or in the catering services
- Despite of some concerns, retailers' attitudes towards implementation of intelligent packaging concepts predominantly positive