Active and Intelligent Packaging

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Session Overview

- What do we mean by smart packing?

- Types of packaging available
  - Active packaging
  - Smart or intelligent packaging
  - Use case examples

- Closing thoughts
Smart Packaging

Why are we looking to use this?

- Enhance the customer experience
  - Add value in some means

- Improving the product

- Quality control about the product

- Additional information
Active Packaging

Overview

- Enhance performance of the product
  - *Interact directly with the product*
  - *Food applications*

- Manufactured into the packaging materials
- Printed or coated
Oxygen Absorbers

Why do we use

- Extend shelf life
- Reduced growth of pathogens
- Improved product quality
- Reduced oxidation
  - Vitamins, spices…
- Extend pharmaceutical life
Oxygen Absorbers

Active Packaging

- Chemicals to absorb $O_2$
  - $Fe \rightarrow Fe(OH)_3$
  - $H_2 \rightarrow H_2O$

- Applications
  - Sachets
  - Bags
  - Labels
  - Bottles
Moisture Absorption
Active Packaging

- Applications include
  - *Pharmaceutical*
  - *Electronics*
  - *Food applications*

- Materials
  - *Sachets: Silica gels, calcium oxide ….*
  - *Sheets: Multi layer with superabsorbent polymers*
    - Polyacrylate salts. Starch copolymers ….*

www.multisorb.com
Thermochromic Inks
What Temperature is the Product At?

- Color change inks
  - *Indicate the current temperature*

- Food products

- Drinks and for promotions
  - *Fanta “Funstigator”*
Active Packaging

Some additional examples

- Ethylene absorbers
  - *Strawberries*

- Releasing elements
  - $CO_2$, *preserving agents*

- Antimicrobial
  - *Silver applications for office, electronics …*

- Heating elements
  - *Metals for microwaves*
Smart (Intelligent) Packaging

Overview

- Indicator on packaging
  - *Internal or external*

- Monitor the product and provide information
  - *Quality*
  - *Change*
  - *History*

- Communicate
Time Temperature Indicators (TTI)
Also referred to as Time Temperature Integrators

- Temperature over time
  - Warning above/below set temperature
  - Color change over time
- Partial or full history
  - Different solutions available
- Different activators
Oxygen / Carbon Dioxide
Smart Packaging

- Oxygen sensors
  - Detect leaks in packaging
  - Issue with responsiveness
  - Microbial action

- CO$_2$ indicators
  - React to changes in pH
  - Used in meats
Shock Indicators
Labels, circuits or sensors

- Look at shocks or impacts
  - Record over time
  - If pre-determined value exceeded

- Delicate materials
  - Shipping, handling and use
Interacting With Packaging
Customer Use of NFC (RFID from a producer)

- Utilize NFC enabled device
  - *NFC tag*

- Provide added value to the consumer
  - *Growth worldwide in linking packaging with mobile*
Chateau Le Pin

NFC integrated into wine labels

- Reliable anti counterfeiting solution
  - $3,000 average, up to $10,000

- Evaluated many technologies

- Linked the ID to the bottle and customer
  - Encrypted

- Created added value
  - Details of wine, virtual cellar, notes on wine etc.
MIT
Research published using NFC

- Sensors connected to NFC tags
  - NFC tag adapted to detect the chemical using carbon nanotubes
  - Simple scan with phone
  - Used either by manufacturer or customer
Smart Packaging
Growth for Communication

- Integrating RFID/NFC communication into packaging

- Added functionality to the user
  - Instructions
  - Interactive guides
  - Additional content
  - Promotions
  - Live updates

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Smart Packaging

Closing thoughts
Thanks for listening!

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