Active Packaging

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Active Packaging - definition

- Active Packaging is an extension of protection function of packaging

Smart Packaging

Basic Functions of Packaging

- Convenience
- Protection
- Containment and preservation

Intelligent Packaging
- RFID, NFC
- QR, AR codes

Communication and identification

Active Packaging
- Moisture scavengers
- Antimicrobial agents
- Etc
Active Packaging Materials to prevent Food Waste problem?

• Around 88 million tonnes of food are wasted annually in the EU, with associated costs estimated at 143 billion euros (FUSIONS, 2016)

• Active functionalities in packaging is one solution to decrease food waste.

Split of EU-28 food waste in 2012 by sector; includes food and inedible parts associated with food, FUSIONS 2016
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Active Packaging Markets

- The 2016 Smithers Pira report The Future of Smart Packaging to 2021 forecasts that the global active packaging market value will grow 4.9% pa to reach $5.6 billion in 2021.

- Almost all of the active packaging materials are today based on plastics!

- Why not to use fiber based materials also for active packaging?
Active Packaging material development in Stora Enso

- Oxygen scavenging materials
- Moisture controlling materials
- Ethylene scavenging materials
- Antimicrobial materials

Figure 1: Meat packaging trial in oxygen scavenging material, Stora Enso

Figure 2: Examples of moisture absorbers, EU Guidance to the Commission Regulation (EC) No 450/2009

Figure 3: Examples of oxygen absorbers and ethylene scavenger, EU Guidance to the Commission Regulation (EC) No 450/2009

Figure 4: Fruit packaging trial in ethylene scavenging material, Stora Enso

Figure 5: Laboratory trial of antimicrobial activity, Stora Enso
Oxygen scavenging materials

• Oxygen scavenging material developed to extent shelf life of the food products and improve the quality.

• Polymer coated food packaging board piloted to verify that developed material can work as sufficiently as commercial oxygen scavenging labels.
Moisture control materials

- Moisture control materials developed to protect moisture sensitive goods.

- Target is to maintain stable relative humidity conditions inside packaging absorbing the excess moisture leaking inside.

- Own coating solution developed to enable efficient moisture absorbance properties to packaging board.

Moisture absorber materials

- They may for example consist of a laminate of plastic gauze, adhesive and pads containing polymeric fibres or granular polyacrylates only or in combination with natural cellulose all contributing to the absorbing function of the pad.

- E.g. 100% fiber based materials are not considered as active moisture absorbers
Ethylene scavenging materials

• Ethylene scavenging material is tested to be incorporated into polymer layer of the packaging board.

• Use of such material could slow the ripening of many fruits and vegetables and extend the shelf life of the products.

Ethylene scavenger materials

• Ethylene, a natural plant growth hormone, is a key to the ripening process of fruits and vegetables, being liberated during respiration and then driving the ripening process itself.

• The active component is meant to prevent an excess of the gas in order to extend shelf life of the packaged product.
Antimicrobial materials

- Antimicrobial material developed to protect growth of bacteria, yeast and mold on packed products. Not only food products but other sensitive products for e.g. growth of molds.

- Special natural substance based coating on packaging board developed to enable wide range of activity against different microorganisms.

Antimicrobial materials

- Their function is to prolong shelf-life by protecting food against deterioration caused by micro-organisms and/or to protect against growth of pathogenic micro-organisms.
Conclusions

• Food waste problem is important from economical and environmental perspective. Packaging has a role to solve that!

• Active Packaging market is growing but currently focusing only on plastic packaging.

• Fiber based active packaging could create a sustainable solution to fight against food waste problem.

• Could fiber based active packaging materials be an area for the future product development together with Stora Enso?
Thank you!