



# Active Packaging

Simo Siitonen, Project Manager, 14.6.2017

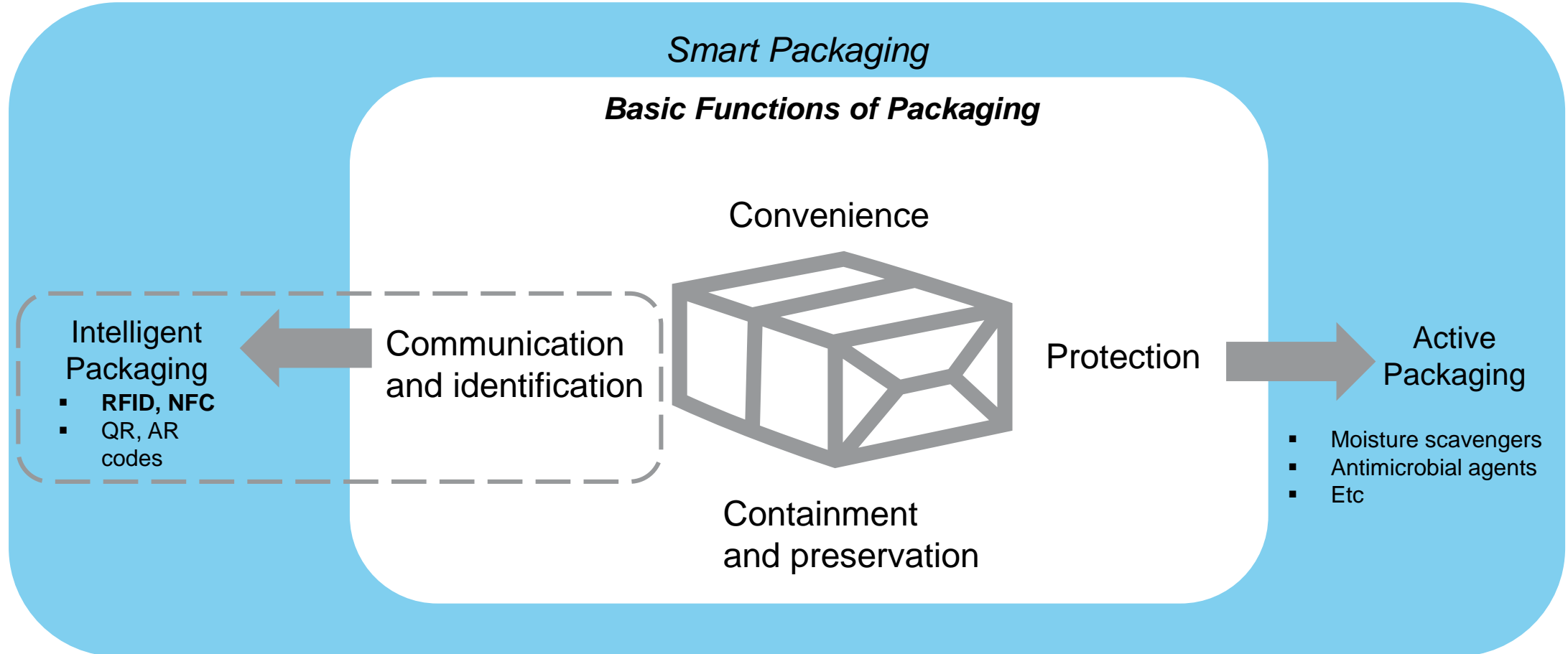


THE RENEWABLE MATERIALS COMPANY

# Active Packaging - definition



- Active Packaging is an **extension of protection function of packaging**



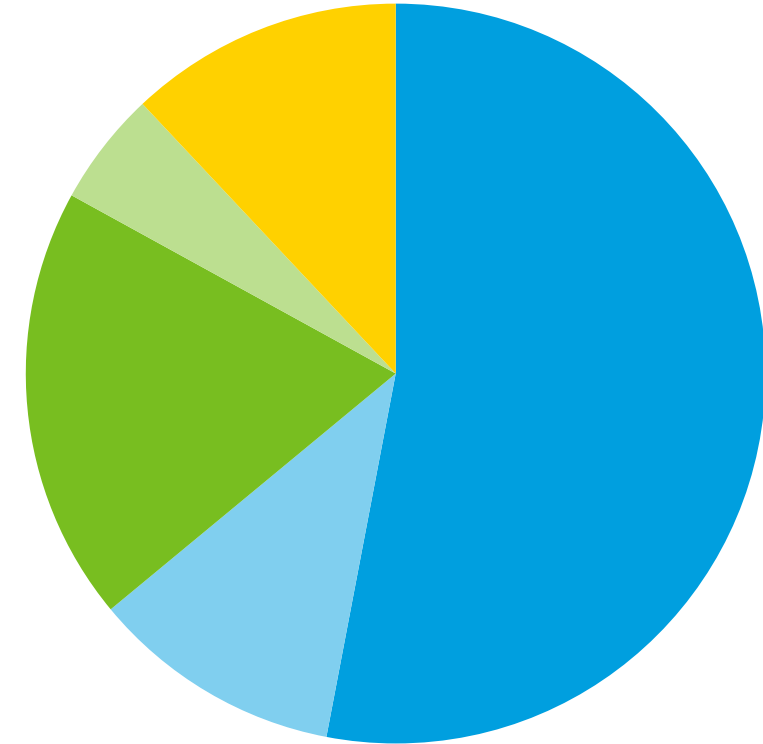
# Active Packaging Materials to prevent Food Waste problem?



- 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.



- Households
- Productions
- Processing
- Wholesale and retail
- Food service



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

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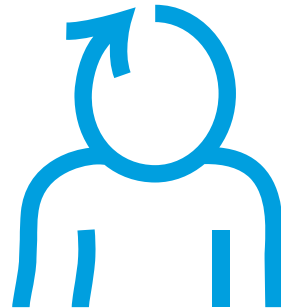
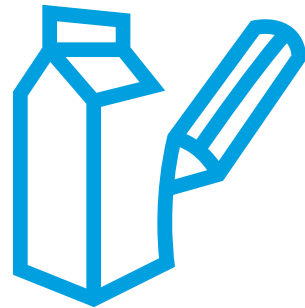
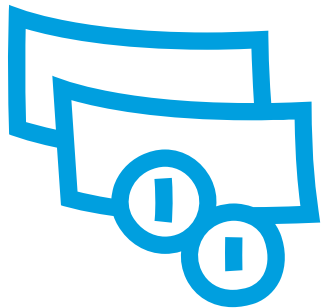


Active Packaging Markets

Active Packaging material development in Stora Enso

Active Packaging legislation and acceptance considerations

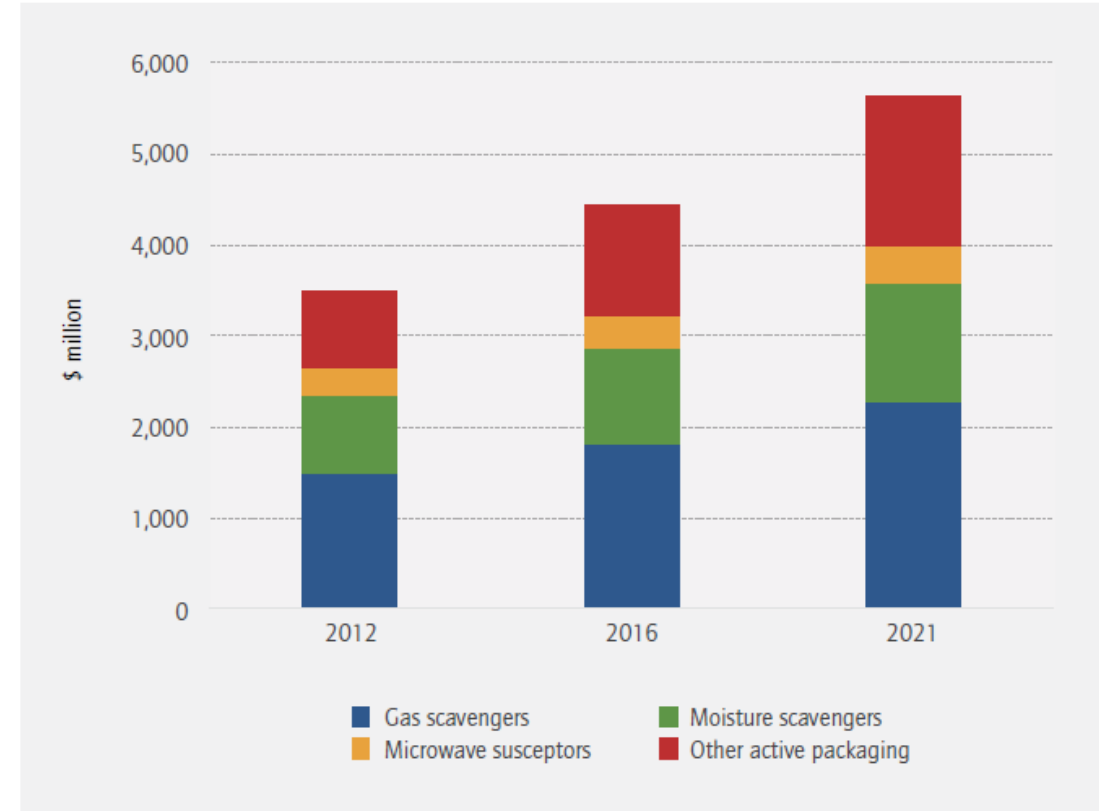
Conclusions



# 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?



Source: Smithers Pira



# Active Packaging material development in Stora Enso

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



Figure 5: Laboratory trial of antimicrobial activity, Stora Enso



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



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

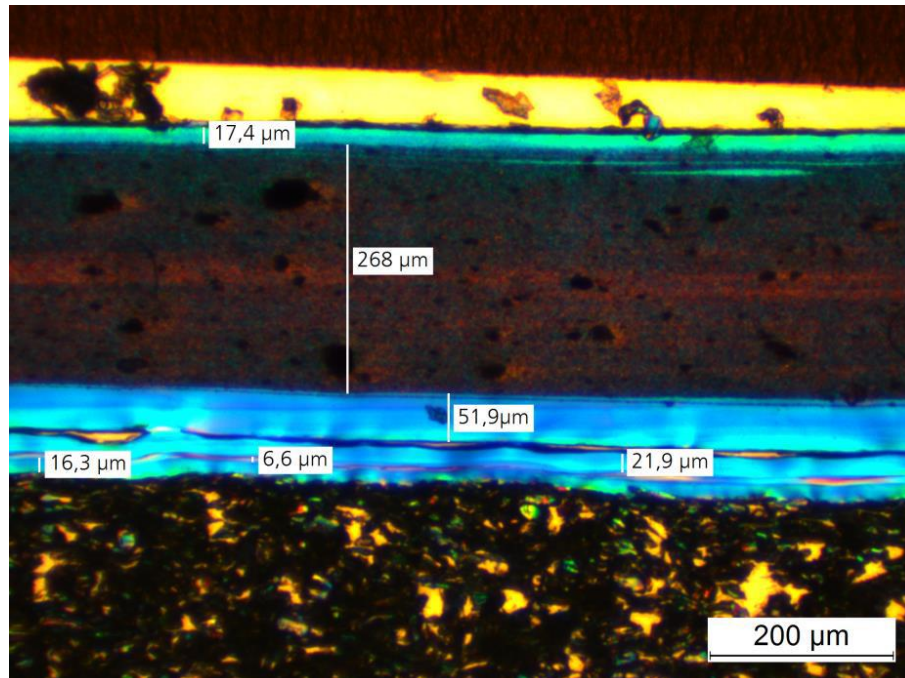


Figure 3: Examples of oxygen absorbers and ethylene scavenger, EU Guidance to the Commission Regulation (EC) No 450/2009

# Oxygen scavenging materials

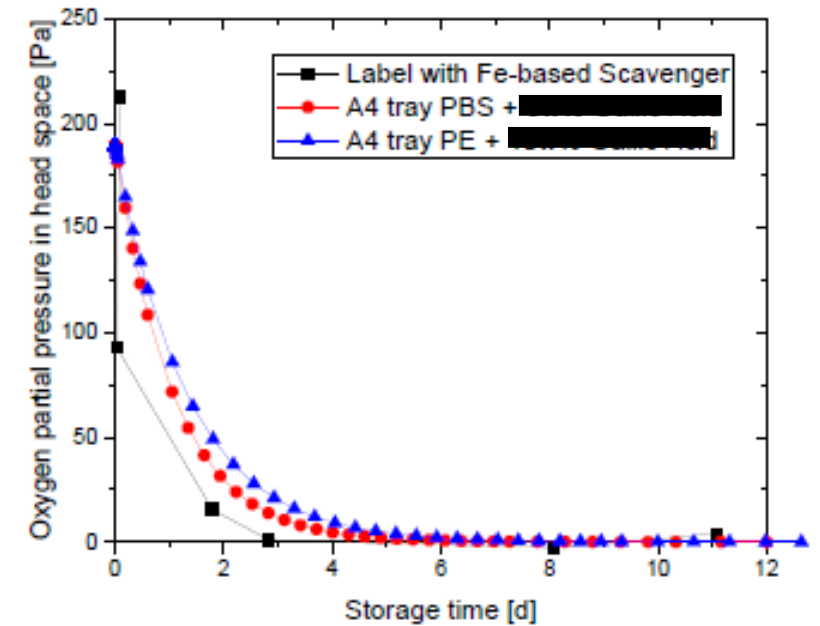


- Oxygen scavenging material developed to extend shelf life of the food products and improve the quality.
- Polymer coated food packaging board piloted to verify that developed material can work as sufficiently as commercial oxygen scavenging labels.



## Oxygen scavenger materials

- Exposure to oxygen may result in microbiological growth on the food, chemical changes to the food, etc.
- An oxygen scavenger is meant to reduce these effects thereby prolonging the shelf-life of the foodstuffs.



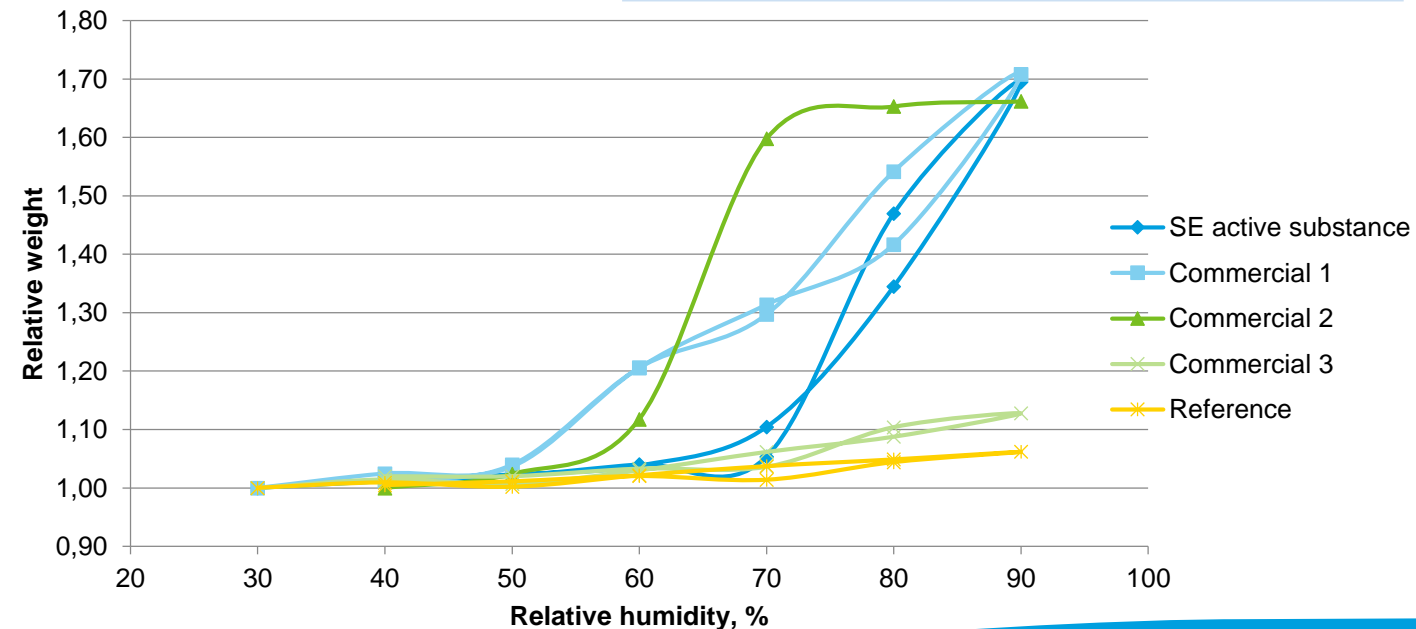
# Moisture control materials



- 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

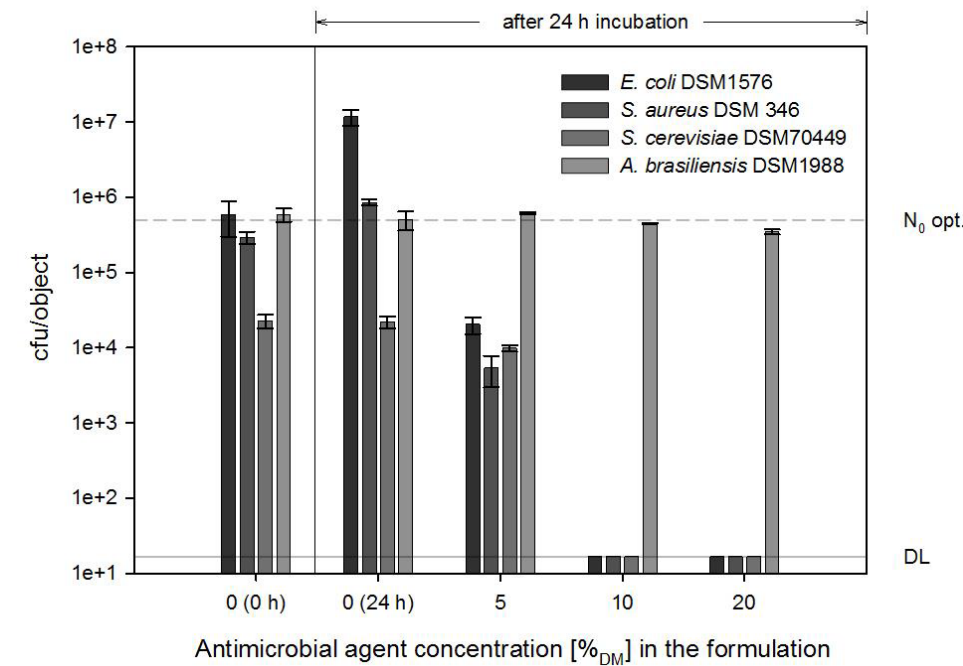


- Antimicrobial material developed to protect growth of bacteria, yeast and mold on packed products. Not only food products but other sensitive products for e.g. growth of molds.
- Special natural substance based coating on packaging board developed to enable wide range of activity against different micro-organisms.



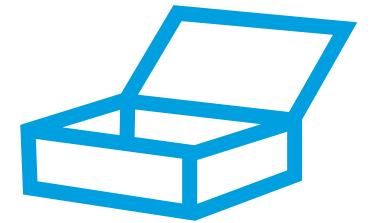
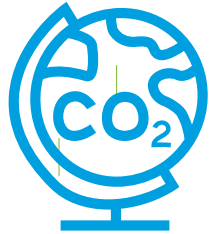
**Antimicrobial materials**

- 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?





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**Thank you!**