



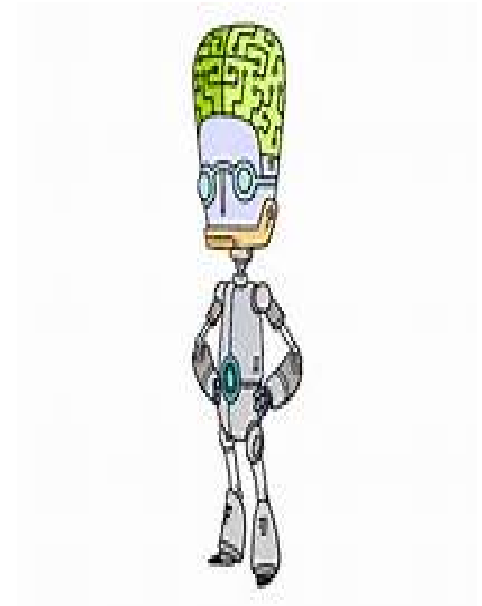
Active & Intelligent Packaging Industry Association

Andrew Manly
Communication Director
Brussels September 2016



APIA

**The FUTURE of
Plastics Packaging
Is
Active & Intelligent!**



What is AIPIA?

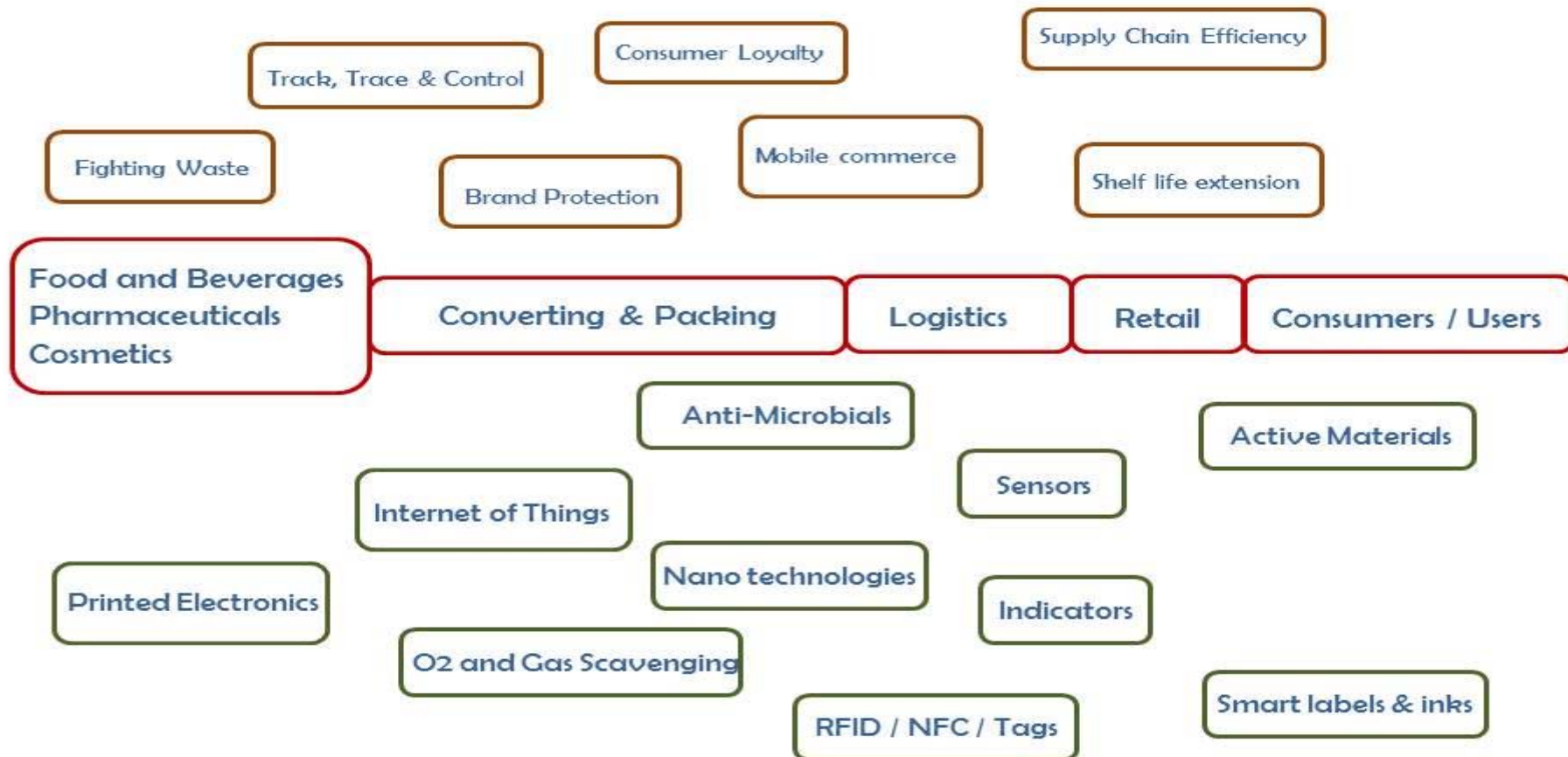
- **Association for Active & Intelligent Packaging**
- **Our members 800+**
- **Global reach: Members in 50 countries on 6 continents**
- **Membership Free to qualifying companies**
- **Brand owners, Retailers, Packaging Manufacturers, A&IP Providers.**
- **On-line Newsletter.**
 - Sign up for free www.aipia.info

What is APIA?



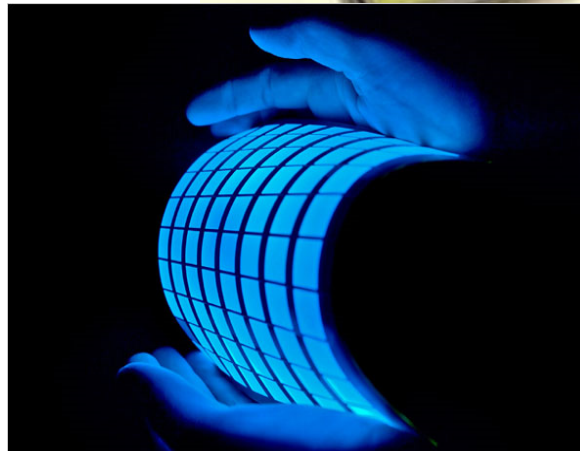
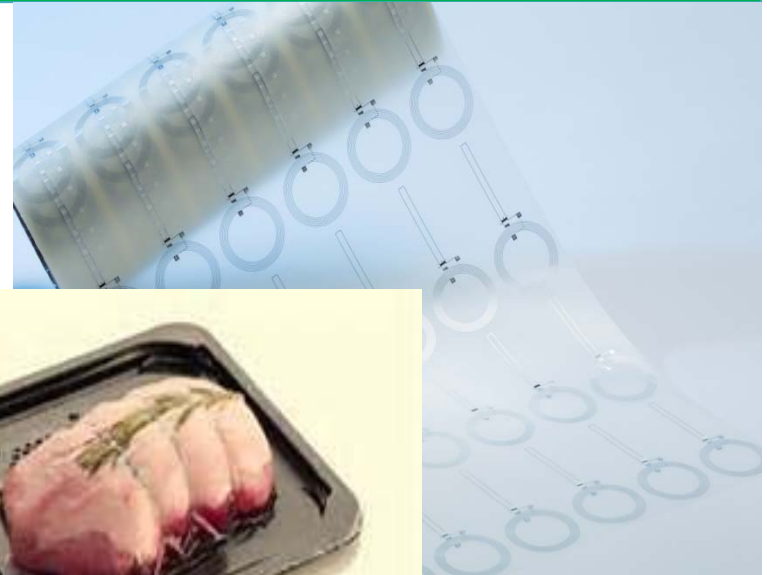
Active & Intelligent Packaging Industry Association

What is Active & Intelligent Packaging?



A&IP for Plastics Packaging

- Additives
- Coatings
- Laminates/Encapsulation
- Pads
- Modified/Vacuum Atmospheres/Skin
- Nano Materials
- Natural Materials
- Micro Perforations
- Substrates for PE



The Challenges

- **Cost**
- **Scaleability**
- **Technical Barriers**
- **Legal Barriers**
- **Recycling/Sustainability**
- **Consumer (& Retailer) Acceptance/Habits**



What can Active Packaging do?

- Reduce Microbial Development
- Slow Ripening Process/ Fungal Growth
- Maintain Quality and Colour
- Reduce or eliminate odour
- Slow Level/Rate of Deterioration
- Extend Supply Chains



Additives

Parx Plastics – Holland

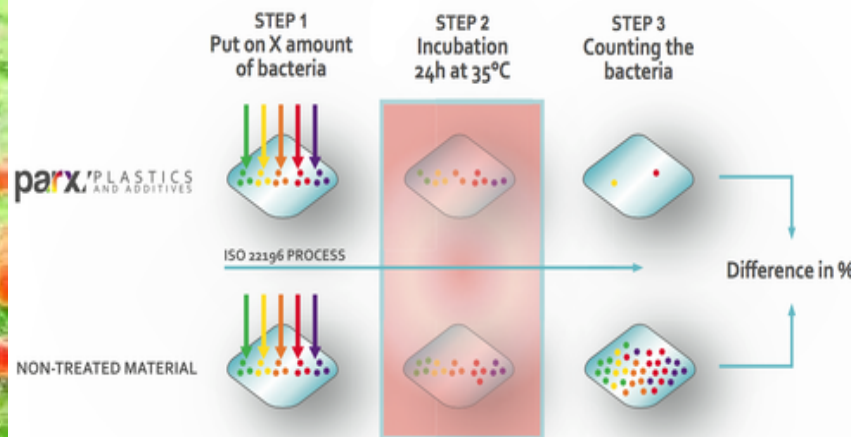
- **World's First Biocompatible & Non-Toxic Technology for Antibacterial Plastic**
- **No Heavy Metals, No Nano-Particles, No Biocides**
- **No Migration (Material in Contact with Food Regulations)**
- **Biocompatible: uses natural trace element Zinc**
- **No degradation**



Additives

Parx Plastics – Holland

- Unaffected by Light, Heat or Shape
- Up to 99% effective according to ISO 22196 & JIS Z 2801
- Non-toxic Substances: EU Approved



Coating: Biopolymers +

SINTEF: Norway

- Biopolymer with Nanoparticles
- Shelf Extension + Condition Alert
- Improved Oxygen Barrier
- Low Carbon Footprint
- 4 prototypes: 2 Rigid and 2 Flexible
- Sensors made of Nanocapsules with signal substance
- Signals can be hidden to alert only retailer



Coatings

Tufts University: USA

- Odourless, biocompatible, edible silk solution
- Naturally derived material and a water-based manufacturing process
- Fibroin: insoluble edible protein found in silk
- Crystalline beta-sheets in the coating
- 7 Days: strawberries coated with higher beta-sheet silk coating were still juicy and firm
- Bananas (ripen after harvest) Fibron coating reduced ripening rate
- slowing fruit respiration



Additives and coatings: natural solutions

Hexanal: International Research

- Canada, India, Sri Lanka
- Nano-technology
- 40% of Tropical fruit lost Post-Harvest
- Hexanal: Natural Plant Extract
- Additive & Spray
- Inhibits plant Enzymes
- Smart Packaging from Plant Fibres
- Slow Release of Hexanal in Storage
- Phased Crop Ripening possible with Spraying
- 15% increase in Crop revenues
- No Residues



Additives and coatings: natural solutions

Pullulan

- Edible film
- Water soluble polysaccharide with excellent film-forming and binding properties.
- Low permeability to oxygen
- Essential oils from Rosemary, Oregano with nanoparticles



Pads

Food Freshness Technology: UK

• *Its Fresh!*

- Filters the air to remove ethylene
- Reduces premature degradation and waste
- Increases natural disease resistance
- Works in all temperatures and atmospheres
- Safe, non-invasive simple to use



Barrier/Encapsulation

TERA – BARRIER FILMS: (Singapore IMRE)

- Nano inspired – encapsulated nano layer (700nm)
- High air and moisture barrier
- “10 times more effective than traditional materials”
- Alternative to alufoil



Coating & Encapsulation

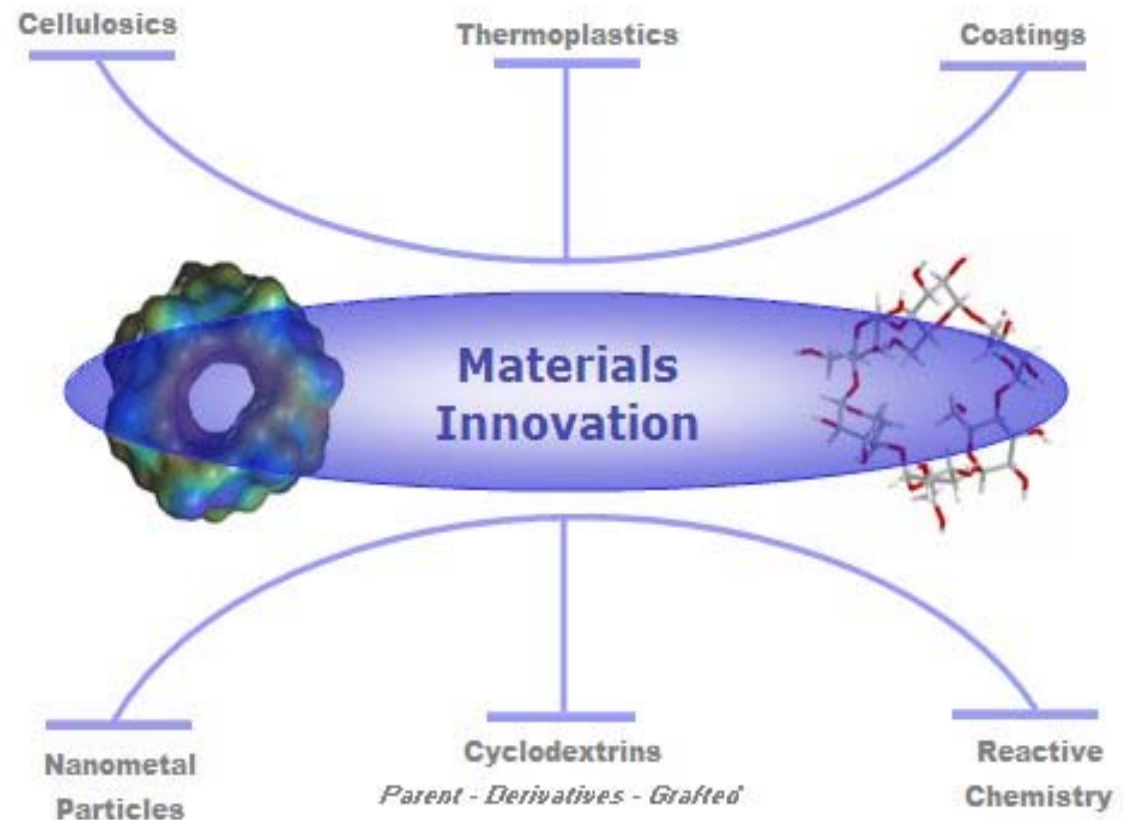
Cellresin: USA

- Flexible & Rigid
- Bottles & Caps
- Printed Cartons

•Cyclodextrins (CD):

Active Barrier/Scavenger

- Reduces odours
- Slows Ripening
- Extend shelf-life by removal of confinement odours



Traditional MAP: problems

Poor seals

Variable gas input (empty cylinders)

Wrong O2 levels

Needs regular online tests (analysers)

High barrier (expensive) films

Can look untidy

Poor shelf presence

Needs more packaging - trays



Vacuum Skin Packaging

Advantages of Vacuum/Skin:

- Substantial Increase in shelf life leads to reduced product loss
- Attractive, Clear Packaging that emphasizes the product
- Minimizes need for preservatives
- Minimize packaging material making it an affordable packaging option
- Eliminates freezer burn
- No oxygen degradation to 21 days on red meat
- Product can remain in date across two weekends extending opportunities to sell



BIGGEST GROWTH MARKET IN PROTEINS

Non-Invasive Solutions

Example: OPLON / REYNOLDS Group

- Coating for juice products
- Polyelectrolytes in polymer matrix
- Creates electric field on contact with liquid to disrupt cell membranes
- Non-toxic / inexpensive



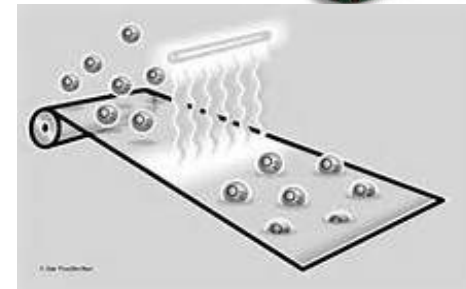
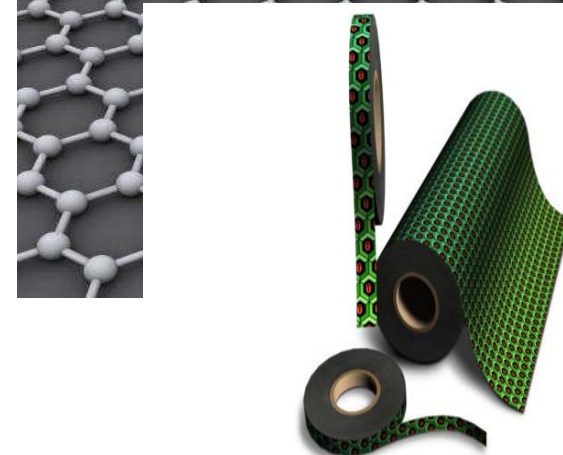
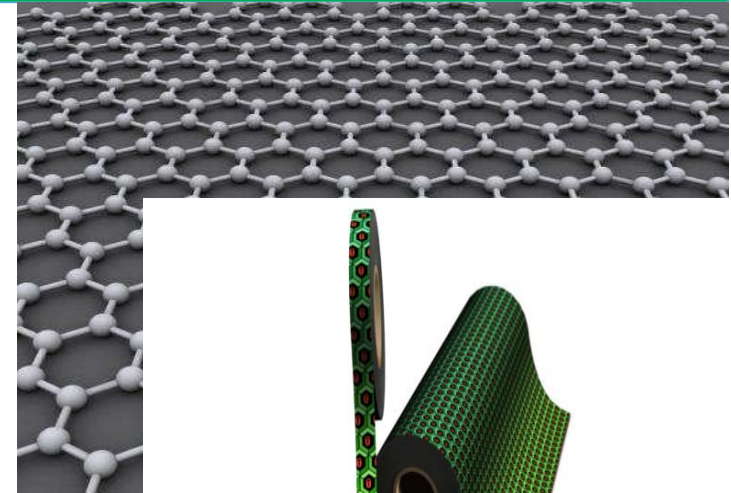
Other technologies

- **Laser / micro perforation**
 - produce can breathe
- **Natural compounds: Sugar Cane**
- **Making materials from natural substances such as Chitosan**



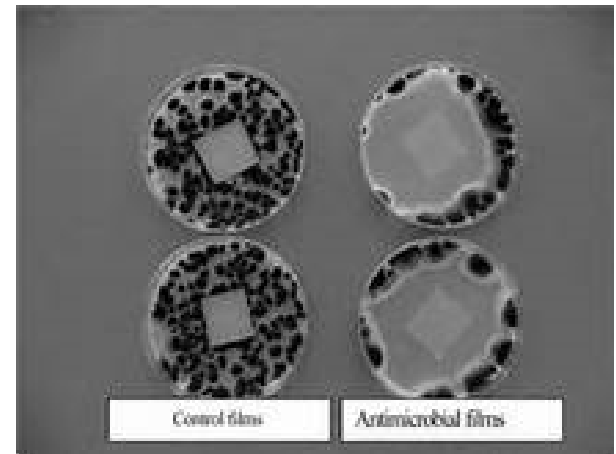
Some New Developments I

- **Graphene layer on film: Reduces water vapour transmission up to 1 MILLION times better than before. Chemical vapour deposition, using a simple and scalable process, transfers the graphene to a polymer film**
- **DuPont Izon 3D security film: utilizes imaging technology and the integration of overt anti-counterfeiting features directly onto product packaging or labelling.**
- **Novel oxygen scavenging system with natural phenolic compound : Pyrogallol is present in some fruits and possesses antioxidant and anti-bacterial properties. Possible to develop a coating for polymer substrates using the compound with sodium carbonate and water.**



Some New Developments II

- **Singapore (NUS):** successfully developed environmentally-friendly food packaging material free from chemical additives, by fortifying natural chitosan-based composite film with grapefruit seed extract (GFSE). This can slow down fungal growth, doubling the shelf-life of perishable food.
- **University Ca' Foscari, Venice, :** Start up company Crossing is developing innovative antimicrobial active packaging by deliberately and irreversibly attaching to the inner surface of packaging some preservatives and/or additives. Usually these components, present in most foods, drugs, cosmetics, are ingested or come in contact with the skin of users. This does not happen if the preservative is firmly “anchored” to the surface of the packaging.



AIPIA World Congress

Active & Intelligent Packaging by Design!

- Amsterdam November 14/15th 2016
- More than 40 expert speakers on A&IP (including the Brand Owners)
- Live demonstrations of some of the latest technologies
- The **ONLY** event to cover **EVERY** aspect of Active & Intelligent Packaging
- A **GLOBAL** event
- Information? www.aipia.info



New service



AIPIA CONNECT: share your A&IP project online at the AIPIA website to find the right solution

Contact Andrew Manly on
andrew@aipia.info



EuPC:
The Future of Plastics Packaging
Thank You For Your Attention!
Any Questions?

