Sustainable innovative materials and Technology transfer: new opportunities for F&B packaging

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Ljubljana.– 13th December 2013

BANANA

Bananas, raw

Nutritional value per 100 g (3.5 oz)	
Energy	371 kJ (89 kcal)
Carbohydrates	22.84 g
- Sugars	12.23 g
- Dietary fiber	2.6 g
Fat	0.33 g
Protein	1.09 g
Thiamine (vit. B_1)	0.031 mg (3%)
Riboflavin (vit. B_2)	0.073 mg (6%)
Niacin (vit. B_3)	0.665 mg (4%)
Pantothenic acid (B_5)	0.334 mg (7%)
Vitamin B_6	0.4 mg (31%)
Folate (vit. B_9)	20 µg (5%)
Choline	9.8 mg (2%)
Vitamin C	8.7 mg (10%)
Iron	0.26 mg (2%)
Magnesium	27 mg (8%)
Manganese	0.27 mg (13%)
Phosphorus	22 mg (3%)
Potassium	358 mg (8%)
Sodium	1 mg (0%)
Zinc	0.15 mg (2%)
Fluoride	2.2 µg

Link to USDA Database entry
Percentages are roughly approximated using US recommendations for adults.
Source: USDA Nutrient Database


BILLA
BILLA
BILLA

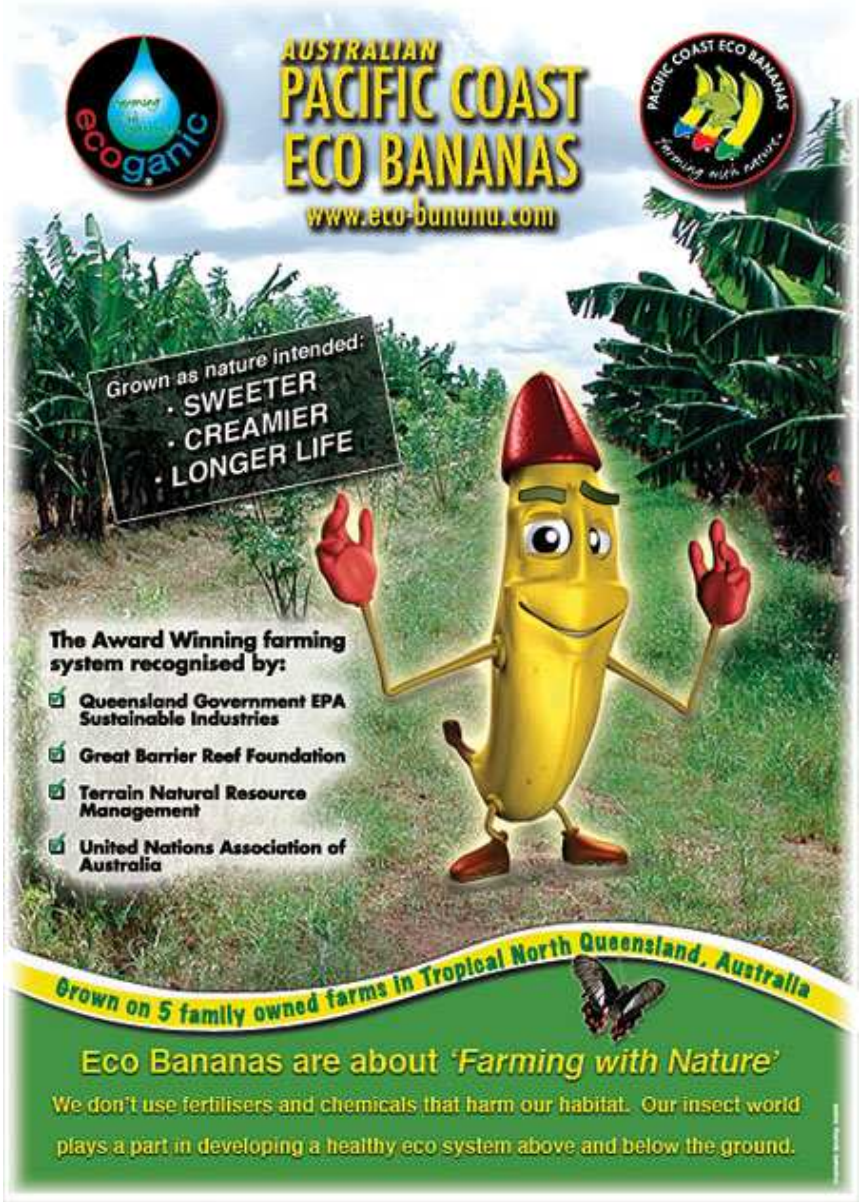
HOW TO INNOVATE?

BEST PRACTICE

The «better» BANANA

- **Party**
- **Weddings**
- **…**

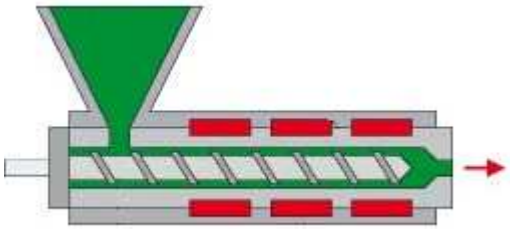
Sustainable Packaging



Communication

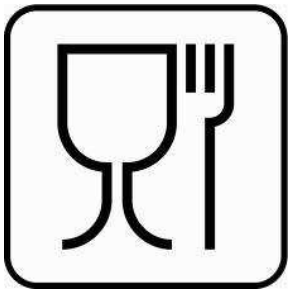
THE CHOICE OF MATERIALS…

- Material costs



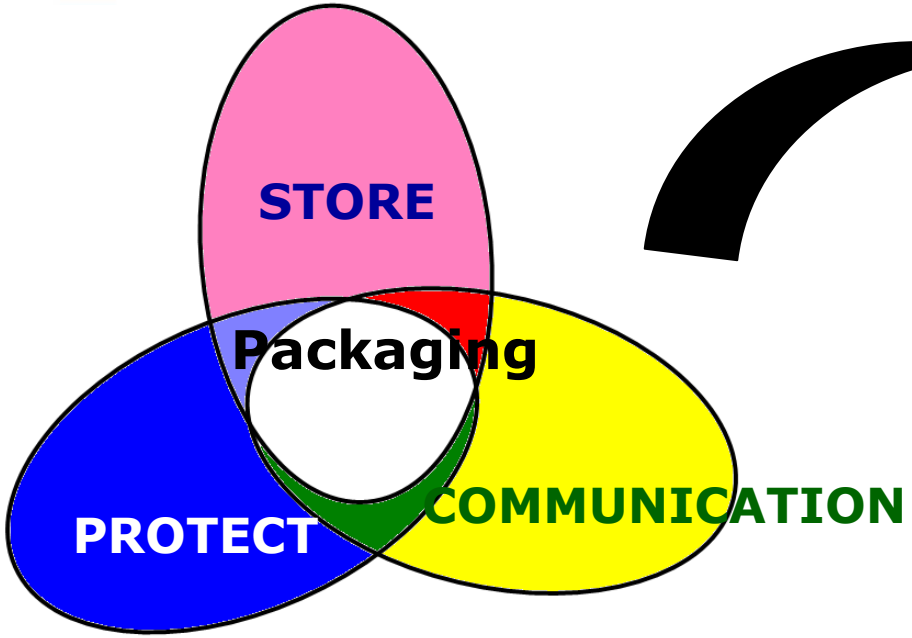
- The technologies involved in the working

- Compatibility with food contact



- Methods of transport

- Waste management



WASTE??

FOOD PACKAGING INDUSTRY

…a industry of one-way products and increasing waste products!

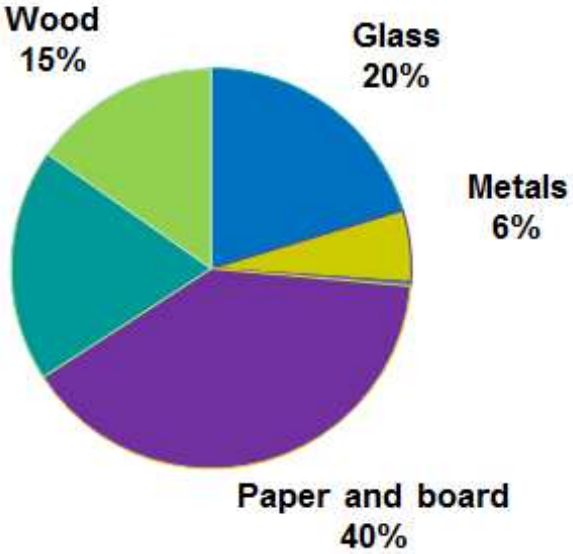
On the market

Facilities

Consumer

And the empty packaging?

It’s time to take some decision!



Source: Eurostat - Data Centre on Waste

LESS MATERIALS / RECYCLED MATERIALS

LESS CO2

EXAMPLES of PREVENTION

Reduction of the quantity of waste

*ECO*DESIGN

MATERIAL ⟺ SHAPE

Less plastic means weight reduction.

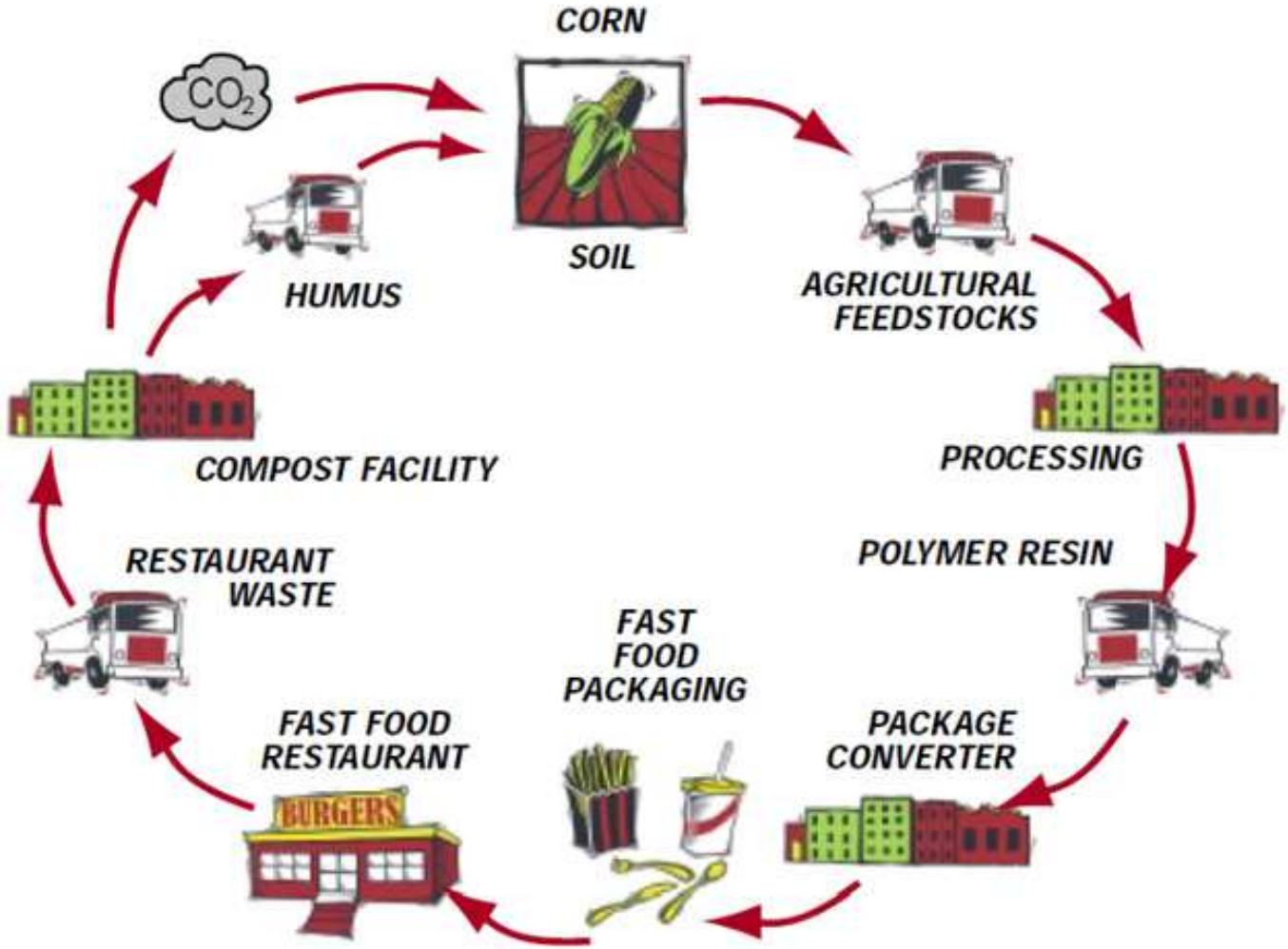
- Reduction of cost transportation
- Reduction of CO_2 emissions during transportation

EXAMPLES of PREVENTION

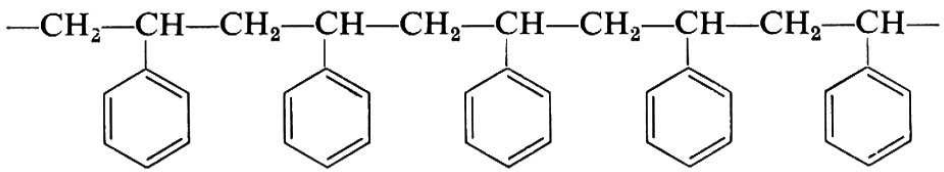
Reduction of the negative impacts of the waste product on the environment and human health
(Reduction of weight)

BIODEGRADABLE polymers allow for the use of natural resources and avoid petroleum waste

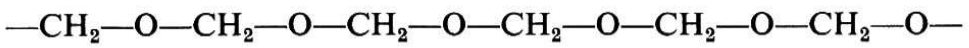
Biodegradable materials: materials that eventually break down into CO2, methane and water through the action of naturally occurring micro-organisms.

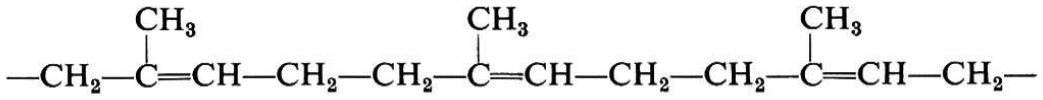


POLYMERS



Polyethylene (PE)



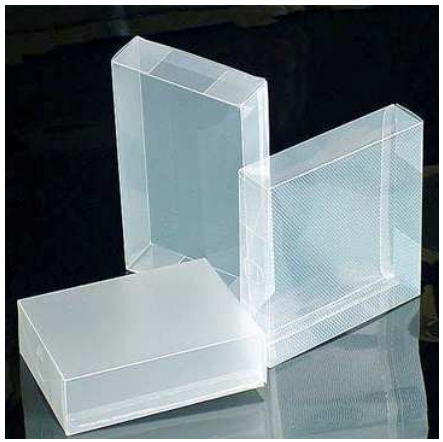


Polypropylene (PP)

Polyethylene terephtalate (PET)

Polystyrene (PS)

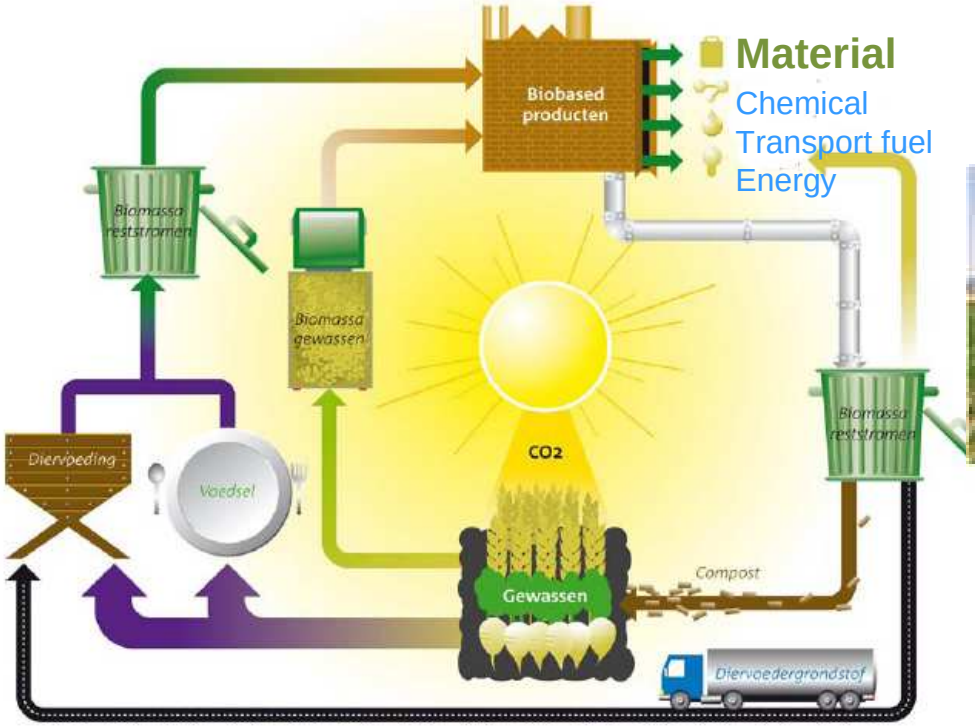
APPLICATIONS



BIO-BASED PLASTIC

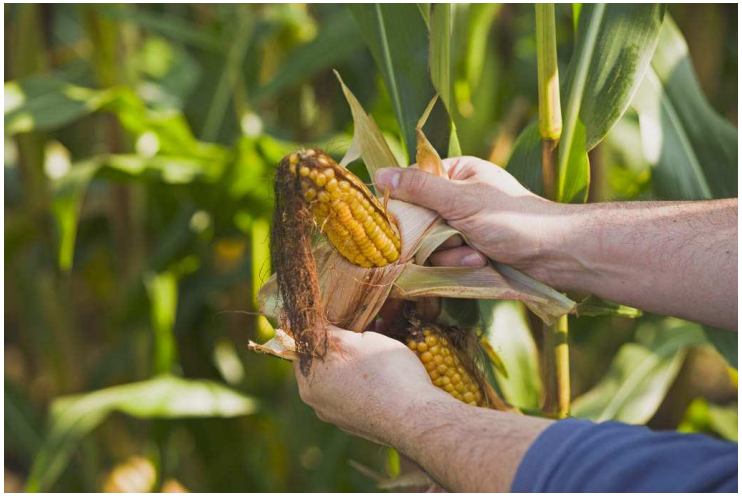
from

renewable ingredients / renewable biological resources / renewable raw materials



A bio-based material is a material made from substances derived from living (or once-living) organisms..Strictly the definition could include many common materials such as wood and leather, but it typically refers to modern materials that have undergone more extensive processing.

RAW MATERIALS



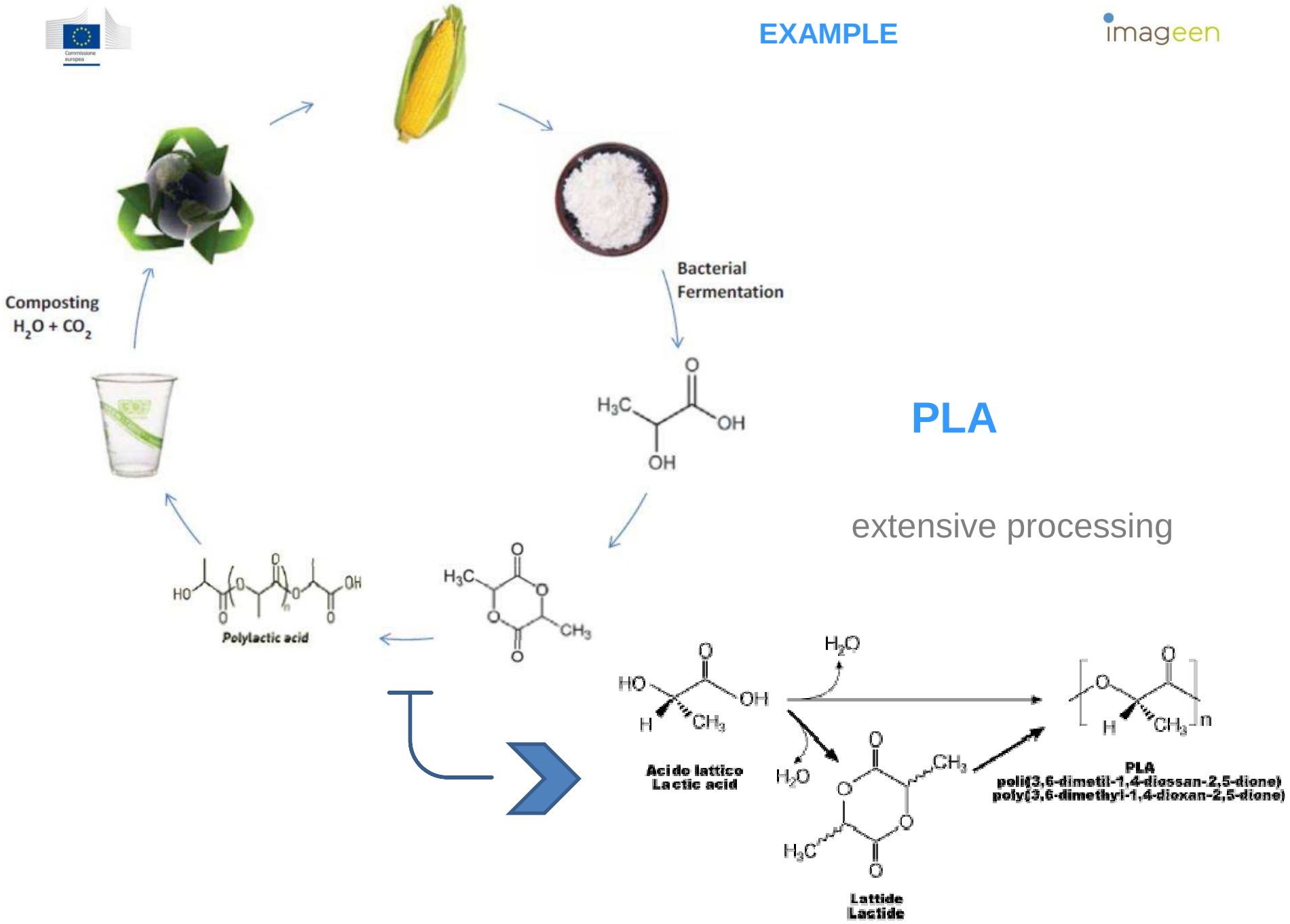
CORN STARCH

CASTOR OIL

SUGAR CANE

EXAMPLE

imageen



PLA

extensive processing

BIODEGRADABLE AND THERMOFORMABLE PLASTICS

Code NT6021

Properties

Bio-based
Biodegradable
Compostable
Recyclable
UV resistant
Hypoallergenic

Working Processes

Injection moulding
Thermoforming
Blow moulding

Biodegradable plastics whose components are derived entirely or almost entirely from renewable raw materials. Recent advances in research and technology have shown that these plastics can be made from abundant agricultural resources. They preserve non-renewable resources - petroleum, natural gas, and coal - and contribute little to the already burdensome problems of waste management. The primary commercial application of these plastics is in packaging and display trays. Biodegradable trays look, feel and function the same as traditional plastic trays except that biodegradable trays are made from renewable resources, and are almost entirely compostable when they come into contact with water. They are manufactured as flat sheet roll stock in a range of standard colours and gauges for industrial use. The standard colour range is natural, white, brown, black and gold. . Biodegradable finished products are priced competitively with plastic trays made from petrochemical plastics. Biodegradable trays are not subject to the dramatic price variations petrochemical products are exposed to. The material is suitable for dry foods packaging such as biscuit and confectionery trays, blister packaging, and trays for electronic components.

COMPOSTABLE FILM FOR FOOD PACKAGING

Code NT6046

Properties

UV resistant
Suitable for food contact
Compostable
Reduced emissions
Bio-based
Biodegradable
Transparent
Thermal insulation
Electrical insulation
Antistatic

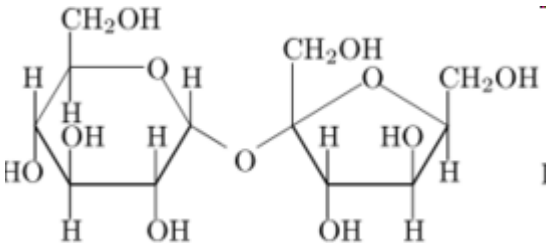
Working Processes

Lamination/coupling
Welding

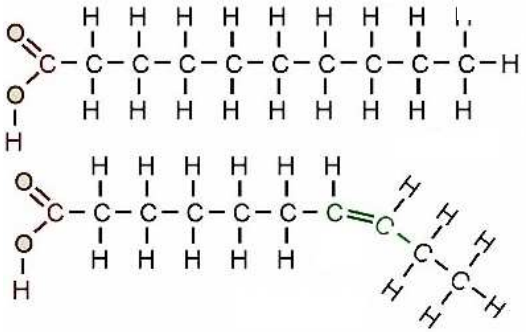
Compostable film made from renewable resources such as cellulose. This film meets the requirements of the European, American and Australian regulations for compostable packaging such as EN13432, AS4736 and ASTMD6400. They are available in various thicknesses from 20 to 50 microns in transparent, white, coloured and metallic versions. Because they have a heat sealable layer on both sides, they have excellent hermetic properties against the flow of gas and contaminants as well as good chemical resistance to oils and fats. There are also metallic versions available which provide increased barrier properties to gases, aromas and moisture. They are used in food packaging applications such as for snacks, cereals, cookies, chips, bread, and vegetables. They can also be treated to make the surface printable with common inks used in the packaging sector or with natural inks as well; in some cases they can be treated to make the surface anti-static. In order to maintain film quality it is recommended to store it in an environment with temperatures between 17 and 23 °C and rel ative humidity between 35 and 55%.

PLA e PHA

Bacillus Subtilis



CARBOHYDRATES

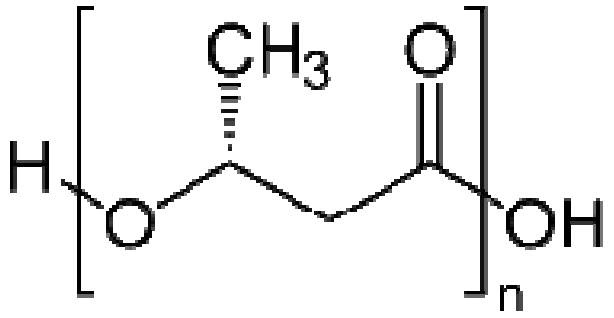


LIPIDS

MAIN TECHNICAL CHARACTERISTICS

Linear polyesther

- Termoplastic
- UV resistant
- low water absorption
- up to 70% of cristallinity
- Biodegradable (EN13432)
- Biocompatible



EUROPE	USA	USA	CHINA	JAPAN
EN13432	FDA	ASTM D 6400	BMG	GREEN PLA

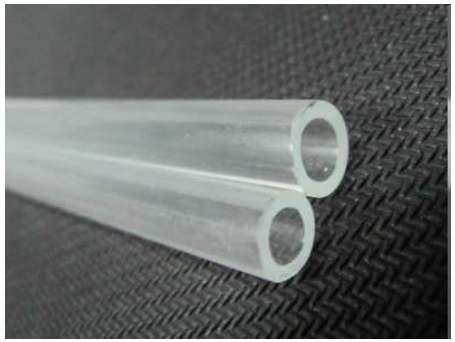
APPLICATIONS

FILM

SHEET

Injection moulding

Blow Moulding



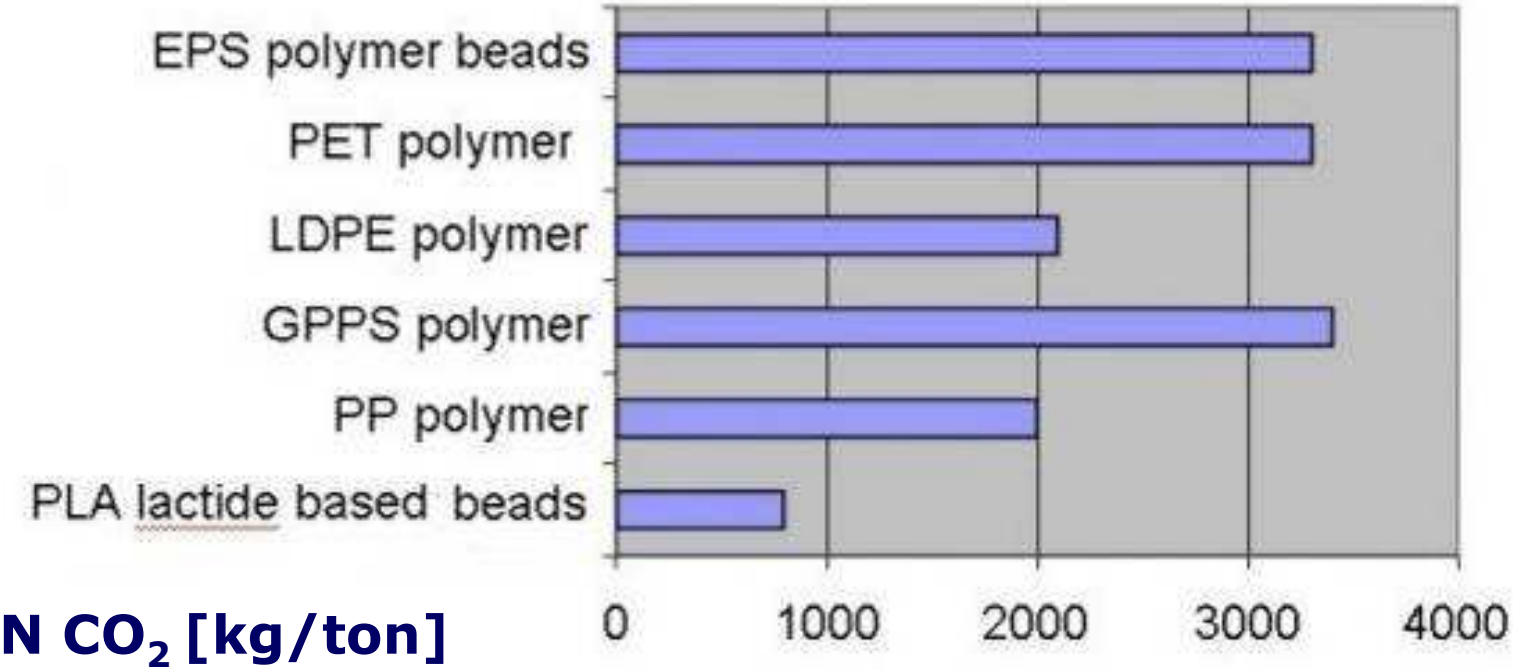
Bio-elastomers

Foams

Biodegradable FOAMS

From renewable resources

			EPS	
Thermal conductivity (MW/m·K)	35 g/l	34	33	30 g/l
Bending strength (kPa)	35 g/l	300	300	30 g/l
Compressive stress @ 10% deformation (kPa)	40 g/l	200	200	30 g/l
Compressive modulus (MPa)	40 g/l	4.0	3.0	30 g/l
Shear strength (kPa)	35 g/l	140	250	30 g/l
Shear modulus (kPa)	35 g/l	2.7	3.1	30 g/l
C-value (for drop testing) (-)	35 g/l	2.6	2.7	30 g/l



EMISSION CO_2 [kg/ton]

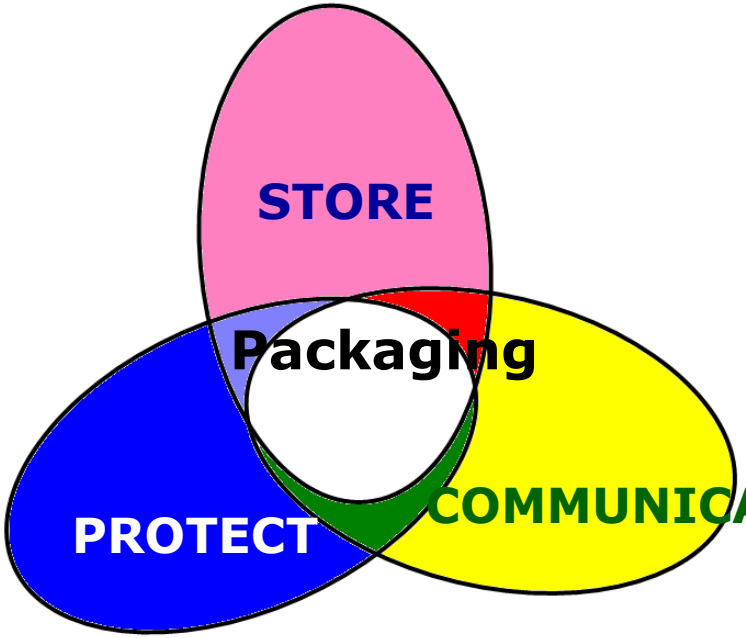
PACKAGING DERIVED FROM MUSHROOM MYCELIUM

Properties

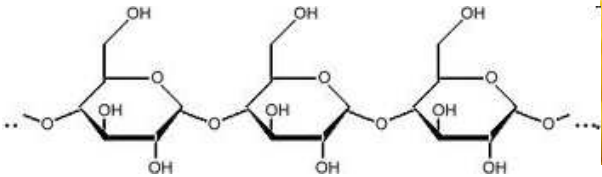
Thermal insulating
Soundproofing
Elastic
Impact resistant
Electrical insulation
Compostable
Recycled
Bio-based
Energy Saving
Biodegradable
Reduced emissions
Recyclable

Code NT6048

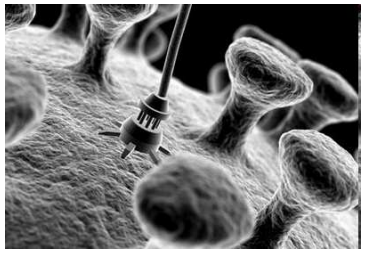
Mushroom-based packaging. This material is obtained from agricultural crop waste bonded together with mushroom “roots” (called mycelium), which represent the mushroom vegetative apparatus and appear with long white filaments. The mushroom mycellium, when put in a particular environment (indoor, in the dark, without water or petrochemical inputs), grows in 5-7 days and digests the agricultural byproducts, binding them into a structural soft material like a self-assembling glue. To stop the growth it is necessary to dehydrate and heat the system; this final process ensures that there will never be any spores or allergen concerns. This material, which is entirely recyclable and compostable, therefore offers the advantage of being able to assume any shape, given that it suffices to manage the growth of fungus within and/or around the object that has the desired form. For this reason it represents an excellent option for protective packaging made of natural materials. In contrast to traditional bioplastics, the technology which produces this natural material does not use agricultural products but rather takes advantage of leftovers from agriculture (e.g. rice hulls) or from industry (e.g. from the working of cotton). Moreover, if this process is compared with the one used to obtain expanded polystyrene, it is completely natural, **consumes 10 times less energy and produces reduced emissions in the atmosphere.** It is applied in packaging for electronic objects or for foodstuff (wine bottles, etc.).

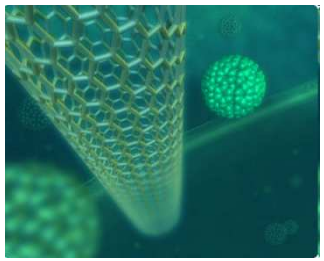


SUSTAINABLE



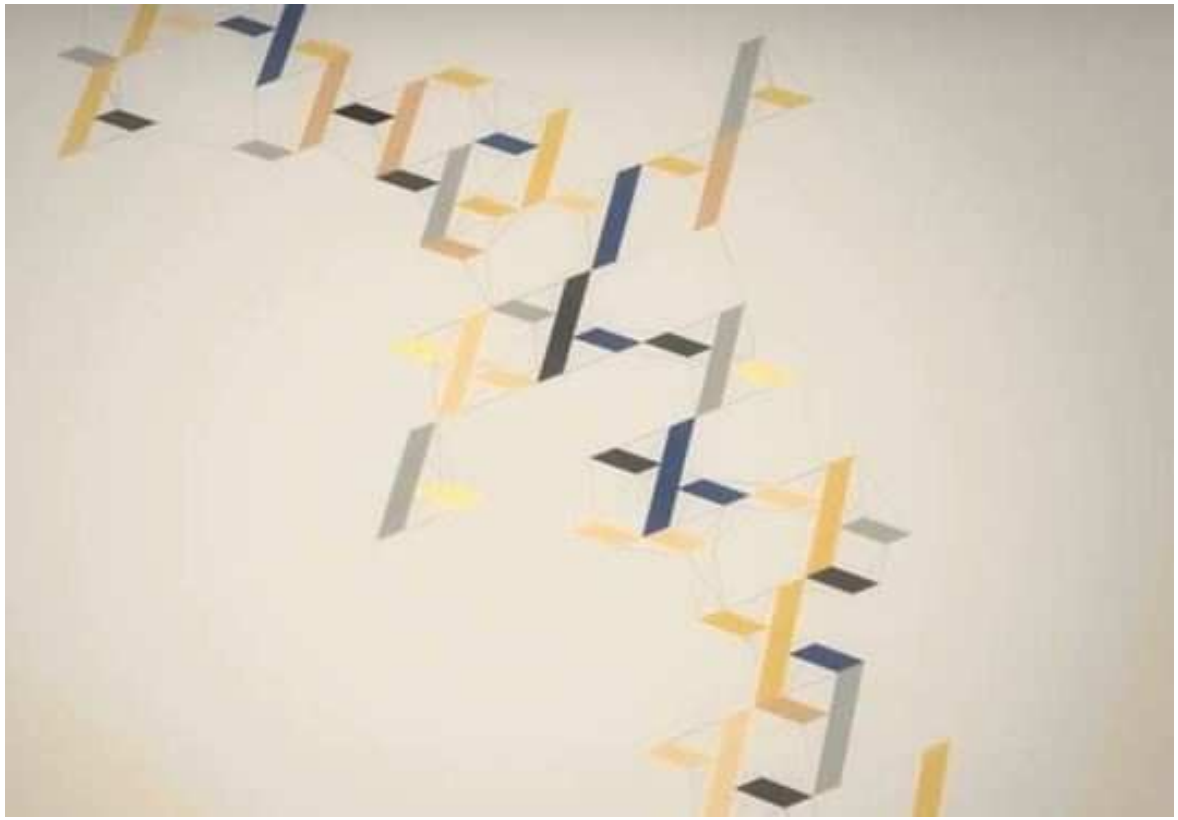
NANOTECNOLOGY





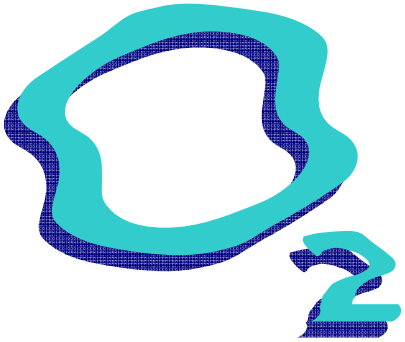
TO PROTECT/ TO STORE

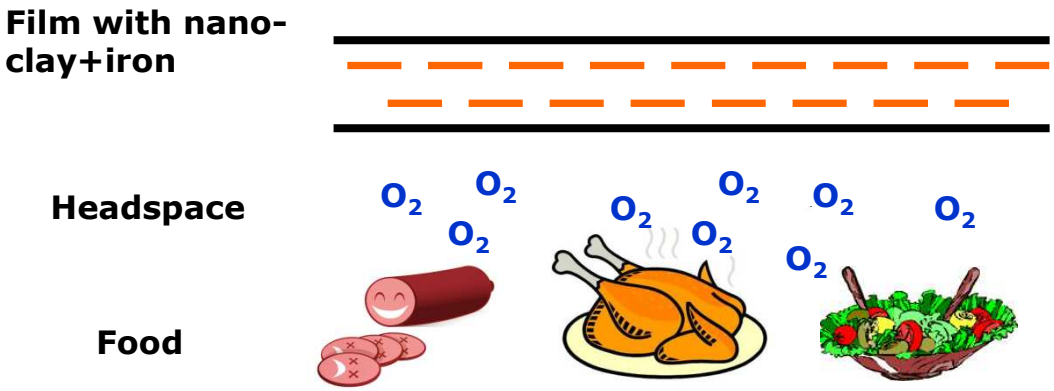
SMART PACKAGING



THE PACKAGING OF THE FUTURE

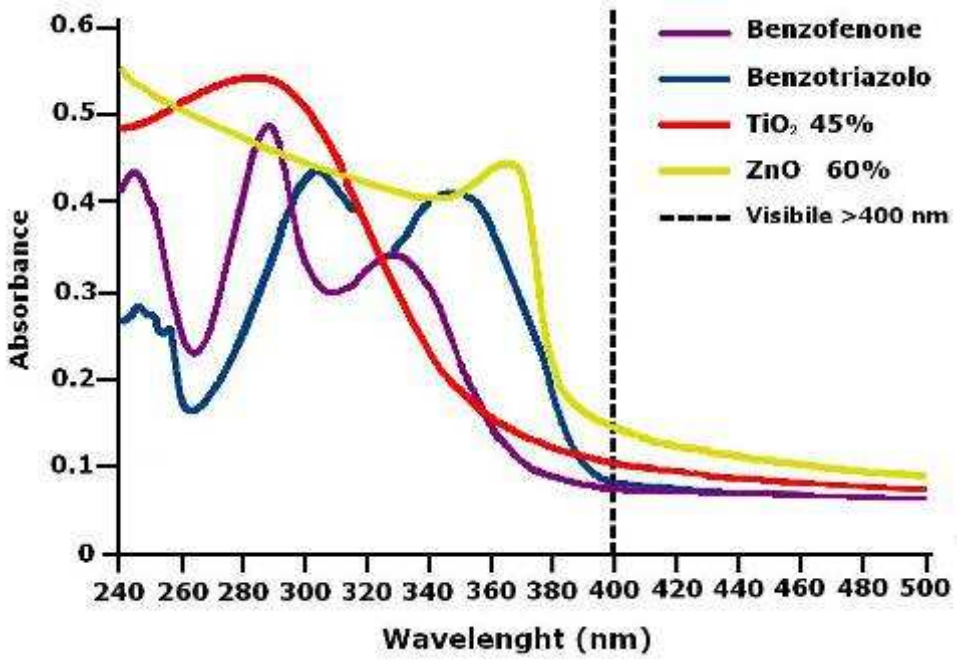
NANO-FILLERS





- LDPE, HDPE, PET, PLA and Others
- Antimicrobic with the addition of silver ions

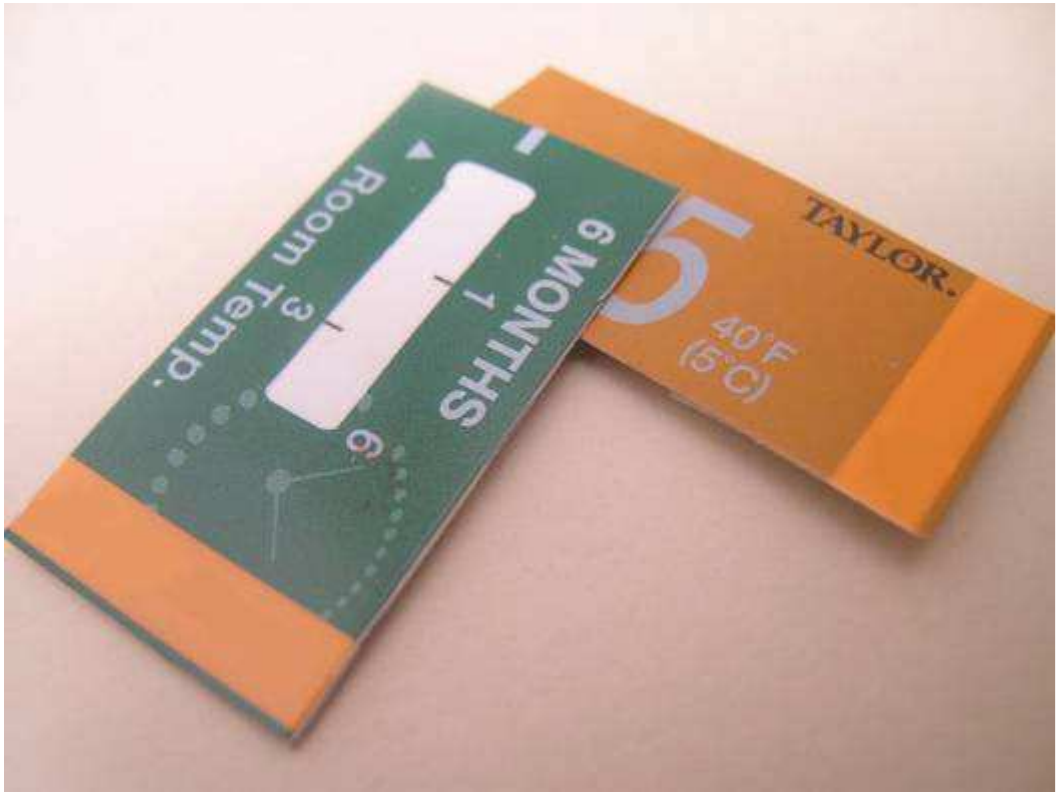
Inorganic (TiO2 – ZnO) UV radiations absorbers



- **suitable for food contact**
- **reversible reactions**
- **no yellowing**
- **optically performant**
- **available as dispersion powder or masterbatch (PE o PP)**
- **suitable for not polar polymers**

LIFETIME COMMUNICATION

From few minutes till years



A way to decrease food wastage

imageen

CUSTOM SOLUTIONS

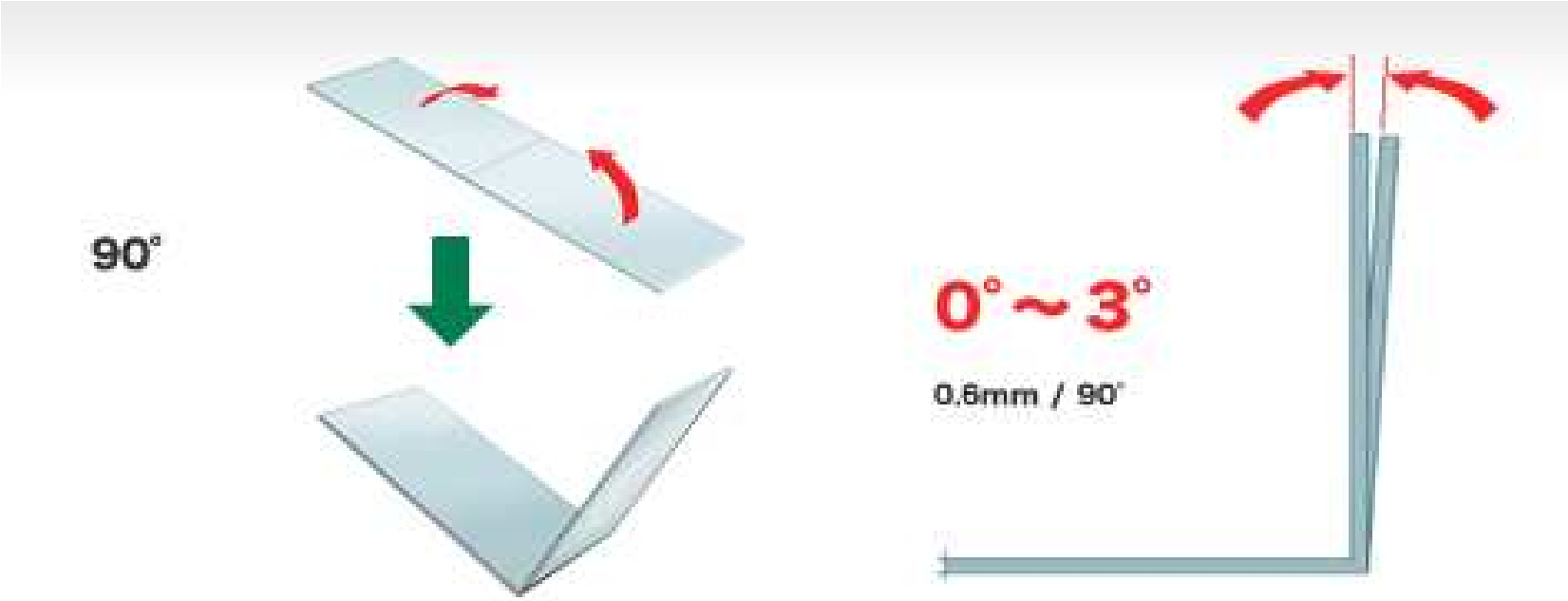
Monitoring TIME

Monitoring TEMPERATURE

TO MONITOR – TO INFORM – TO PROTECT

TO REMEMBER – TO PROMOTE

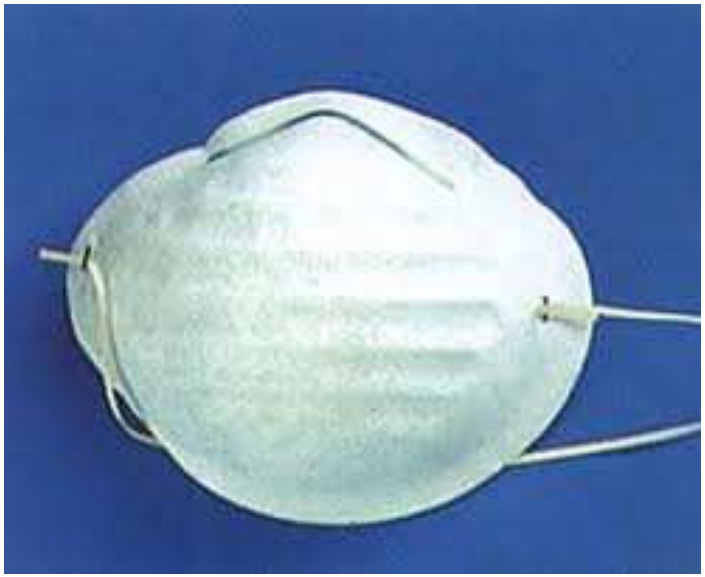
Shape Retaining Polymers



100% PE

Very small “returning angle”

APPLICATIONS



COMMUNICATION

COMPOSTABLE INK

- Vinçotte standard
- water or solvent-based
- no heavy metals
- the ink % depends on product kind

Certified materials + Certified ink → Design and product certification →

RECYCLED FIBREBOARD WITH WHITE MINERAL PRINTABLE COATING

Properties

Waterproof
Reduced emissions
Recyclable
Energy Saving
Recycled

ecofriendly

Code CP2137

100% recycled ‘eco’ fibreboard with a mineral surface treatment that makes the material white, glossy and well-printable. Its low environmental impact is due to the base material which is recycled (more than 35% is post-consumer) and also because the white mineral coating does not use chemical whitening agents, often applied in the paper industry which also leads to a more expensive product. The mineral coating makes the surface waterproof and also gives it good barrier properties against moisture, oils and fatty acids. This fibreboard can be die-cut, glued and folded using existing machinery and printed using standard offset, flexographic, digital and roto-gravure printing techniques. The surface treatment allows for photo-quality graphics and images comparable to non-recycled virgin material. This product is applied in packaging industry to make boxes and custom packaging.

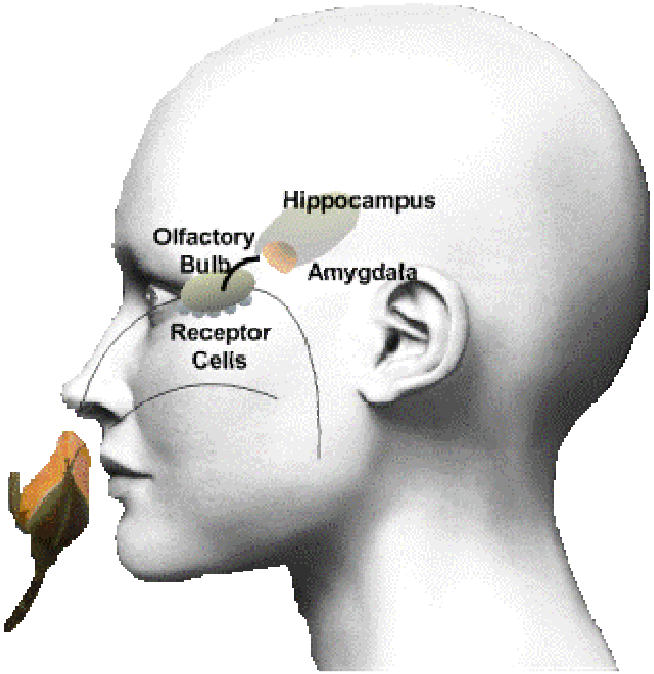
SMART PACKAGING

POLYSENSORIAL COMMUNICATION

marketing and olfactory perception : olfactory observatory

«Furnish the air»

Logos SMELL



MICROENCAPSULATED FLAVORS


cheese


ciocolate


cynnamon


cedronella


coffee


eucaliptus


apple


apricot


banana


garlic


nut


fish


yasmine


cabbage


lavender


barbecue


citron


chamomile


leather


lemon


mint


myrtle


oil


orange


peach


pear


pine


strawberry


rose


rosemary


sage

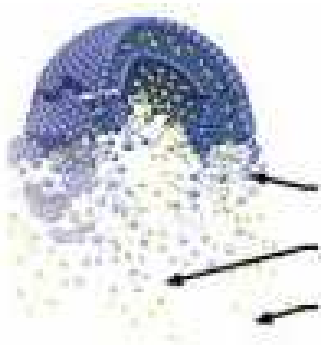

mandarin


rubbish


vanille

…NANO - ENCAPSULATED ingredients

nanomat

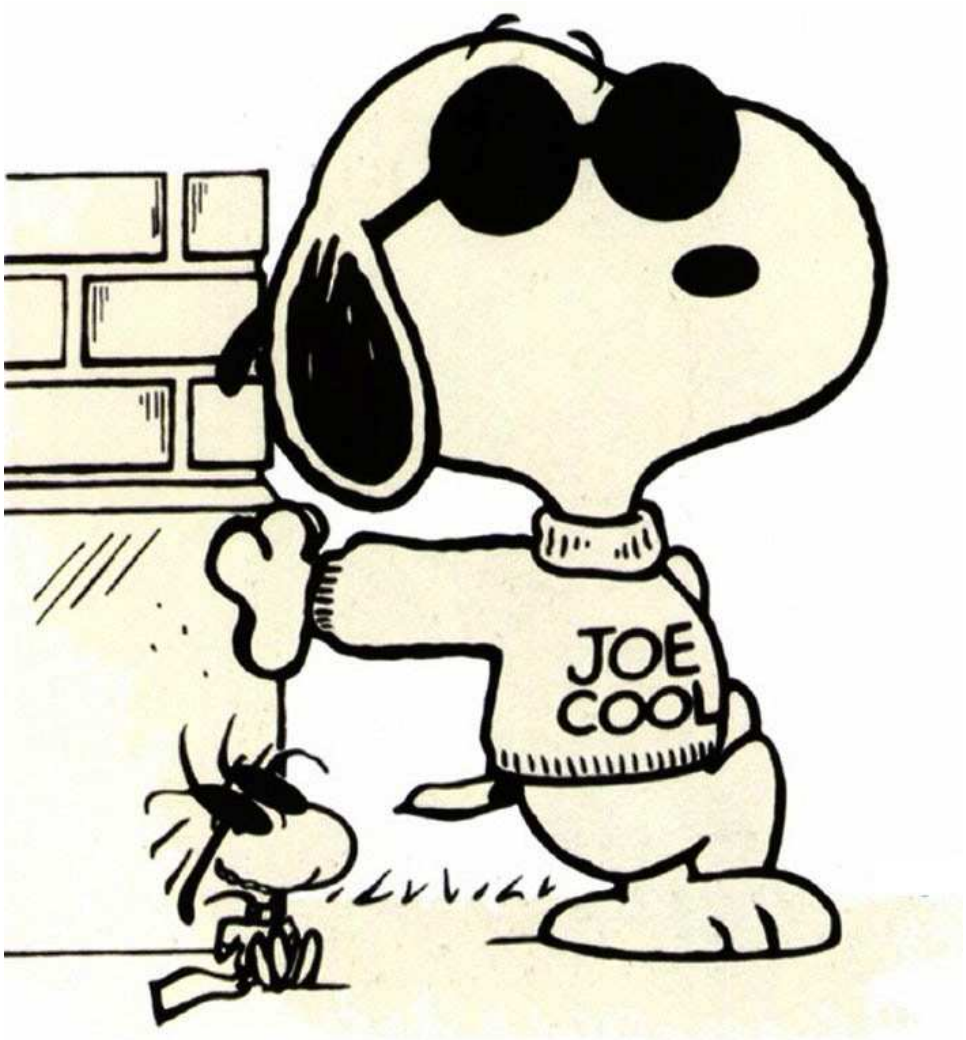


- Encapsulation of active and therapeutic ingredients - PATENT
- High efficiency
- Able to protect from physical stimulation induced by light, heat, pH
- High solubility and compatibility with peptides, nutrient ingredients and healthy products

…FROM COSMETIC…

…TO FOOD…

NEW LOOK



FLEXIBLE WOOD

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THANKS !

Galileo
PARCO SCIENTIFICO E TECNOLOGICO

PADOVA