Bio coating

a sustainable solution for flexible packaging

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Managing Director
Metalvuoto produces approx. 4000 tons/year of metallised films and 1300 tons/year of water-based coated films for food and industrial packaging.
The SAES Group is present in the world with twelve manufacturing facilities, distributed across Europe and the United States, and has an active sales and technical service network on a global scale, with a workforce of about 1100 people.
Thanks to the entry of SAES Group in Metalvuoto S.p.A., we are discovering **new synergies** in the combination of patents and knowhow from SAES Getters & our experience in the flexible packaging market & technology introducing a **new generation of functional coatings**
Sustainable Development

Social

Economical

Environmental

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs [40].”

G. Buntrald, 1987
Metalvuoto in the direction of sustainability

- From multilayers to monomaterial
  - same performances
  - recyclability

- From standard plastics to bioplastics
  - adding barrier performance by coating
Functional Coatings: value proposition

- Process simplification
- Eco-sustainability
- Taylor made properties

**NOW**
- Barrier properties thanks to the combination of many layers

**NEXT**
- Only one coating with the same properties of many layers with a considerable reduction of the thicknesses
Active Materials

Functional Elements: (nano)zeolites technology platform
The Perfect Fit for Flexible Packaging

- Perfect product to packaging ratio
- Perfect “light weighing” performances
- Perfect adaptability to protect, while delivering convenience and portioning
- Perfect performance, giving optimum protection for valuable goods
- Perfect flexibility to meet the needs of a society that is continuously evolving
- **Multiple end-life solutions, minimising waste end ensuring optimised recovery**

“Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away”

Antoine de Saint-Exupery
Multiple end-life solutions

- Biowaste Bags
- Packaging
- Injection Moulding product
- Coating extrusion

Biowaste Bin → Home compost → Green dot system → Paper bin → Domestic reuse

Organic Recycling
- Industrial Composting
- Anaerobic Digestion

Mechanical Recycling

Disposal (Incineration, landfill)
- PLA
- Starch
- Blends
- Cellophane
- Chitosan
- Alginites
- Pectins

Biogas

Renewable → PLA → Biodegradable → Fossil

not biodegradable
- Why PLA among other bioplastics?
- Can be processed with a large number of techniques
- Commercially available on large scale in a wide range of grades
- Reasonable prices
- Functional properties to fulfill different applications

- 1932: Carothers (DuPont) created PLA
- 1954: DuPont patented Carothers’ process
- Extremely high cost of production
- 1997: Cargill Dow Polymers LLC forms
- 2001: 300 million pounds produced at the Blair, Nebraska plant

Starch $\xrightarrow{\text{Hydrolysis}}$ Dextrose $\xrightarrow{\text{Fermentation}}$ Lactic Acid $\xrightarrow{\text{Polymerization}}$ PLA
BioPlastics: VALUE PROPOSITION

Packaging Dis-functional Trends (Recyclability, Weight reduction, compostability)

- Bioplastics
  - PLA
- Plastics
  - Containment
  - Barrier
- Glass, Metals, Paper

Packaging Functional Trends

- Active
- Dynamic Control
- Reactive

Sensors
PLA: BARRIER PROPERTIES

- BOPP
- PLA
- PET

O$_2$ TR - 23°C 0% R.H. [cm$^3$ m$^{-2}$ day$^{-1}$]

WVTR - 38°C 90% R.H. [g m$^{-2}$ day$^{-1}$]
Our sustainable solutions

... creating a film coated (and eventually metallized), with high water and Oxygen barriers, with heat sealable performance

It is a combination of peculiar metallisation technique enhanced by plasma activation system & barrier coating
Propylester PLA

Metallization

Oxaqua® coating

BOPLA layer
- Can be certified as **Compostable**

- Can be certified as **Recyclable** with paper (ATICELCA MC 501/13)

- **Gas Barrier**:
  - Oxygen < 0.75 cc/m²x24h
  - Water Vapor < 2.5 g/m²x24h
Some examples

PLA coated with high Oxygen barrier
- **Packaging simplification**, with brands looking to move from complex multilayer laminates to simpler packaging solutions without compromising shelf life.

- The Propylester PLA film allows a **2 layers pouch** with performance matching that of prior 3-layers pouches without AL foil.
Propylester PLA solutions

**Before**

Fossil based 3-film structure

- Paper
- Aluminium
- LDPE

**Today**

100% biobased 2-film structure

- Paper

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Today we are re-thinking packaging
Sustainability for the Future

Packaging concept innovation

**Passive Barrier**
- ✓ Oxygen Barrier
- ✓ Oxygen Barrier outstanding thermal processing (sterilization, pasteurization)
- ✓ Combine $O_2$ TR/WVTR barrier packaging
- ✓ Transparent Water vapor barrier

**Active/Reactive**
- ✓ Ethylene Scavengers
- ✓ Off-odours scavengers

**Biopolymers**
- ✓ PLA
- ✓ Alternative to fluorinated compounds
- ✓ MOSH/MOAH

**Membrane**
- ✓ Selective coating for dynamic control of MAP

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...together for re-thinking packaging

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