



Guala Closures Group

**THE FUTURE OF PACKAGING:
Recycling and smarter materials**

Sustainable packaging – the possible paths

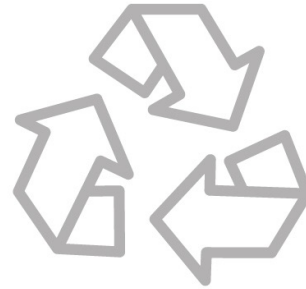
Materials represent a fundamental variable for product's sustainability.

There are three paths that can be followed when choosing a material with a focus on sustainability:



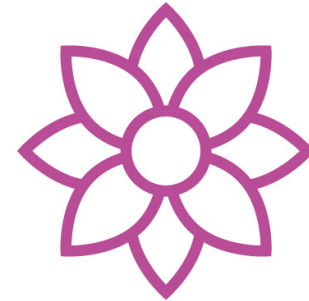
LESS

Technical solutions
for a lower impact at
production



LONGER

Designs easy to be
recycled and make a loop



SMARTER

Innovative polymers with
advantages at beginning
and end of life

FIBRE FILLED RESINS

A CIRCUAL ECONOMY SOLUTION

Using waste to reduce the amount
of polymers used



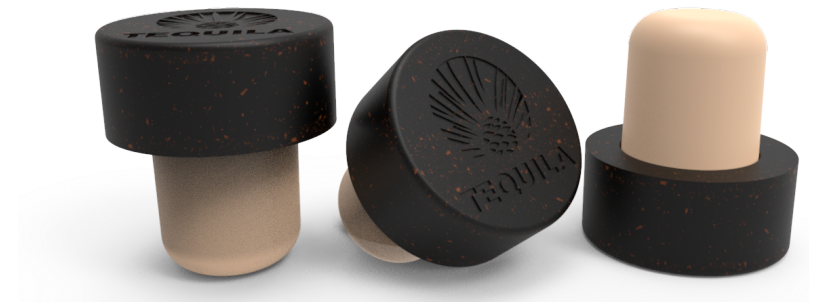
GUALA CLOSURES DEVELOPED COMPOUNDS 70% POLYPROPYLENE 30% AGAVE FIBERS:

- Value to other industries' waste
- Reduced amount of virgin plastics
- Reduced carbon footprint



THE NEXT STEPS:

- 60% wood fibers from internal process
- Recycled polymers instead of virgin



From PP to fiber filled PP



BISIO PROGETTI COFFEE CAPSULES

ENHANCING TECHNICAL POLYMERS

Combining product engineering and material properties
Weight is reduced, keeping the same performances

Bisioprogetti
— a Guala Group company —

The new Nespresso® Compatible capsule:

- Is lighter thanks to a proper redesign featuring polybutylene terephthalate
- Is compatible with existing filling machines
- Uses material with higher MFI (*) to make easy the filling of the mold cavities with a thin wall thickness
- Keeps a good OTR(**) to guarantee a proper level of barrier against oxidation of the coffee inside the capsule

(*) MFI = Melt Flow Index

(**) OTR = Oxygen Transmission Rate

To bring this solutions to the next level: the modification will be implemented on all the NC PBT existing moulds and will allow to save about 20% of the plastic used for the production.



From PP to PBT
(Polybutylene
terephthalate)



RECYCLABLE CLOSURES

RECYCLING THE CLOSURES,
THROUGH TWO DIFFERENT PATHS

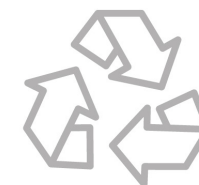


GREENCAP

- Packaging easy to be separated by the consumer, improving recycling rates
- Fundamental in countries where recycling norms are very strict, like Japan

WAVE

- Safety recyclable closure, made 100% with PE, through our recycling stream
- Collecting bottles and closures through return policies, preventing counterfeiting and enhancing recycling



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RECYCLABLE POUCHES

IMPROVING RECICLABILITY OF
MULTILAYER POUCHES



GOGLIO TOOK A STEP FORWARD TOWARD RECYCLING

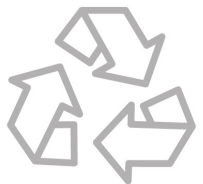
- Switching to mono-material solution to enhance recyclability
- Exhaust valve made in the same material as the bag
- High barrier performance keep unchanged, thanks to surface treatments (like plasma or the exclusive barrier lacquering from Goglio) and the combination of same family materials



Multi-material (PET, Alu, PE)
Multi-layer



Recyclable
mono-material (PP)
Multi-layer



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RECYCLED PLASTICS



A SMALL CHANGE FOR A
SIGNIFICANT IMPACT



The use of recycled plastics is especially successful in UK market, due to consumers' request and plastic tax

A STRONGER MESSAGE

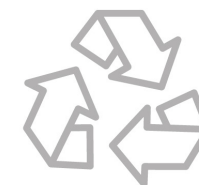
Using recycled Ocean Plastics is a step forward in our commitment to the planet and the people provided by Oceanworks

Issues:

- Restricted availability for large industries
- Not idoneous for food contact
- Medium mechanical properties
- Very high costs on high quality products



From ABS/PP to
rABS/rPP/ocean PP



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BIOBASED POLYMERS

Use biobased plastics for all of our components, keeping performance unchanged



THE USE OF BIOBASED PRODUCTS ALLOWS GUALA CLOSURES TO

- Reduce closures' impact
- Have no limits related to food contact regulations

Issues:

- Materials availability
- Costs



From PE to bio-PE



SMARTER

BISIO PROGETTI COMPOSTABLE COFFEE CAPSULES

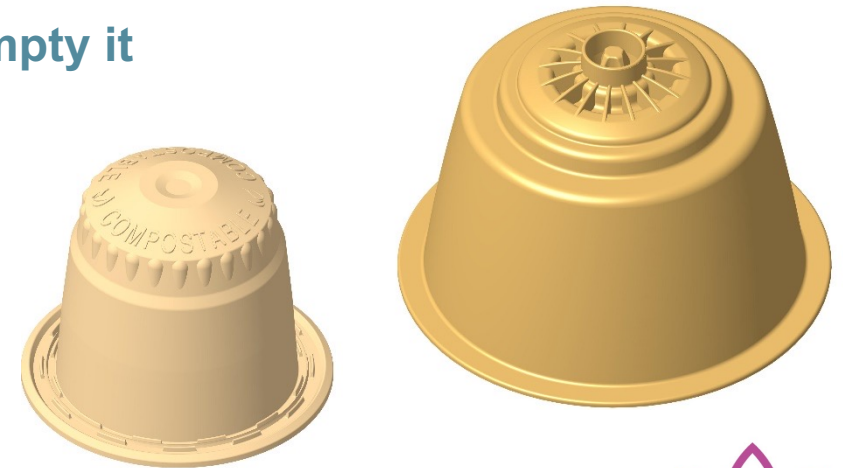
Introducing compostable materials for Dolce
Gusto® and Nespresso® Compatible capsules

Bisioprogetti
— a Guala Group company —

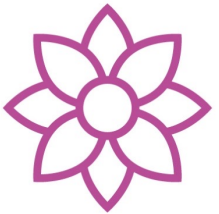
Compostable material is a good choice for coffee capsules
The organic content inside the capsule (coffee) can be managed
together with the capsule in its end of life, without the need to empty it

Issues:

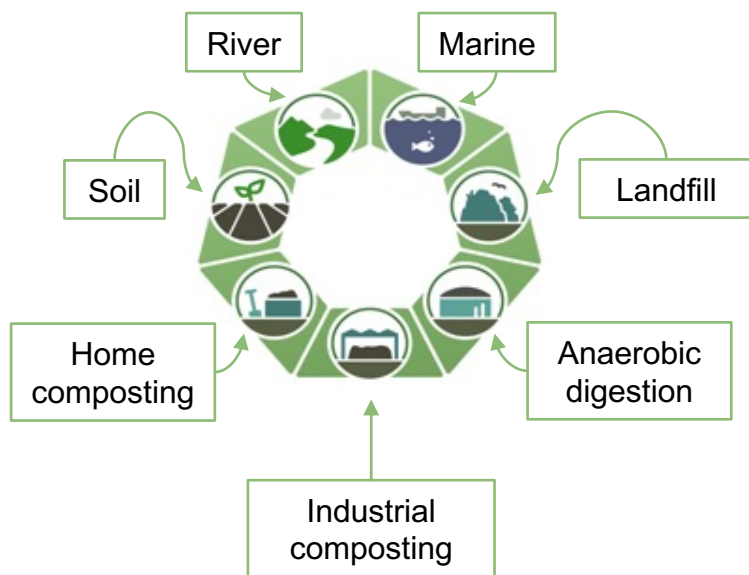
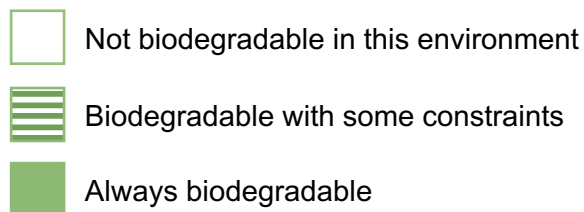
- Not every industrial composting plant treats the capsules (due to complete composting timing)



From PP to PLA



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Only cellulose, PHB and starch are fully biodegradable in every environment.

Polybutylene succinate



Polylactic acid



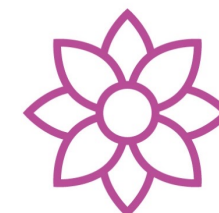
Polybutyrate



Polybutylene succinate adipate



Polyhydroxy butyrate



SMARTER

BIODEGRADABLE POLYMERS

Using natural polymers, making a
loop from nature to nature



GUALA CLOSURES IS DEVELOPING INNOVATIVE SOLUTION BASED ON INNOVATIVE MATERIALS

- Completely biobased
- Biodegradable in every condition

Issues:

- Very low materials availability
- Very high costs currently
- Lack of related know how
- End of life stream not ready



From PP/ABS to PHB



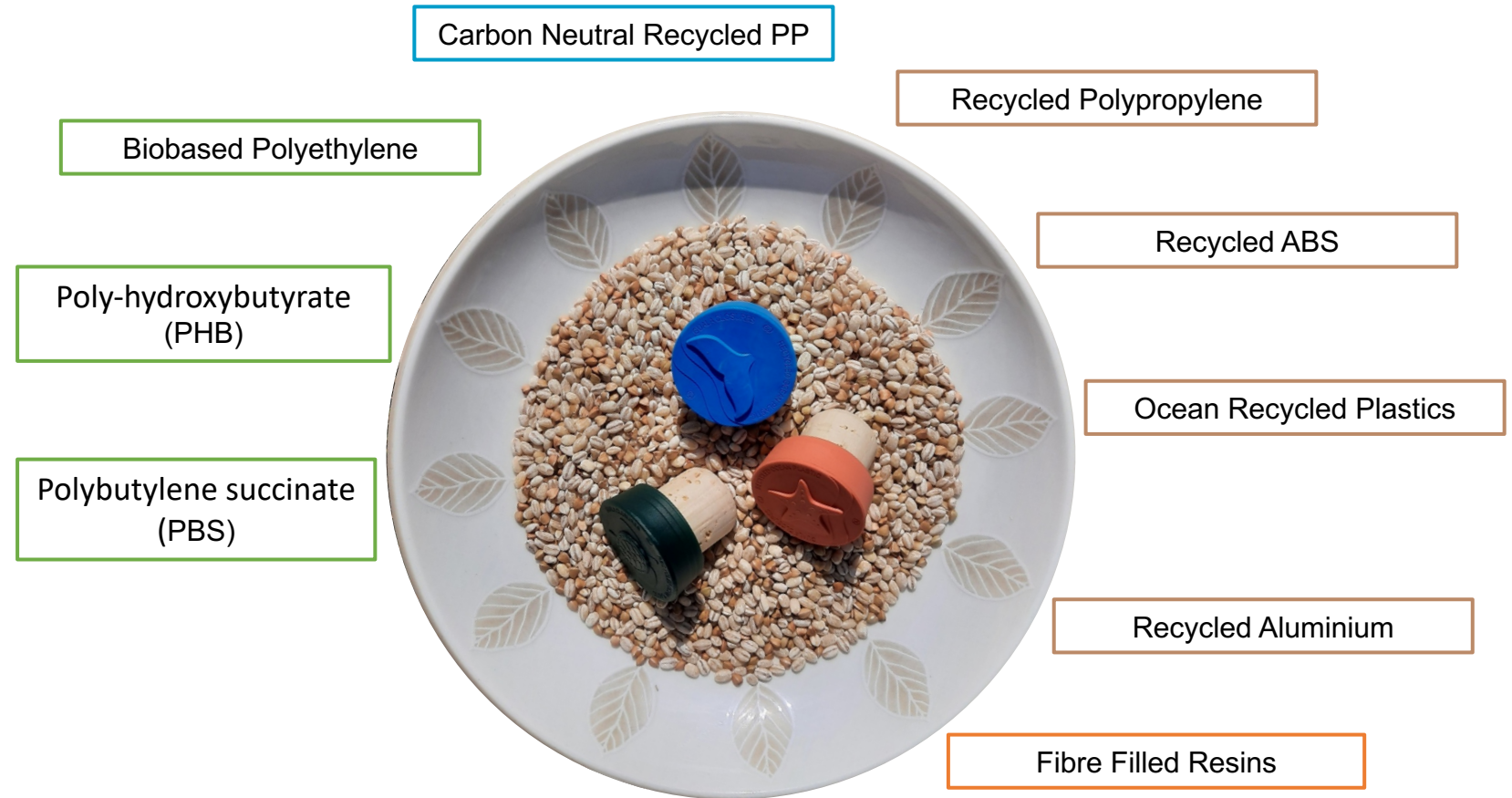
Sustainable Materials – More to come

We are studying several sustainable materials, we are ready to join our forces with you to create the packaging for a sustainable future.

We believe it is possible to create packaging with a low environmental impact;

the key actors in this development are:

- Suppliers
- Customers
- Consumers
- Recyclers
- European legislators



Together, we will shape the future!



Thank you!