New biobased waterborne barrier coatings for paper alternative to plastic

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Lamberti expertises & solutions

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The technology behind barrier coatings

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Waterborne Biobased for paper alternative to plastic

Our technological expertise

Natural polymers
carboxymethyl cellulose
and hydrocolloids

Waterborne
synthetic polymers
acrylic and polyurethanes

Oleochemicals
and fatty derivatives

Polymer beads
acrylic and polyurethanes

Hydroxyapatite

Active ingredients
for cosmeceuticals

Global Presence

Surface Treatment Markets: Sustainability targets

- Reduce the climate change impact: CO_2 emissions
- Avoid introduction of fossil Carbon and extend life of treated articles
- Reduce waste and impact on natural resources: water and microplastic
- Avoid toxic and polluting impurities releases (VOC, RSL, SVHC)

Packaging materials challenges

Materials characteristics:

- Diverse material structures and performance: Cellulosic vs Plastics
- Diverse manufacturing processes: laminations, thermosealings, coatings, printability
- Shelf life and durability of goods, barrier performance, vapour, moisture, gas, inks, oxigen

Environmental challenges:

- Persistence in the environments: PFAS free, Microplastics
- Reduction of impact on climate change, LCA and Product Environmental Footprint
- EcoDesign: reuse, recycle, biodegradability or compostability as ultimate option

Paper as alternative to plastic:

- Paper-based materials are considered eco-friendlier because they can be biodegradable, compostable and recyclable

- The transition from plastic to paper packaging needs innovative surface treatment solutions in order to improve their barrier properties

- Paper based materials must be treated with coating technologies to perform durability and integrity of the goods contained

When paper is the solution,
it cannot become plastic again!

Barrier coating technologies
Biobased and Plastic definition

Bio based content EN 16785:2

100 %

Biobased polymers:
PLA, PHA

50 %

Waterborne
Acrylics_Polysaccharides,
PBS derivatives

Coatings extrusions
Acrylics waterborne
Olefin

0 %

Natural Waxes,
Natural extracts,
Starch,
Caseine,
Polysaccharides

Natural polymers that have not been chemically modified are exempt from the directive.

Target requirements for Barrier Coatings products

- Free of PFAS
- Food Contact Compliant
- Don’t influence Biodegradability or Compostability and Recyclability of paper materials
- Barrier to:
  - Water,
  - Oil & Grease,
  - Hexane, MOSH, MOAH
- Heat Thermosealabe
- No Blocking
- Plastic free

The Challenge:
Biobased waterborne barrier coating for paper alternative to plastic

Waterborne Product Evaluated

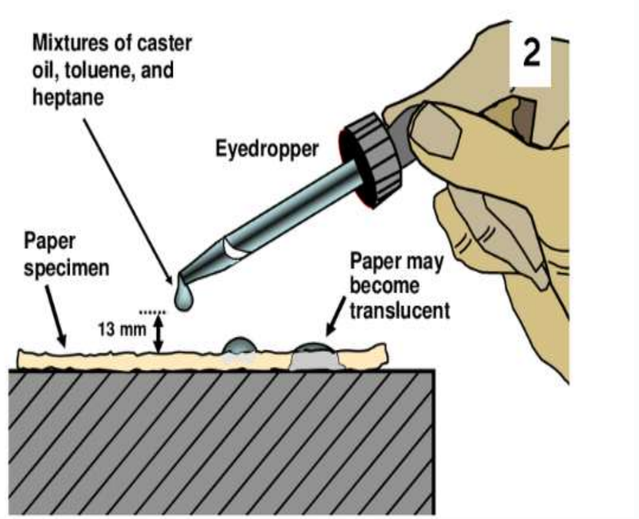
Product Name	Technology	Biobased %	Main Features
WB Olef	Ethylene copolymer	0%	Water repellency & Heat sealable
WB AC_1	Acrylic	0%	Good Water repellency
WB AC BIO 1	Acrylic_Polysaccharide	25%	Medium water repellency, High Oil barrier
WB AC BIO 2	Acrylic_Polysaccharide	50%	Medium water repellency, High Oil barrier
WB BIO 3	Polysaccharide in water	65%	Good Oil barrier easy to be used in coatings
WB BIO 4	Bioplastic (Confidential) in water	65+%	Biobased Plastic with good biodegradability/Compostability
Natural 1	Polysaccharide	100%	Good Oil barrier

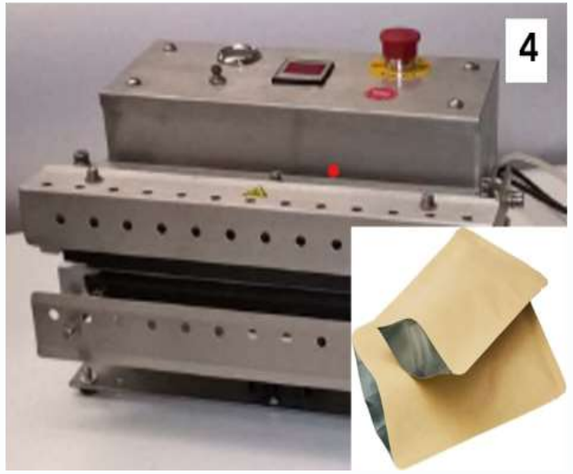
Bio based content according to EN 16785:2 Biobased content calculated on anhydrous product

Test Methodology

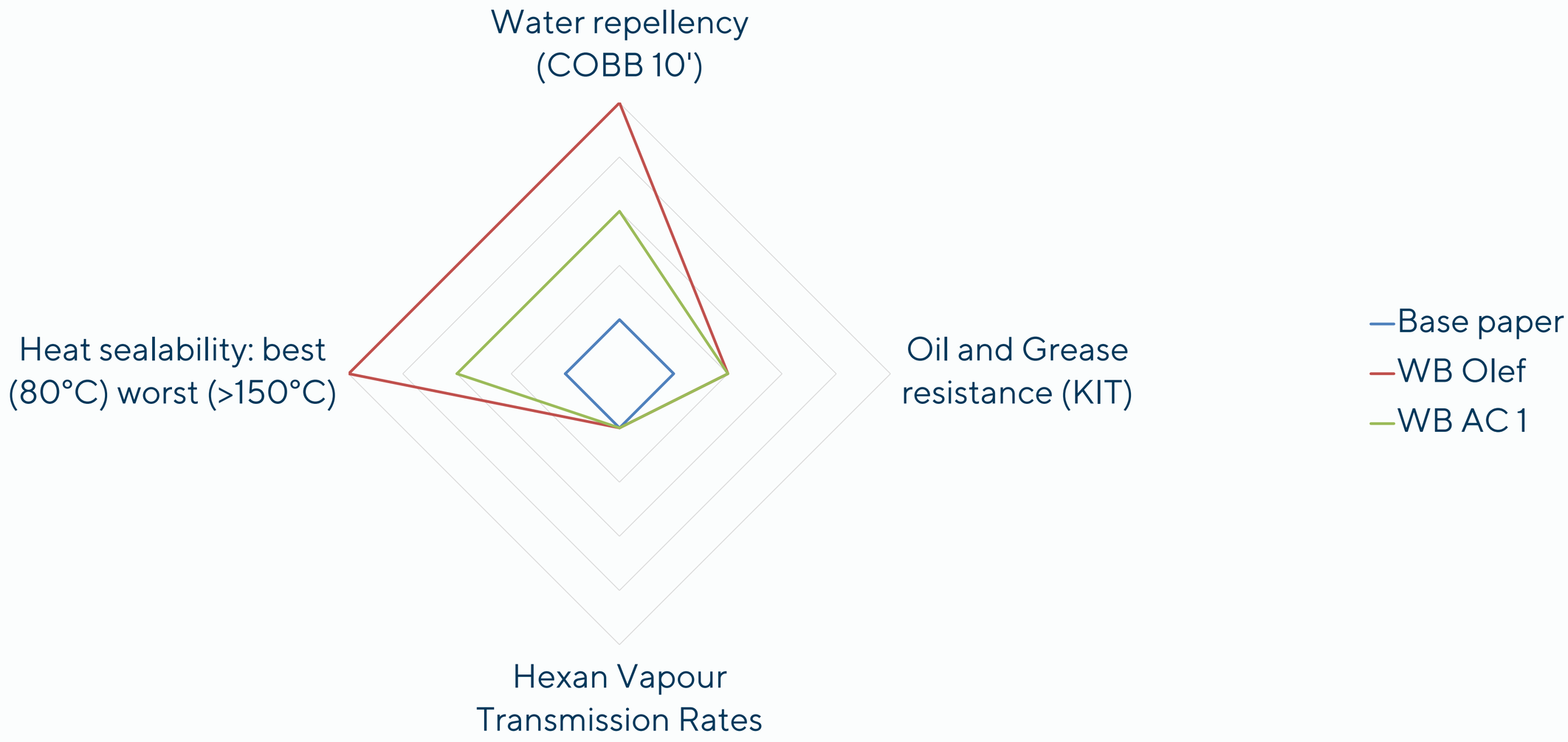
Standard base paper of 80 g/m^2 coated
add-on 5-6 g/m^2 by wire wound rod
Drying condition 85 °C for 1 minutes.

Test name	Target
(1) Cobb method 10′ TAPPI T 441	Water resistance
(2) Kit test TAPPI T 559	Oil & Grease resistance
(3) HVTR	MOSH/MOAH* permeability using hexane vapour
(4) Heat sealing initial Temperature	Sealability after 1″ contact time.

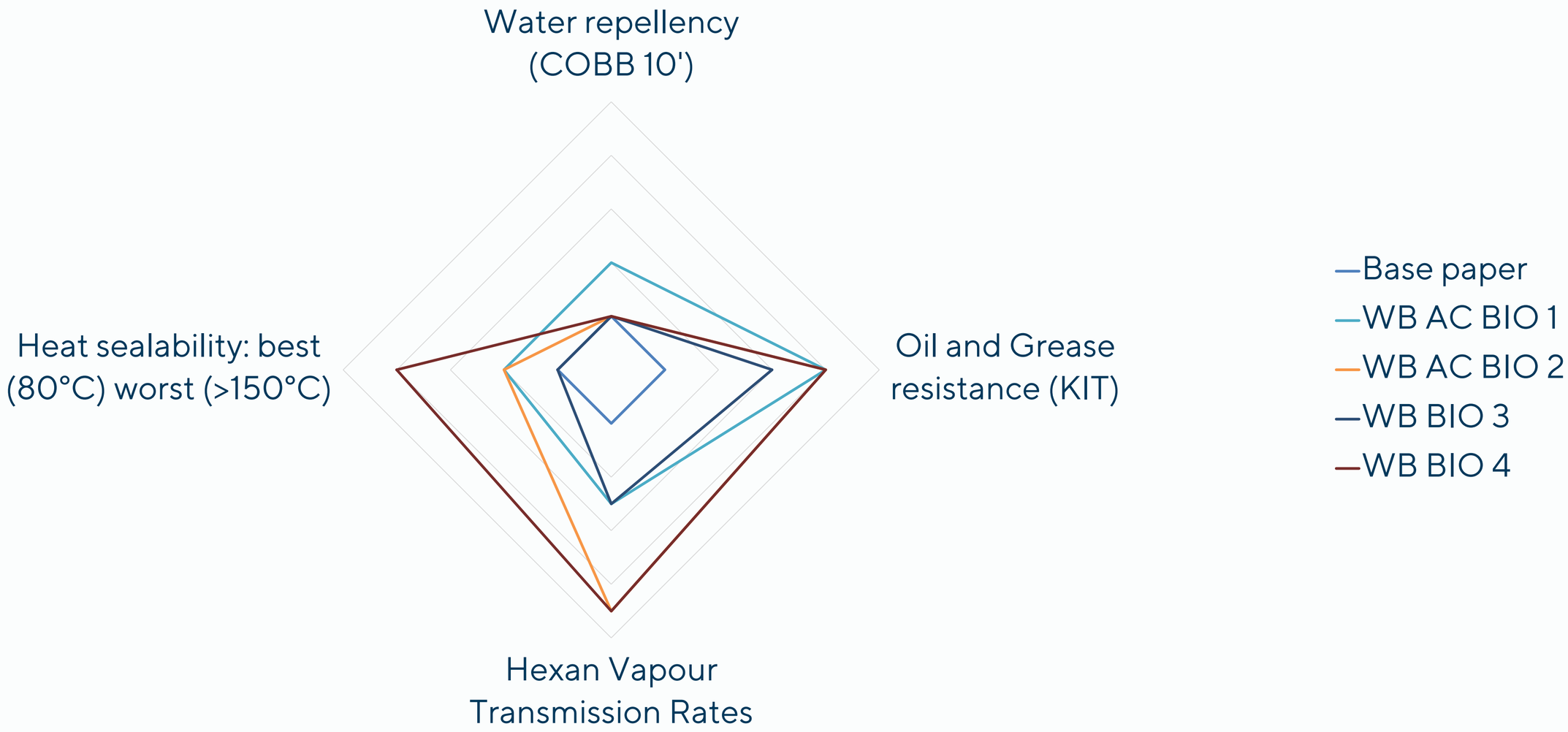




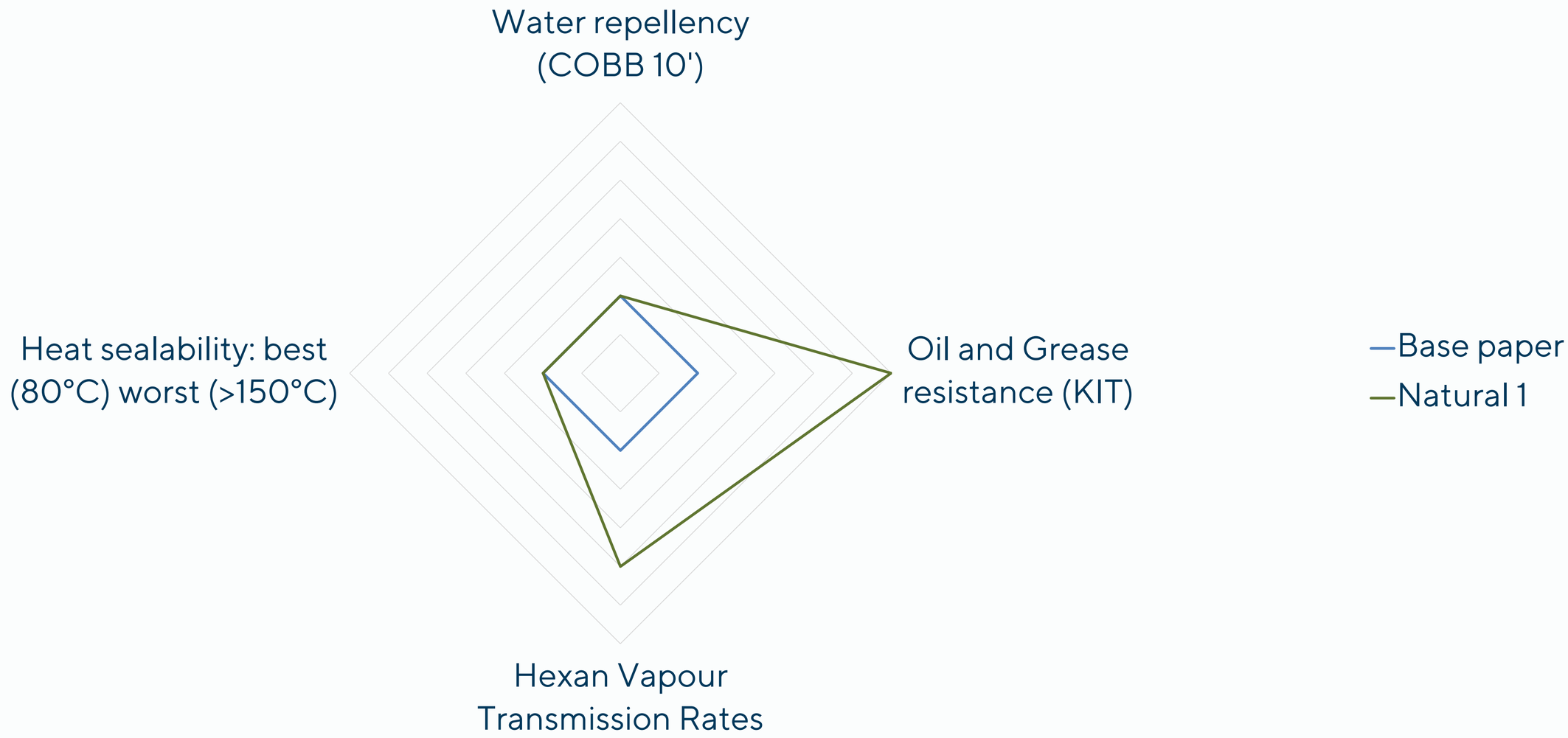
Overall Performance: Waterborne Synthetics



Overall Performance: Waterborne Biobased



Overall Performance: Waterborne coating plastic free



Inspired by Nature

Fruit skins or cuticles, are already performing to extend life of all organic matters and are primarily composed by cutin substance

Cutin can be extracted from fruits, vegetable, especially from tomato peels.

The tomato processing industry use 40 mil ton* of Tomato yearly, which makes tomatoes the world’s leading vegetable for processing, and generates significative amount of tomato peels by-product.

*World Processing Tomato Council 2023

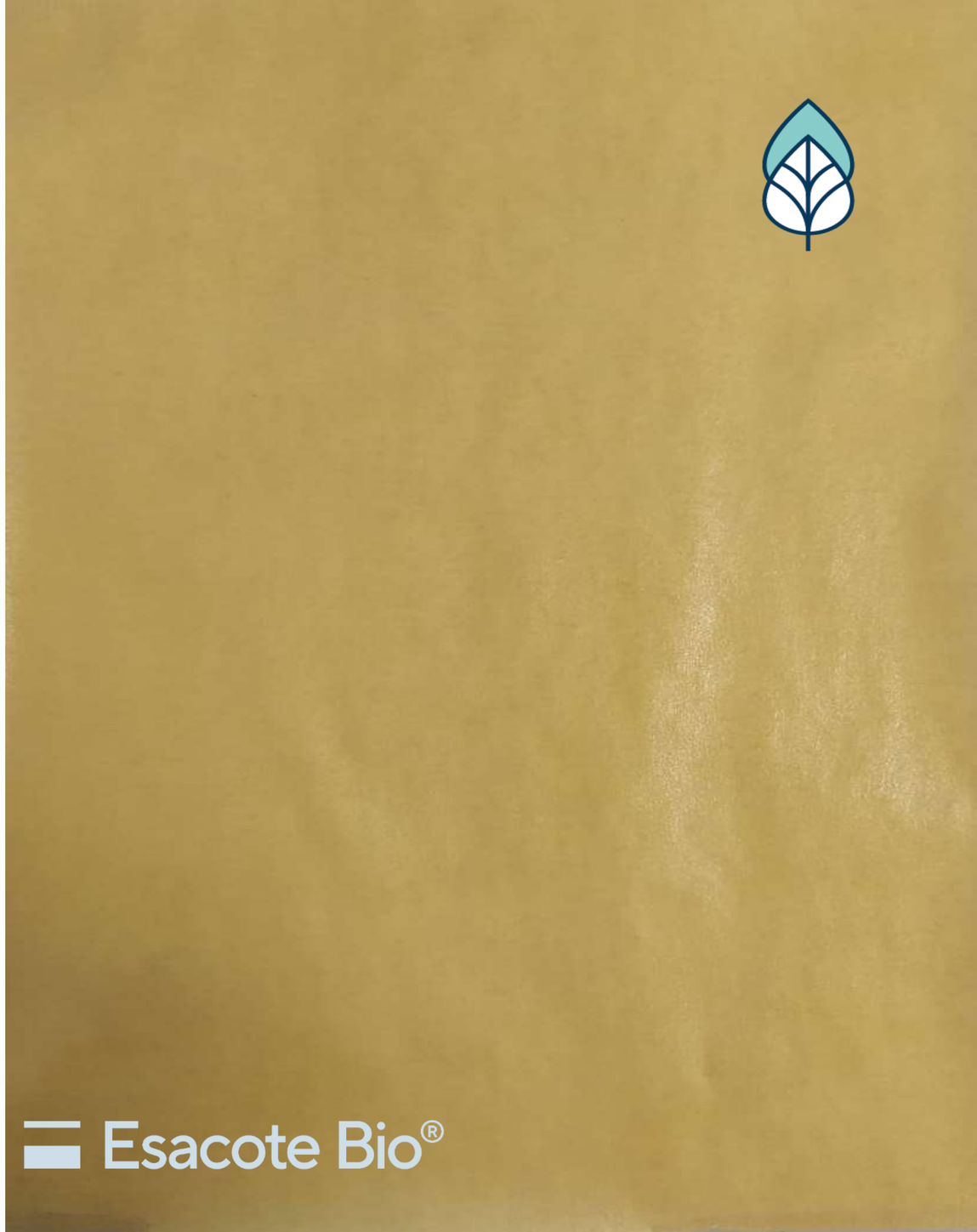
Esacote Bio® BC 100

Tomato's Skin Barrier Coatings

Lamberti patented an innovative solution to convert extracted cutin in Esacote® BIO BC 100, a waterbased fluid easy to be applied for all flexible packaging materials.

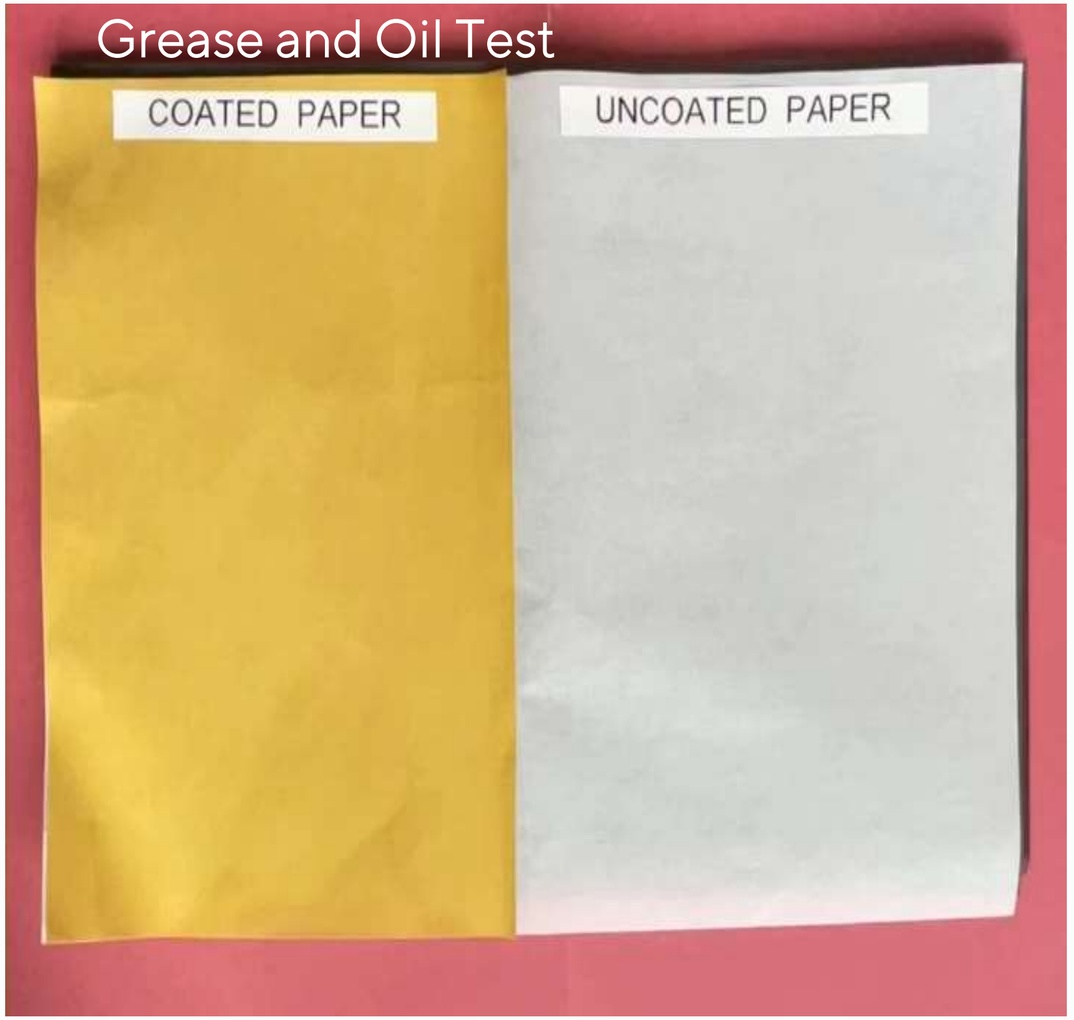
Fully natural & plastic free
from by-product of food industry
100% biobased carbon*

*Tested by Beta Analytics: ASTM D6866 C14/Ctotal



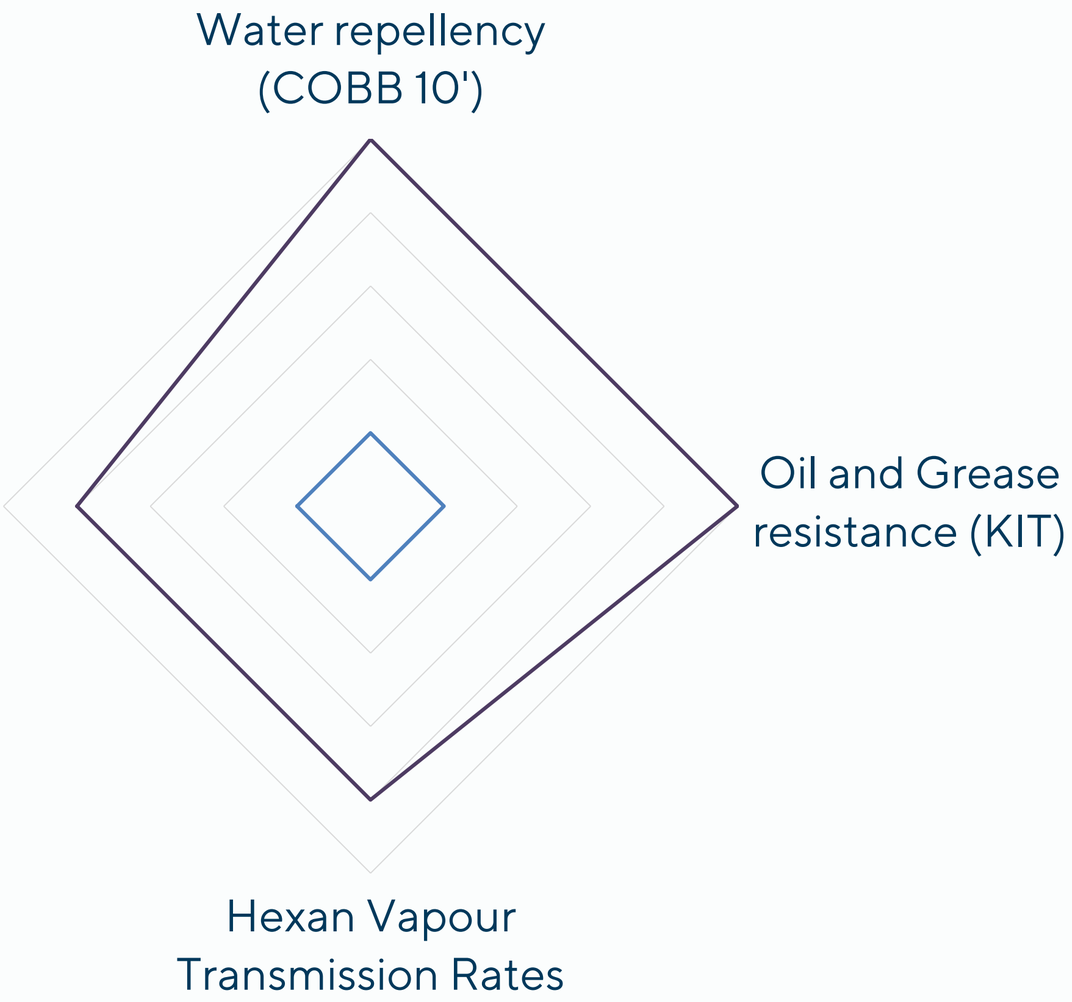
Esacote Bio® BC 100

Superior Performance



*Pellikan Blue Royal Ink watersoluble

Esacote Bio® BC 100



Conclusions

The shift from Plastic to Paper as alternative material for barrier coating packaging is challenged by getting overall high performance on Water, Grease and Oil, Gas and Thermo sealing performances and sustainable attributes

We show the performance of several WB Technologies presenting the complexity of achieving overall performance by coating together with Single Use Plastic compliances

Thanks to the innovation developed by Lamberti, the conversion of cutin extracted from tomato peel by product of the food industry, it is possible to achieve an extraordinary performance for barrier coating application with circular and sustainable attribute.

Scan QR code to download the presentation and being contacted

Special Thanks to
- C. Barcellona – Innovation R&D
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- M. Ubbiali – Product Manager Barrier Coating

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