



Press release

## Carbios and Michelin take a major step towards developing 100% sustainable tires

- Michelin has successfully validated the use of Carbios' enzymatic recycling technology for PET<sup>1</sup> plastic waste in its tires
- Carbios confirms the potential of its recycled PET to address all types of applications – from bottles to clothing fibres and now technical fibres
- The validation of Carbios' technology in Michelin's tests, marks a new step towards 100% sustainable tires

Clermont-Ferrand – April 23, 2021 – (7:45 AM CEST)- [CARBIOS](#) (Euronext Growth Paris: ALCRB), a company pioneering new bio-industrial solutions to reinvent the lifecycle of plastic and textile polymers, and [MICHELIN](#), a leader in sustainable mobility, have taken a major step towards developing 100% sustainable tires. Michelin has successfully tested and applied Carbios' enzymatic recycling process for PET plastic waste, in order to create a high tenacity tire fibre that meets the tire-giant's technical requirements.

### Enzymatic recycling: a revolutionary process

Carbios' enzymatic recycling process **uses an enzyme capable of depolymerizing the PET** contained in various plastics or textiles (bottles, trays, polyester clothing, etc.). This innovation allows infinite recycling of all types of PET waste. It also allows the production of 100% recycled and 100% recyclable PET products, **with the same quality as if they were produced with virgin PET.**

### The application of PET enzymatic recycling in car tires: a world first

Conventional thermomechanical recycling processes for complex plastics do not achieve the PET high-performance grade required for pneumatic applications. However, the monomers resulting from Carbios' process, which used colored and opaque plastic waste such as bottles, once repolymerized in PET, made it possible to obtain a **high tenacity fibre meeting Michelin's tire requirements.**

The technical fibre obtained is of the same quality as the one from virgin PET, processed with the same prototype installations. This high tenacity polyester is particularly suitable for tires, due to its breakage resistance, toughness, and thermal stability.

---

<sup>1</sup> PET (PolyEthylene Terephthalate) PET is a petroleum-based plastic wherein the monomers used, ethylene glycol and terephthalic acid, come from the transformation of petroleum. PET is the raw material for one of the main textile fibres used in tire reinforcements.

“We are very proud to be the first to have produced and tested recycled technical fibres for tires. These reinforcements were made from colored bottles and recycled using the enzymatic technology of our partner, Carbios,” said Nicolas Seeboth, Director of Polymer Research at Michelin. “These high-tech reinforcements have demonstrated their ability to provide performance identical to those from the oil industry.”

Carbios’ enzymatic recycling process therefore enables Michelin to get one step closer to its sustainable ambitions, and contributes to the entry of tires into a true circular economy. Michelin is committed to achieving 40% sustainable materials (of renewable or recycled origin) by 2030 and **100% by 2050**.

### **The potential of Carbios’ process confirmed**

This major step constitutes a world-first in the tire sector and confirms the potential of Carbios’ process to engage the industry in a responsible transition towards a sustainable circular economy model.

Every year, **1.6 billion** car tires are sold worldwide (by all tire manufacturers combined). The PET fibres used in these tires represent **800,000 tonnes of PET** per year.

When applied to Michelin – this represents nearly 3 billion plastic bottles per year that could be recycled into technical fibres for use in the company’s tires.

“In 2019, Carbios announced it had produced the first PET bottles with 100% Purified Terephthalic Acid (rPTA), made from the enzymatic recycling of post-consumer PET waste. Today, with Michelin, we are demonstrating the full extent of our process by obtaining from this same plastic waste, recycled PET that is suitable for highly technical fibres, such as those used in Michelin’s tires,” said Alain Marty, Carbios’ Chief Scientific Officer.

### **About Carbios:**

[Carbios](#), a green chemistry company, develops biological and innovative processes to revolutionize the end of life of plastics and textiles. Through its unique approach of combining enzymes and plastics, Carbios aims to address new consumer expectations and the challenges of a broader energy transition by taking up a major challenge of our time: plastic and textile pollution.

Established in 2011 by [Truffle Capital](#), the mission of Carbios is to provide an industrial solution to the recycling of PET plastics and textiles (the dominant polymer in bottles, trays, textiles made of polyester). The enzymatic recycling technology developed by Carbios deconstructs any type of PET plastic waste into its basic components which can then be reused to produce new PET plastics of a quality equivalent to virgin ones. This PET innovation, the first of its kind in the world, was recently recognized in a scientific paper published in the prestigious journal [Nature](#). Additionally, Carbios is working hand in hand with multinational brands — like L’Oréal, Nestlé Waters, PepsiCo and Suntory Beverage & Food Europe — to implement its technology, and to lead the transition toward a truly circular economy.

The Company has also developed an enzymatic biodegradation technology for PLA (a bio sourced polymer) based single use plastics. This technology can create a new generation of plastics that are 100% compostable in domestic conditions, integrating enzymes at the heart of the plastic product. This disruptive innovation has been licensed to [Carbiolice](#), a joint venture created in 2016, in which Carbios now holds a majority stake alongside the SPI fund operated by Bpifrance.

For more information, please visit <https://carbios.com/en/>

Twitter: [Carbios](#) LinkedIn: [Carbios](#) Instagram : [carbioshq](#)

### **About Michelin:**

Michelin, the leading mobility company, is dedicated to enhancing its clients' mobility, sustainably; designing and distributing the most suitable tires, services and solutions for its clients' needs; providing digital services, maps and guides to help enrich trips and travels and make them unique experiences; and developing high-technology materials that serve a variety of industries. Headquartered in Clermont-Ferrand, France, Michelin is present in 170 countries, has 123,600 employees and operates 71 tire production facilities which together produced around 170 million tires in 2020.



Carbios (ISIN FR0011648716/ALCRB) is eligible for the PEA-PME, a government program allowing French residents investing in SMEs to benefit from income tax rebates.

#### **Carbios**

Agnès Mathé  
Communication Department  
[contact@carbiosa.fr](mailto:contact@carbiosa.fr)  
+33 (0)4 73 86 51 76

#### **Media Relations (Europe)**

Tilder  
Marie-Virginie Klein  
[mv.klein@tilder.com](mailto:mv.klein@tilder.com)  
+33 (0)1 44 14 99 96

#### **Media Relations (U.S.)**

Rooney Partners  
Kate L. Barrette  
[kbarrette@rooneyco.com](mailto:kbarrette@rooneyco.com)  
+1 212 223 0561

#### MICHELIN GROUP MEDIA RELATIONS

**+33 (0) 1 45 66 22 22**

7 days a week

[www.michelin.com](http://www.michelin.com)  
[@MichelinPress](https://twitter.com/MichelinPress)

27 cours de l'Île Seguin, 92100 Boulogne-Billancourt

*This press release does not constitute and cannot be regarded as constituting an offer to the public, an offer to sell or a subscription offer or as a solicitation to solicit a buy or sell order in any country.  
Translation for information purposes only. In case of discrepancy between the French and the English version of this press release, the French version shall prevail.*