INVITED SPEAKER

ENZYMES: INNOVATIVE SOLUTIONS FOR REINVENTING THE LIFECYCLE OF PLASTICS

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Plastics are found everywhere in our daily-life, they are exceptional materials and represent an annual world production of 322 million tons. However, their lifetime is often limited and nowadays they represent a major environmental issue with 125 million tons of generated plastic waste annually. Only 10% of collected plastics are recycled, and, at best, plastic wastes are incinerated but an unacceptable quantity are lost in nature, with for instance 9 million tons ending each year in the oCEAns.

Carbios (http://www.carbios.com), a young innovative green chemistry company, proposes enzymatic solutions to face the problem of the plastics' end of life and has the objective to turn plastic waste into industrial value. Carbios has created a collaborative laboratory with the internationally recognized laboratory TBI (Toulouse Biotechnology Institute (INSA/CNRS/INRAE, http://www.Toulouse-biotechnology-Institute.fr) specialized in enzyme engineering.

This presentation will focus on the development of an enzyme-catalyzed recycling process of the million tons of PET plastic bottles and fibers. An extraordinary evolved enzyme is used to break down PET to return to monomers which enables the material to be recycled ad infinitum and creates a virtuous circular economy scheme. The work of enzyme evolution leading to the possibility to make a new bottle from plastic waste was published in Nature (Volume 580 Issue 7802, 9 April 2020). A demo plant is operational since September 2021 to validate the technology and to be able to build the first industrial plant in 2025.