



CASE STUDY | SUSTAINABLE BIOTECHNOLOGY

## The Missing Link in **Enzymatic PET Upcycling**

PET2More is a collaborative project between Innophore and the University of Edinburgh and funded by the Austrian FFG. It will enable sustainable production of value-added products from PET (polyethylene terephthalate) and PEF (polyethylene furanate) plastic waste through discovery of novel biocatalysts.

The targeted products and their derivatives are high volume industrial chemical compounds used to manufacture pharmaceuticals, dye intermediates, plasticizers, spices and food preservatives, for example. To realise a sustainable, circular economy for plastics, a biocatalyst is needed to convert the monomer building blocks that are the corresponding products of enzymatic degradation. So far, no biocatalysts are known to catalyse this reaction. Until now, these molecules have been produced unselectively under harsh conditions from fossil fuel feedstocks. To find efficient and selec-

tive enzymes for this purpose, the patented Catalophore™ technology of Innophore will be used. This technology can identify suitable enzymes from millions of enzyme sequences and structures using bioinformatic methods, which can then be used as candidate enzyme catalysts for the upcycling bioprocess.

The partner, Dr. Joanna Sadler (University of Edinburgh), will characterize the novel biocatalysts and analytical methods will be established to determine the best candidates. The most promising enzymes from the biochemical characterization studies will be further developed and optimized through computational enzyme engineering. Mutations will be introduced to improve activity, stability and selectivity. Together, this project will deliver novel tools for biotechnology to valorise post-consumer plastic whilst alleviating reliance on finite fossil fuels for chemical production.

