





Sustainable up-cycling of PET monomers towards platform organic acids by yeast fermentation

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Abstract:

The use of plastic is unavoidable in our society, due to its unique mechanical properties and low cost compared to other materials. Regrettably, the biodegradation of traditional plastic is extremely slow and occurs only rarely and only in specific niches: most of the plastic waste is burnt for heat or landfilled, representing a loss of resources, and creating a cascade of environmental issues.

The **project REPLAY** (REconnecting PLAstics life cycle to biogeochemical cycles by sustainable hydrolysis and Yeasts fermentation) aims at the upcycling of PET from post-consumer plastic waste through sustainable depolymerization and fermentation, towards the production of platform chemicals. Research teams from UNINA and UNIBA will develop sustainable strategies for the (bio)chemical hydrolysis of PET in its monomers terephthalic acid (TPA) and ethylene glycol (EG).

My work will focus on the implementation of the use of systems and synthetic biology, and (bio)process engineering to enable yeasts (*Saccharomyces cerevisiae* and non-*Saccharomyces* yeasts, among which *Zygosaccharomyces parabailii*) to convert TPA into different organic acids (e.g. protocatechuic acid, *cis,cis*-muconic acid, and 3-carboxy-*cis,cis*-muconic acid); EG will be converted to glycolic acid, while also being considered as a carbon source by implementing heterologous and/or synthetic metabolic pathways for efficient assimilation.