Assimilation of hexadecane by *Yarrowia lipolytica* for co-production of microbial lipids and enzymes

Sílvia Miranda[1,2], Marlene Lopes[1,2] and Isabel Belo[1,2]

[1] CEB – Centre of Biological Engineering, University of Minho, Braga, Portugal

[2] LABBELS – Associate Laboratory, Braga/Guimarães, Portugal

The improper disposal of petroleum-derived effluents has negative impacts on the environment and human health owing to the hydrophobic pollutant compounds, especially hydrocarbons. This work aimed to assess the potential of *Y. lipolytica* CBS 2075 to use hexadecane as the sole carbon source and produce added-value compounds (enzymes and microbial lipids) under different oxygenation conditions and medium composition.

In bioreactor experiments, the increase of k_La to 132 h^{-1} improved hexadecane assimilation and lipids-rich biomass production. Simultaneous synthesis of protease was observed, which is a new feature that was not previously reported. In cultures supplemented with corn steep liquor, the increase in C/N ratio enhanced biomass production, faster hexadecane assimilation and lipids synthesis (27 % w/w). At the highest C/N ratio conditions, lipase (several applications, including the biodiesel industry) and protease (used in the pharmaceutical, detergent and food industries) were also produced. Lipids from *Y. lipolytica* CBS 2075, composed of palmitic, palmitoleic, oleic, and linoleic acids, are a potential source of feed and food supplements or feedstock for biodiesel.

The results obtained are quite promising since demonstrated the potential of *Y. lipolytica* to convert hydrophobic compounds (hexadecane) from wastewaters into valuable compounds, under the scope of the circular economy concept.

Acknowledgments: FCT - UID/BIO/04469/2020, SFRH/BD/144188/2019, LABBELS associated laboratory (LA/P/0029/2020).