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Yeasts as workhorses for food and chemistry

Application of non-conventional yeasts for olive mill wastewaters valorization

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The olive oil consumed worldwide is mainly produced in Mediterranean countries. Portugal is one of the ten major producers. Pressing and continuous (three- or two-phase) are the most important extraction processes used in olive oil production. A large amount of a liquid waste, called Olive Mill Wastewater (OMW), is generated to a three-phase decanter extraction process. This effluent causes serious environmental problems due to its high lipid content, chemical oxygen demand (COD) and dark colour. Moreover the phytotoxicity of the OMW can be attributed to the phenolic compounds [1]. In fact, the olive pulp is very rich in phenolic compounds and approximately 53 % is lost in the OMW [2]. Due to the seasonality of olive oil production the OMW treatment process should be flexible enough to operate in a non-continuous mode. Besides, the olive mills are small enterprises, scattered around the olive production areas, making individual on-site treatment options unaffordable [3]. The OMW use as a resource to be valorised is an approach of great interest.

It is widely posited that several lipolytic yeast species are able to grow in OMW media, consume the organic material and, simultaneously, produce biomass and other valuable products. The aim of the present study is the valorisation of distinct OMW by producing high-value compounds (such as biomass and lipase), while degrading this waste. The OMW were collected from different olive mills from the north of Portugal and 6 yeasts of *Candida rugosa*, *Candida cylindracea* and *Yarrowia lipolytica* were used.

All strains were capable to grow on OMW based medium, without dilution, despite the low effectiveness of phenolic compounds degradation. Furthermore the yeast cells were able to consume almost all the sugars present in the media and significantly reduce COD. The process conditions were optimized in order to achieve the highest values of lipase activity. The strains were also selected according to its efficiency, and three of six strains were chosen: *C. cylindracea* CBS 7869, *Y. lipolytica* W29 (ATCC 20460) and *C. rugosa* CBS 2275. [1] Lanciotti, R. et al., Bioresour. Technol. (2005) 96:317 [2] Rodis, P.S. et al., J. Agric. Food. Chem. (2002) 50:596 [3] Paraskeva, P., Diamadopoulos, E., J. Chem. Technol. Biotechnol. (2006) 81:1475. The authors acknowledge the financial support provided by ‘‘Fundação para a Ciência e Tecnologia” (Project PTDC/AMB/ 69379/2006; Grant SFRH/BD/27915/2006).