

## Olive mill wastewaters treatment by enzymes producing microorganisms

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Olive mill industry is a traditional agricultural industry in Mediterranean countries. These countries produce almost all the olive oil sold worldwide. Olive oil production results on a large amount of wastewaters (OMW), which represents a major environmental problem. OMW is a dark liquid residue with high organic content composed mainly by sugars, tannins, polyphenols, polyalcohols, organic acids, proteins, pectins and lipids. Different treatments and disposal alternatives can be found in the literature in order to provide solutions for the OMW problem. OMW biological treatments with its simultaneous valorization through the co-production of added-value products are one of the main approaches possible. In this work, the ability of several fungi (yeast and filamentous fungi) to reduce the polluting characteristics of OMW and to produce extracellular enzymes is shown.

Yeast species such as *Yarrowia lipolytica*, *Candida rugosa* and *Candida cylindracea* were used for the production of lipases in undiluted OMW based media (COD of 30 to 261 g/L). In fed-batch cultures of yeasts it was possible to attain high values of lipase activity and simultaneously a higher level of organic matter degradation than the observed in batch operation. Filamentous fungi such as *Trametes versicolor*, *Aspergillus ibericus*, *Aspergillus niger* and *Penicillium expansum* were more efficient in degrading OMW in batch cultures than yeasts, mainly to reduce OMW colour, aromatic compounds, phenolic compounds and COD. *A. ibericus* has shown to be a good lipase producer from

OMW (around 3000 U/L). Moreover, lipase-producing aerobic fermentation was proven to have a positive effect on the anaerobic degradation of OMW.

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