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Title: The olive mill wastewater as substrate for single cell oil production by Zygomycetes

Author(s): Bellou, S (Bellou, Stamatia); Makri, A (Makri, Anna); Sarris, D (Sarris, Dimitrios); Michos, K (Michos, Konstantinos); Rentoumi, P (Rentoumi, Penelope); Celik, A (Celik, Ayhan); Papanikolaou, S (Papanikolaou, Seraphim); Aggelis, G (Aggelis, George)

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Abstract: The conversion of olive mill wastewater (OMW) into high added value lipids containing polyunsaturated fatty acids (PUFA), in parallel with a significant phenolic removal by selected strains of Zygomycetes, is reported here for the first time. The growth of Mortierella isabellina, Mortierella ramanniana, Cunninghamella echinulata, Mucor sp., Thamnidium elegans and Zygorhynchus moelleri on solidified media was not significantly affected by the presence of OMW used in the growth medium up to 50% (v/v). Kinetic parameter values and conversion yields, estimated using a mathematical model which was fitted on the experimental data originated from submerged cultures, shows the ability of some Zygomycetes (i.e. T. elegans and Z. moelleri) to grow on OMW and accumulate storage material, i.e. lipids rich in PUFA, and these findings open new perspectives in OMW management and valorization. In liquid media containing OMW as sole carbon source, T. elegans and Z. moelleri produced 4.4 and 3.5 g/L cell mass in surface (SC) and submerged (SMC) cultures, respectively, containing around 60% (w/w) of lipids. Oleic and palmitic acids were the predominant fatty acids. Gamma-linolenic acid was found in high percentages (up to 17.7%, w/w) in the lipid of Z. moelleri, in SMC with OMW as sole carbon source, while PUFA biosynthesis was not favored in SC. (C) 2013 Elsevier B.V. All rights reserved.

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Addresses: [Bellou, Stamatia; Makri, Anna; Michos, Konstantinos; Rentoumi, Penelope; Aggelis, George] Univ Patras, Dept Biol, Div Genet Cell & Dev Biol, Microbiol Unit, Patras, Greece.
[Sarris, Dimitrios; Papanikolaou, Seraphim] Agr Univ Athens, Dept Food Sci & Technol, Lab Food Microbiol & Biotechnol, GR-11855 Athens, Greece.
[Celik, Ayhan] Gebze Inst Technol, Dept Chem, TR-41400 Gebze, Turkey.
[Aggelis, George] King Abdulaziz Univ, Dept Biol Sci, Jeddah 21413, Saudi Arabia.

Reprint Address: Aggelis, G (reprint author), Univ Patras, Dept Biol, Div Genet Cell & Dev Biol, Microbiol Unit, Patras, Greece.

E-mail Addresses: George.Aggelis@upatras.gr

Author Identifiers:

Author	ResearcherID Number	ORCID Number
Aggelis, George	E-9403-2011	0000-0002-1200-5592
Fac Sci, KAU, Biol Sci Dept	L-4228-2013	
Bellou, Stamatia	J-5970-2013	0000-0002-2997-877X

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