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Valorization and treatment of blends containing crude glycerol and olive mill waste-waters by two Yarrowia lipolytica strains: Production of citric acid, polyols and single cell oil and simultaneous partial decolorization of the media

Crude glycerol, a waste stream derived from bio-diesel production and olive mill waste-waters (OMW), one of the strongest Agro-industrial wastes, were mixed and used as substrate for growth of *Yarrowia lipolytica* strains ACA-YC 5033 and Y46 in nitrogen-limited submerged shake-flask experiments. Specific volume of OMW was used to partially substitute process tap water, giving initial phenolic compounds concentration of ~2.0 g/L. The total initial substrate (TS) concentration was ~70 g/L, including ~60 g/L of glycerol and ~10 g/L of glucose deriving from OMW. Blank experiments with no OMW addition and initial glycerol concentration of ~70 g/L were also conducted. The principal metabolic product was citric acid. Polyols mannitol, arabitol and erythritol were also synthesized. Regarding both strains, the accumulation of both citric acid (Citmax=61.8 g/L, YCit/TS=0.87 g per g of TS consumed; strain Y46) and cellular lipids (Lmax=1.7 g/L, YL/X=0.19 g per g of dry cell weight; strain ACA-YC 5033) was highly favored by OMW addition, whereas maximum production of biomass (Xmax=10.7 g/L, YX/TS=0.15 g/g; strain ACA-YC 5033) was negatively affected, compared to blank experiment. Regarding both strains, the metabolism seemed to be shifted towards citric acid production at expense of erythritol production, due to the addition of OMW into the medium. Erythritol presented significantly lower values with OMW addition (Erymax=17.3 g/L, YEry/TS=0.24 g/g; strain Y46), whereas mannitol production was increased (Manmax=14.1 g/L, YMan/TS=0.23 g/g; strain ACA-YC 5033) compared to blank experiment. Moreover, total reconsumption of polyols occurred when TS depleted from the medium leading in the additional accumulation of citric acid. Finally, removal of medium color occurred from both strains up to ~30%..

Biography

Dimitris Sarris has completed his PhD in Food Biotechnology and three Post-doctoral Research Projects at Agricultural University of Athens, Greece. He is currently working as an Assistant Professor of Molecular Biology and Food Biotechnology in the Department of Food Science and Nutrition, School of the Environment, University of the Aegean, Greece. He has published 11 papers in reputed journals and has been serving as a reviewer in more than 10 journals. His scientific interests are in the treatment and valorization of Agro-industrial by-products and wastes (and in general food industry effluents) via biotechnological methods for the production of (high-) added value products.

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