Lipase production by *Yarrowia lipolytica* under increased air pressure

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Lipases, triacylglycerol hydrolases, are generally produced by microorganisms from a lipidic carbon source (Gupta *et al.*, 2004) and *Yarrowia lipolytica* was proposed as an alternative organism for lipase production (Pignede *et al.*, 2000). In the present work, *Yarrowia lipolytica* was grown in a pressurized bioreactor in order to obtain a further insight on the influence of moderate total air pressure on yeast growth and lipase production. A stainless steel reactor was used were the variation of OTR with pressure could be modelled by the power function. Despite the OTR increase of 2.3-fold when the pressure varied from 4 bar up to 8 bar, no differences were observed in the cellular growth. An increase of the lipase activity at 8 bar of 5.5-fold and 2.3-fold was obtained compared with the experiments under atmospheric pressure and 4 bar, respectively. The rise of the total air pressure from 1 bar up to 8 bar led to a 4.8-fold improvement in the lipase productivity. Besides lipase production, protease secretion into the medium was observed. Protease activity was inhibited by air pressure of 8 bar, indicating that pressure has different effect on lipase and protease activities. Moreover, an influence on metabolism leading to organic acids secretion is anticipated by this work. Through an automatic image analysis technique it was observed that cell exposure to increased air pressure did not induce hyphae formation but led to a cell size decrease for the 8 bar cultures.

1. Gupta, R. G. *et al.* (2004) *Appl. Microbiol. Biotechnol.* **64**:763-781.
2. Pignede *et al.* (2000) *J. Bacteriol.* **182 (10)**: 2802-2810