



## Enhanced *Pichia pastoris* biomass under increased air pressure: batch and fed-batch strategies

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*Pichia pastoris* is used as a source of single-cell protein because the species can grow either on glucose or methanol, and high cell densities can be maintained under fermentation conditions. In spite of the well-known importance of *P. pastoris* as a cell-factory mainly for biopharmaceuticals production, no studies are available on air pressure increase application for high-cell density cultivation of this yeast. Batch fermentations were performed in a hyperbaric reactor to study the effect of increasing total air pressure up to 5 bar on *Pichia pastoris* CBS 2612 growing on glucose, pure glycerol, crude glycerol and methanol. With pure glycerol, a total pressure of 5 bar led to a specific growth rate 3-fold higher than the obtained under 1 bar. Under 5 bar biomass yield (g of cell per g of substrate) was 0.97 whereas at 1 bar was 0.6 for crude glycerol. In fed-batch cultivations on pure glycerol the rise of air pressure from 1 to 5 bar led to a 2-fold improvement in biomass yield. Hyperbaric bioreactors can be successfully applied for *P. pastoris* cultivation, particularly in high-density cultures used for heterologous proteins, preventing oxygen limitation and consequently increasing overall productivity.