Morphology and physiology of the dimorphic fungus Mucor circinelloides (syn. M. racemosus) during anaerobic growth

The dimorphic Mucor circinelloides requires an anaerobic atmosphere and the presence of 30% CO2 to grow as a multipolar budding yeast, otherwise hyphal growth predominates. Establishing other means to control the morphology would be a distinct advantage in the development of a fermentation process for this organism for the production of heterologous proteins. Thus, conditions suppressing polarised growth while at the same time abolishing the CO2 requirement were investigated in submerged cultivations. It was found that supplementing cultures with mixtures of ergosterol and Tween 80 resulted in yeast-like growth under 100% N-2. Their impact on growth and morphological development was assessed at a range of concentrations. Maximum biomass levels and the specific growth rate decreased at elevated levels of ergosterol and Tween 80. Possible effects of carbon dioxide and the added fatty acid/sterol mixture on supporting yeast growth by influencing the fluidity of the plasma membrane or affecting polarised growth are discussed.

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