

Provitamin D2 – A balance between aerobic conditions and ergosterol production by *Saccharomyces sp*

Anca Irina Galaction

University of Medicine and Pharmacy of Iasi, Romania

Statement of the Problem: Ergosterol (ergosta-5,7,22-trien-3 β -ol), also known as provitamin D2, is the precursor of vitamin D2 (ergocalciferol), because it is converted under UV radiation to this vitamin. The natural sources of ergosterol are mainly the yeasts, but it can be also found in fungus or plants. In the yeasts cells, ergosterol is accumulated in membranes, especially in free form in the plasma-membrane, but also as esters with fatty acids in membrane lipids. The purpose of this study was to analyze comparatively the influence of aeration efficiency on ergosterol production by *S. cerevisiae* in batch and fed-batch fermentations, by considering different levels of mixing intensity, aeration rate, and n-dodecane concentration.

Methodology & Theoretical Orientation: The experiments were carried out in 2 L laboratory stirred bioreactor, provided with computer-controlled and recorded parameters. The fermentation was carried out comparatively in batch and fed-batch systems. In both fermentation systems, the temperature was 30°C. The pH-value was maintained at 5.4, being automatically adjusted. n-Dodecane was used as oxygen-vector with volumetric concentration varied between 0 and 15%.

Findings: The hydrocarbon concentration exhibits a significant influence on ergosterol production mainly by accelerating the oxygen transfer rate. Therefore, for the fermentation moment corresponding to the maximum ergosterol content (9 h), the oxygen mass transfer coefficient, kLa, is amplified for about 3 times by increasing the volumetric concentration of n-dodecane from 0 to 15%. Moreover, the increase of dissolved oxygen concentration by adding n-dodecane leads to the diminution for 3.5 times of the produced alcohol amount.

Conclusion & Significance: For the batch process, the maximum ergosterol amount was reached for 5% vol. n-dodecane, while for the fed-batch process for 10% vol. hydrocarbon. In the fed-batch process, in presence of hydrocarbon, the ergosterol concentration increased with over 50%, and the ergosterol yield factor with almost 70%.

Biography

Anca-Irina Galaction is currently Professor at "Grigore T. Popa" University of Medicine and Pharmacy of Iasi, Romania, at the Faculty of Medical Bioengineering. She is PhD. supervisor in chemical engineering and bioengineering. Her doctoral studies were focused on medical biotechnologies and mass transfer in fermentation processes. Scientific activity can be resumed by over 400 published papers, of which over 130 papers (Hirsch Index 18, on Clarivate Platform) in peer-reviewed journals with impact factor and conference proceedings indexed by ISI Web of Knowledge, Scopus, IEEE Xplore, 8 published books, and 7 book chapters.

Received: April 08, 2022; **Accepted:** April 12, 2022; **Published:** April 25, 2022
