

# Bioreactors – Technology and Design Analysis

Neha Rakesh Dhor<sup>1</sup> and Dr. Badri N. Mohapatra<sup>2</sup>

Student, Department Instrumentation Engineering<sup>1</sup>

Faculty, Department Instrumentation Engineering<sup>2</sup>

All India Shri Shivaji Memorial Society's Institute of Information Technology, Pune, Maharashtra, India  
Savitribai Phule Pune University, Pune, Maharashtra

**Abstract:** *A bioreactor provides a controllable environment enabling the biological, biochemical and biomechanical requirements to manufacture engineered products. As the bioreactor aims to create a desired biological product, it is important to closely monitor the reaction parameters like internal and external mass transfer, heat transfer, fluid velocity, shear stress etc. The effects of such reaction variables on biological cultures and analyzing the other parameters such as oxygen, carbon dioxide, nutrients and metabolism waste material transports have been addressed in the paper. Sophisticated and sound bioreactor design with unique performance characteristics is essential in production of useful biotechnological products from natural and genetically modeled cell systems. Understanding of the mass transfer behavior in bioreactors would result in improved reactor designs, reactor operation, and modeling tools, which are important for maximizing reaction rates, optimizing throughput rates and minimizing cost. The paper discusses the bioreactor design and various types of bioreactors, which are useful for industrial operations.*

**Keywords:** Bioreactor, batch & continuous reactors, fed-batch, CSTR, air-lift, bubble-column, plug flow

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