

## TYPES OF FERMENTER-

Based on shape it can be classified as-

- (i) Tabular &
- (ii) Stirred tank

(Cooling coils are provided to maintain constant temperature inside the bioreactor. It can be operated aseptically for many days and simple in construction.

Disadvantages-

- high power requirement
- shearing on the organisms caused by vigorous agitation and inhibition exercised by the product)

- (i) **Fluidized Bed Bioreactor:** - It is more popular in chemical industry rather new to biochemical industry. These are mostly used in conjunction with immobilized cells or enzyme system and are operated continuously.
- (ii) **Loop or Air Lift Bioreactor:** - In the conventional bioreactor, oxygen is supplied by vigorous agitation of the bioreactor content. The heat is generated which is a problem in conventional type. In this cooling becomes simpler due to the position of inner or outer loop.
- (iii) **Membrane Bioreactor:** - These consist of a semipermeable membrane made up of cellulose acetate or other polymeric materials. The primary purpose of the membrane is to retain the cells within the bioreactor, thus increasing their density, while at same time allowing metabolic products to pass through the membrane.
- (iv) **Pulsed Column Bioreactor:** - It has a column bioreactor generator connected to the bottom of the column. It can be utilised as an aerobic bioreactor, enzyme bioreactor or as separation unit.
- (v) **Bubble Column Bioreactor:** - Multistage bubble column bioreactor are suitable in the equivalent batch process. In this it is possible to provide different environmental conditions in various stage. It is not suitable for fungal fermentation due to oxygen demanding system.
- (vi) **Photo Bioreactor:** - For the growth and production of photosynthetic organisms, a light source is required. In this, there is an important 'reactant', the photons which must be absorbed in order to react and produce products. The design of the light source is critical in the

# Biochemical Eng 2

**K Morrison**



## Biochemical Eng 2:

*Biochemical Engineering for 2001* Shintaro Furusaki, Isao Endo, Ryuichi Matsuno, 2012-12-06 Biochemical engineering forms a bridge between fundamental biochemical research and large scale biotechnology processes It covers genetic and protein engineering cell culture bioprocess and reactor design separation and modelling Research work in biochemical engineering is an investment in the future when conventional resources will have to be replaced with renewable ones In this book the papers presented at the Asia Pacific Biochemical Engineering Conference Yokohama Japan 1992 are collected This collection is unique in its wide coverage of topics and it gives an overview of the current trends of research in an important area

**Biochemical Engineering Fundamentals** James Edwin Bailey, David F. Ollis, 1977 Biochemical Engineering Fundamentals 2 e combines contemporary engineering science with relevant biological concepts in a comprehensive introduction to biochemical engineering The biological background provided enables students to comprehend the major problems in biochemical engineering and formulate effective solutions

Tools and Applications of Biochemical Engineering Science K. Schügerl, A.-P. Zeng, 2003-07-01 This special volume Tools and Applications of Biochemical Engineering Science is dedicated to Professor Wolf Dieter Deckwer on the occasion of his 60th birthday It was a great pleasure for me to act together with Professor Karl Schtiggerl as volume editor and to present here a collection of 11 outstanding review articles written mainly by former students associates colleagues and friends of Wolf Dieter Deckwer The title of this special volume well reflects the research interests and scientific pursuit of Wolf Dieter Deckwer during his more than 20 years work in the area of biochemical engineering particularly during the last 15 years when he was the head of the Biochemical Engineering Division of GBF German National Research Center for Biotechnology He has decisively pushed the development not only of software tools ranging from analytical means and mathematical models for monitoring and understanding cellular processes to gene expression systems for designing microorganisms but also of hardware tools such as computer control systems bioreaction and separation devices for effectively producing a variety of bioproducts on semi production scale New developments in some of these important tools in biochemical engineering are reviewed in articles included in this volume Wolf Dieter Deckwer was among the leading biochemical engineers who timely pointed out the necessity of applying these tools in an integrated manner for bioprocess development By establishing Integrated Bioprocess Development as one of the GBF main search topics as early as 1990 he also actively promoted this idea

Advances in Biochemical Engineering 2 T. K. Ghose, A. Fiechter, N. Blakebrough, 2014-04-17 *Advances in Biochemical Engineering 2* T. K. Ghose, 1972 *Advances in Biochemical Engineering / Biotechnology 2* Springer, 2014-01-15

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