

# BioFERMA Bioreactors & Fermentors



Installation at Indian Institute of Technology, IITG

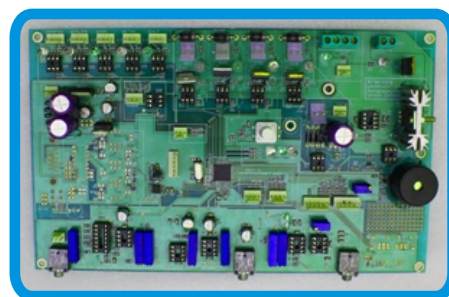
**BioFERMA** series is a low-cost, compact, autoclavable and in-situ sterilizable laboratory fermentors and bioreactors perfect for a range of educational, research and industrial applications.

Using the latest in 16 bit microprocessor technology we offer fermentors and bioreactors that use multi-loop process control techniques to maximize yields in cell-culture and fermentation. At the heart of our fermentors and bioreactors lies 16 bit microcontrollers from Microchip Technology Inc, USA. On board electronics and sensors are sourced from reputed and reliable manufacturers like Texas Instruments, Allegro Micro, National Semi, etc. to give a controller system for these fermentors and bioreactors that works effectively and is extremely reliable.

Fermentor systems are available for microbial and cell culture:

- Microbial Culture: Bacterial, Yeast and Fungi culture.
- Cell Culture: Plant, Animal and Insect culture.
- Moving up from a tissue culture flask and shaker.
- Interchangeable culture vessels (2.5 L, 4 L, 7 L).
- Other sizes also available on request.

Dedicated microprocessor controller system that has been designed specifically for autoclavable and in-situ sterilizable laboratory bioreactor and fermentor control.



## UNIQUE FERMENTOR DIAGNOSTIC MODE

*Unique diagnostic mode in our fermentors and bioreactors, enables the user to evaluate the health of the fermentor and its various components (like probes, pumps, motors, sensors, calibration, reading etc.) so that remote diagnosis and correction can be made over the phone and email. This enables us to give a better after-sales service remotely, often within a few hours of user request.*



[www.BioZen.co.in](http://www.BioZen.co.in)

Design & Engineering of Biotechnology Instruments

# BioFERMA

## Bioreactors & Fermentors

### Vessel

**Borosilicate Glass** Borosilicate glass vessels of total volumes of 2.5 L, 4 L & 7 L. User defined capacities can also be supplied up to 10 L.

### Stainless Steel

Working volume is 50% to 70% of total volume.  
SS316L vessels for volumes of 10 L and above.  
Standard volumes are 10 L, 15 L, 35 L, 50 L, 100 L.  
User defined sizes can be supplied too.

### Head Plate MOC

Stainless Steel 316L head plate is supplied with sufficient number of ports for sensors, tubings, sparger, motor, heater etc. Contact parts are made from SS316L. All ports have been designed to prevent contamination cross-over. Fitting of ports, sensors, tubings, motor etc. is convenient.

### Sirring & Agitation MOC

**Motor** PMDC motor, 12V, 80W, high starting torque.  
**Control Algorithm** PID control  
**Sensor** Magnetic gear tooth sensor.  
**Range** 100-1000 RPM in 1 RPM increments. Accuracy of +/- 10 RPM.

### Temperature MOC

Heating finger made from SS316L for contact heating. For cooling, chiller unit with forced circulation.  
**Control Algorithm** PID control for regulating temperature.  
**Sensor** Platinum RTD dipped in SS316L thermowell.  
**Range** 3°C above room temperature to 60°C. Increments of 0.1°C. With cooling system: 10°C to 60°C.

### pH

**Sensor** Autoclavable gel-filled pH electrode.  
**Control Algorithm** PID control.  
**Control System** Peristaltic pumps dispense weak acids or base, automatically depending on set and actual pH.  
**Range** 2 pH to 12 pH, increments of 0.1 pH & accuracy of +/- 0.1 pH.

### Dissolved Oxygen (pO<sub>2</sub>)

**Sensor** Autoclavable galvanic DO probe  
**Control System** Controls dissolved oxygen by sparging air or gas. Rotameters are provided on front to control flow of air into unit.  
**Range** Up to 100%, in increments of 1%.

### Foam

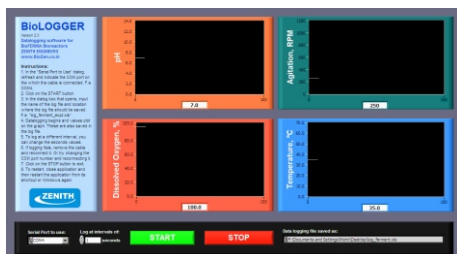
**Sensor** SS316L conductivity probe for foam sensing.  
**Control System** Peristaltic pumps dispense anti-foam agent depending on probe placement.  
**Range** Control range is height adjustable.

### Peristaltic Pumps

Two peristaltic pumps are included with pH module. One with Harvest / Feed module. One with Foam module.

### Software

Software for datalogging and archiving controlled values etc.



### Standard Configurations available in borosilicate glass vessels:

Even our basic units mentioned below are fully functional fermentors and bioreactors. They have been designed in such a way that the units meet your budget yet at the same time are fully upgradeable in the future. So you can add advanced modules

At the same time, the basic unit has systems to control motor speeds and agitation, motor RPM, temperature above ambient, will display pH values and has a 2-gas sparging and aeration system with filters and rotameters.

#### Model BioFERMA-01-01

Bioreactor basic unit with 1.5 litre working and 2.5 litre total volume.

#### Model BioFERMA-01-02

Bioreactor basic unit with 3 litre working and 4 litre total volume.

#### Model BioFERMA-01-03

Bioreactor basic unit with 5 litre working and 7 litre total volume.

Basic unit has systems for · Agitation · Aeration · Temperature control (from 3C above room temp. to 60C) · pH display · Fermentor diagnostics (for remote technical support).

Optional modules can be ordered · For temperatures below room temperature (Cooling System) · pH control (pH Control System) · control Dissolved Oxygen (DO display and control system) · Foam Control · Feed & Harvest · Datalogging Software. (Order these with the basic unit of your choice)

#### Cooling system:

For attaining temperatures below room temperature: Control range (10C to 60C). In case you need to set temperatures below your normal room temperatures, order this module. For example, if you need to run fermentation at 20C and your room temperature is normally 30C, then order the cooling system.

#### pH Control system:

The basic unit has an autoclavable gel filled glass pH electrode that displays the real time pH of the run. If you need to control the pH of the reaction, use this module. The control range is pH 2.0 to 12.0. It uses two peristaltic pumps with acid & base reservoirs which automatically add acid or base depending on the pH set and actual values.

#### Dissolved Oxygen Display & Control system:

With two gases sparging system. This module consists of a low-maintenance autoclavable galvanic glass DO electrode to measure and automatically sparge air to control the dissolved oxygen levels of the reaction.

#### Feed/Harvest Module:

With one bidirectional, variable speed peristaltic pump. Order this if you need to periodically add and remove media, inoculum and samples from the reactor vessel.

#### Foam Control Module:

With one peristaltic pump and conductivity probe that monitors the foam. Anti-foam agent is automatically added to the vessel in case of excess foam.

#### Datalogging Software:

MS Windows XP based software that displays graphs of and logs pH, temperature, DO and RPM values to MS Excel sheets.