



Research Centre for New Technologies in  
Life Science Engineering, University of Tehran

### ■ Reference System:(Microbial, Plant, Cellular)

- ✓ *Aspergillus Niger*
- ✓ *Arxulla*
- ✓ *Bacillus spez.*
- ✓ *CHO Cells*
- ✓ *Corynebacterium glutamicum*
- ✓ *Escherichia coli*
- ✓ *Gluconobacter oxidans*
- ✓ *Hansenula polymorpha*
- ✓ *Hybridoma cells*
- ✓ *Lactobacillus kefir*
- ✓ *Nicotiana tabacum*
- ✓ *Pichia pastoris*
- ✓ *Pseudomonas fluorescens*
- ✓ *Pseudomonas pudita*
- ✓ *Saccharomyces cerevisiae*
- ✓ *Streptomyces lividans*

### ■ Applications:

- ✓ R&D Fields such as, Biotechnology, Microbiology, Agriculture, Tissue Engineering, Food Biotechnology,
- ✓ Microbiology laboratories.
- ✓ Biotechnology laboratories.
- ✓ Cell Biology laboratories.
- ✓ Biotechnology Industries.

### ■ Other Products:

- ✓ Second-generation milli bioreactor (8 parallel aerated flasks) .
- ✓ Micro bioreactor ( 12/24/48/96 parallel vessels) .
- ✓ Animal cell culture and tissue engineering bioreactor.
- ✓ Stirred milli bioreactor.
- ✓ Hollow fiber membrane bioreactor (for production of recombinant drugs, tissue cells, animal cells) .
- ✓ Fed-Batch & Continuous small scale bioreactors.

Milli Bioreactor



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## Milli Zist Payesh I

The first

## Milli Bioreactor

in the Middle East

Online monitoring of oxygen transfer rate (OTR), carbon dioxide transfer rate (CTR) and respiratory quotient (RQ) of microbial, plantal and cell cultures. Determination of the engineering parameters and the physical state of cellular metabolism for the production of biological products.



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## ■ Advantages:

- ✓ Easy handling (set up as fast and easy as a normal shake flask) .
- ✓ One system for animal/human , microbial and plantal cells.
- ✓ Short setup time.
- ✓ Substitution of expensive fermentations in stirred bioreactors.
- ✓ Optimization of engineering parameters and cell culture in Milli Bioreactors (useful for scale up) .
- ✓ More information about your cultures in Milli Bioreactors.
- ✓ Rapid optimization of bioprocess (87% decrease in culture medium and 34% decrease in reaction time and 75% in performance time) .
- ✓ Substitution of expensive and time consuming offline analysis.
- ✓ Screening for an optimal production strain.
- ✓ Quality control and optimization of complex compounds.
- ✓ Optimization of the inoculums for fermenters.
- ✓ Testing of influences of different compounds on the culture.
- ✓ Screening of engineered parameters e.g. inlet energy , viscosity shear stress , culture volume , aeration , mixing speed , mixer type , high speed mass transfer.
- ✓ Online analysis of the effective parameters on cellular metabolism e.g. pH , substrate , production , nutrient , biomass , CO<sub>2</sub> effect , biotransformation , oxygen limitation , growth phases.
- ✓ Analysis of the drug effects on cells and micro-organism.

	Conventional laboratory	Method using the Milli Bioreactor system	The amount of savings
Raw material	2250 ml	290 ml	87%
Time optimization	80 Hour	53 Hour	34%
Performance time	16/5 Hour	4/1 Hour	75%
Use Gas Analyzer for analysis	✓	✗	100%

Milli Bioreactor



## ■ Product Specifications:

- ✓ 4 parallel Milli Bioreactor.
- ✓ Volume of operation, 5- 25cc.
- ✓ Oxygen sensor.
- ✓ Online monitoring of OTR- CTR- RQ based on an automated system ( Without Gas Analyzer ) .
- ✓ Temperature control, Ambient temperature to 50 ° C.
- ✓ Radius of rotational motion of Shaker, 5 mm.
- ✓ Rotational speed of shaker, 30- 500RPM.
- ✓ Aeration volume, 1 - 3VVM.

## ■ Customization of Milli Zist Payesh:

- ✓ Addition of various sensors such as pH, Do, Glucose, Nitrogen,....
- ✓ Desing spcial system including appropriate vessels to Milli Bioreactor, for tissue engineering and stem cell culture.
- ✓ Ability to be installed on your Shakers laboratories.
- ✓ Coustumization of Milli Bioreactor software.



Milli Bioreactor