wave bioreactor for continuous cell perfusion culture

The wave bioreactor is a highly efficient cell culture system that uses wave oscillations for mixing and oxygen dissolution to promote cell growth by providing a uniform culture environment.

Wave Bioreactor Overview

With a working volume up to 25L, the wave bioreactor is widely used in life science research, seed tank culture and production in the biopharmaceutical field, providing an efficient, safe and low-cost solution for cell culture.

Features

- Excellent culture performance: the wave bioreactor carries out gas mass transfer by wave oscillation, eliminating the need for traditional bubble aeration system and avoiding cell damage and the use of defoamer. The oscillating wave motion improves the dissolved oxygen efficiency, which helps to improve the cell state and significantly increase the cell density and yield, suitable for high-density cell culture.

- Platform versatility: The reactor is suitable for a variety of cell culture modes, including suspension cell culture and sheet carrier culture, and has good compatibility with commonly used mammalian cells such as CHO cells, HEK293 cells and insect cells such as Sf9. It supports a variety of process modes, such as batch culture, flow-addition culture and perfusion culture, to meet the needs of different cell cultures.
- Flexible configuration and convenient operation: The wave bioreactor is compatible with different sizes of reaction bags, which helps to reduce the cost of hardware investment, and at the same time reduces the transfer of containers and reduces the risk of cross-contamination. The disposable reaction bag design avoids the cleaning and sterilization process of traditional reactors, thus saving a lot of working time and ensuring a pollution-free culture environment.
- Precise and reliable control system: the reactor is equipped with a precise swing angle and speed control system, which can precisely adjust the swinging amplitude and speed of the reactor to meet the needs of different cell cultures. Combined with pH and dissolved oxygen sensors, it can monitor key process parameters in real time to ensure good conditions during the culture process and optimize cell growth and production efficiency.
- Intelligent process automation: Equipped with automated control software system can monitor and adjust various parameters in the culture process in real time to ensure that the culture conditions at each stage are well controlled, reduce the deviation of human operation and improve the accuracy and safety of operation.

Working Principle

The core working principle of the Wave Bioreactor is to provide gas-liquid mixing and oxygen dissolution through a wave-like oscillating motion. The wave motion inside the reactor pushes the culture liquid up and down, allowing the gas to be more evenly distributed in the liquid, thus increasing oxygen solubility and cell growth efficiency. The use of wave motion to increase the gas-liquid contact area avoids the shear stress damage to cells that may be caused by traditional bubble aeration. The frequency, angle and rotational speed of the oscillation can be precisely adjusted according to different cellular needs, ensuring cell growth during the culture process.

In addition, the reactor is equipped with pH and DO sensors to monitor and regulate important growth conditions in real time during cell culture, including pH and oxygen concentration, thus ensuring stable cell growth. Due to the use of disposable wave reaction bags, the contamination and cleaning work inside the vessel is reduced, which lowers the operation complexity and production cost.