

cell culture bioreactor with agitation for pharmaceutical plants

Cell culture bioreactors provide a growth environment for cells through precise control of temperature, pH, dissolved oxygen, stirring rate, replenishment and other key parameters to ensure the efficiency and stability of cell culture.

Cell Culture Bioreactor

Features

- **Flexible and selectable stirring mode:** Equipped with top mechanical stirring or magnetic coupling stirring system, you can choose the appropriate stirring mode according to the needs of different cell types, common stirring paddles include cage, turbine and inclined blade paddle, etc., which ensures uniform mixing of fluids and promotes gas transmission and material exchange.
- **Comprehensive control system:** Built-in multiple control parameters, including temperature, stirring speed, pH, dissolved oxygen concentration, defoaming, replenishment, gas flow rate, etc., which can accurately regulate the environmental conditions in the reactor and provide the necessary conditions for cell growth.



- **Customized design:** The reactor can be customized according to different production requirements, suitable for large-scale cell culture. It also supports the input of multiple gases, such as air, oxygen, nitrogen, carbon dioxide, etc., which can be flexibly adjusted according to different stages of the culture process.
- **Efficient defoaming system:** Equipped with an automatic defoaming system, it detects and controls the amount of foam in the reactor in real time, avoiding the foam affecting cell growth and saving the use of defoamer, keeping the culture environment clean and stable.
- **Intelligent control interface:** The operation interface is simple and easy to understand, with real-time data acquisition, curve display, report generation and other functions, users can easily monitor and adjust the parameters through the touch screen. It supports remote operation and data storage to ensure convenient operation and long-term traceability of data.

Working Principle

1. **Stirring Principle:** Different types of stirring paddles, such as cage-type, turbine-type or inclined-blade paddles are used to control the fluid flow in the reactor. The purpose of agitation is to enhance gas transfer, such as dissolution of oxygen and improve homogeneous mixing of substances. Different stirring methods can be adapted to the sensitivity of different cells to shear forces, thus guaranteeing high cell survival.
2. The combination of mechanical stirring and magnetic coupling stirring effectively reduces the damage of shear force on cells, and at the same time provides enough gas-liquid interface area to promote oxygen transfer.

3. **Temperature and pH control:** With the built-in temperature control system, the cell culture bioreactor can accurately regulate the culture temperature to ensure that the temperature does not negatively affect cell growth and metabolism. pH control maintains the acid-base balance of the culture medium through automatic detection and adjustment to avoid cell stress due to environmental changes.
4. **Dissolved Oxygen Control:** Dissolved oxygen is one of the key parameters in cell culture. The reactor ensures that the concentration of dissolved oxygen in the culture solution stays within range by controlling factors such as oxygen flow rate and agitation rate. This can be realized by gas flow control system, including air, oxygen, etc. and online dissolved oxygen sensor.
5. **Defoaming mechanism:** The reactor is equipped with an automatic defoaming control system that can monitor and regulate foam generation in real time. Through the use of peristaltic pumps and defoamer automatic addition system, can avoid the foam on the cell growth and other operations within the reactor interference, to protect the stability of the cell growth environment.
6. **Replenishment control:** The replenishment system will automatically add media according to the nutritional consumption during the culture process to ensure that the cells get enough nutrients during the whole culture process and promote their efficient growth.

Application Areas

- **Biopharmaceutical:** Cell culture bioreactor has a wide range of applications in the biopharmaceutical industry, providing an efficient cell culture environment during the cell production process of monoclonal antibodies, vaccines and so on.
- **Cell therapy:** In the field of cell therapy, cell culture bioreactors are used to culture stem cells, immune cells, etc. for clinical treatments such as cancer immunotherapy, gene therapy, etc.
- **Large-scale fermentation production:** In industrial fermentation, cell culture bioreactors can be used for microbial culture and metabolite production, and in the case where high-density culture is required, cell culture bioreactors are able to meet the needs of large-scale production.
- **Food and beverage industry:** Cell culture bioreactors can also be used for the cultivation of microorganisms in the food industry, such as the production of fermented foods, yeast and so on. During the fermentation process, it can provide a good environment to ensure the consistency and high quality of the product.
- **Agriculture and environmental protection:** In agriculture, cell culture bioreactor can be used for the production of microbial fertilizer, plant hormones, optimize the growth environment of crops. In environmental protection, cell culture bioreactor can be used in water treatment and other fields, using microorganisms to decompose harmful substances.