



生物制药

摇摆式生物反应器

WAVE BIOREACTOR

Science to Success: Your Premier Bioreactor Partner
从实验室到商业化的生物反应器合作伙伴



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摇摆式生物反应器

Wave Bioreactor

摇摆式生物反应器是专为细胞治疗、抗体药物种子扩增及疫苗生产等应用设计的一款产品，适用于各种类型的细胞培养，包括CHO、NSO、杂交瘤、HEK293、昆虫细/baculovirus杆状病毒、腺病毒、T细胞、植物细胞和初级人类细胞株。通过控制摇摆速度、摇摆角度、气体流量、pH、DO、温度等参数，使用一次性反应袋进行细胞培养，其性能稳定，安全简便。

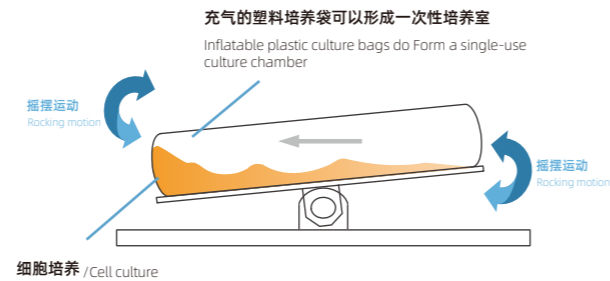
The wave bioreactor is designed for such as cell therapy, antibody drug seed amplification, and vaccine production. It is suitable for various types of cell cultures, including CHO, NSO, hybridoma, HEK293, insect/baculovirus, adenovirus, T cells, plant cells, and primary human cell lines. By controlling parameters such as swing speed, swing angle, gas flow rate, pH, DO, temperature, etc., using a disposable reaction bag for cell culture results in stable performance, safety, and simplicity.

01 产品结构 /PRODUCT OVERVIEW



02 工作原理 /WORKING PRINCIPLE

一次性细胞培养袋安装在摇摆式生物反应器的摇摆平台上，培养袋充气后进行使用。培养基和细胞通过培养袋的管路被输送到一次性细胞培养袋中。摇摆平台中的电机运动，使得细胞培养液产生波浪式摇摆，从而实现有效的气体传输和混合。根据不同的细胞类型和培养条件对摇摆平台的运动速度和角度进行调整。



The single-use cell culture bag is mounted on a rocking platform of the Wave Bioreactor and inflated for use. The culture medium and cells are delivered to the single-use cell culture bag through tins tubing. The motor movement in the rocking platform causes the cell culture fluid to produce a wavy rocking motion, thus achieving efficient gas transport and mixing. The motion speed and angle of the rocking platform are adjusted according to different cell types and culture conditions.

03 设备特点 /EQUIPMENT CHARACTERISTICS

- 1、可适用大部分细胞培养应用；
- 2、可适用批次培养、流加培养、灌流培养；
- 3、可适用悬浮培养、微载体培养和片状载体培养；
- 4、采用一次性技术，保证了无菌极大降低了污染的风险；
- 5、3种托盘型号满足不同的培养体积；
- 6、摇摆方式更好的气体交换和低剪切力；
- 7、一次性细胞培养袋，保证产品间切换灵活，避免交叉污染；
- 8、可根据需求选配各种传感器、软件定制、一次性细胞培养袋定制；
- 9、功能强大且简单易学的控制系统可提供工艺参数精确控制、工艺参数记录、对比等功能，为使用者优化工艺提供有力的帮助。

1. suitable for most cell culture applications
2. Applicable to batch culture, fed-batch culture, and perfusion culture
3. suitable for suspension culture, microcarrier culture and Fibr disk culture
4. Single-use technology ensures sterility and greatly reduces the risk of contamination
5. 3 tray models to meet the different culture volume
6. swing mode enhances gas exchange and reduces shear force
7. single-use cell culture bags allow flexible switching between products, avoiding cross contamination
8. customizable sensors, software, and single-use cell culture bags to meet specific needs
9. powerful and simple to learn control system provide accurate control of process parameters, process parameter record, comparison and other functions, helping users to optimize the process

04 产品参数 /PRODUCT PARAMETER

托盘尺寸 /Pallet size	10L	20L	50L
培养袋体积 /Bag volume	2L; 10L	10L;20L	20L;50L
培养体积 /Culture volume	1L; 5L	5L;10L	10L;25L
控制系统 /Control system	14英寸彩色控制屏，以太网接口，USB接口 14-inch color control screen, Ethernet interface, USB interface		
温度控制 /Temperature control	加热盘加热，PID自动控制，精度：±0.1℃；控制范围：25-40℃ Heating disc heating, PID automatic control, accuracy: ±0.1℃; Control range: 25-40 °C		
摇摆速度 /Rocking speed	1-40rpm; 控制精度：控制精度1rpm 1-40rpm; Control accuracy: Control accuracy 1rpm		
摇摆角度 /Angle of swing	2-12°		
通气 /Ventilate	3个热质流量计（空气、氧气、二氧化碳），范围：0-1L/min 3 heat and mass flow meters (air, oxygen, carbon dioxide), range: 0-1L /min		
尾气控制 /Exhaust gas control	设置尾气过滤器加热 Set the exhaust filter to heat		
pH	一次性光学电极，控制范围：6-8；控制精度：0.02；自动PID控制 Single-use optical electrode, control range: 6-8; Control accuracy: 0.02; Automatic PID control		
DO	一次性光学电极，控制范围：0-100%；控制精度：±2%；自动PID控制 Single-use optical electrode, control range: 0-100%; Control accuracy: ±2%; Automatic PID control		
蠕动泵 /Peristaltic pump	4台蠕动泵输送物料 4 peristaltic pumps transfer materials		
称重模块 /Weighing module	称重范围：0-25Kg；控制精度：±0.05Kg；可与蠕动泵关联 Weighing range: 0-25kg; Control accuracy: ±0.05Kg; Can be associated with peristaltic pumps		
电源 /Power source	AC220V, 50/60Hz		

适配一次性细胞培养袋

Adapted single-use cell culture bags

低配版 / Low configuration

由袋体、管路、连接件、过滤器组成，经辐照灭菌后提供客户使用；

Composed of bag body, pipe, connecting parts and filter, which can be used by customers after irradiation sterilization.

定制培养袋 / Custom culture bag

客户指定培养袋的类型和尺寸，包括管路的长度和直径、配件组成、接口数量等；

The type and size of the culture bag specified by the customer, including the length and diameter of the pipeline, the composition of the parts, the number of interfaces, etc.

片状载体 / Fibra disk

由袋体、管路、连接件、内置片状载体、过滤器组成，经辐照灭菌后提供客户使用；

Composed of bag body, pipeline, connecting parts, built-in fibra disk and filter, provided for customers after irradiation sterilization;

集成灌注过滤膜版

/Integrated perfusion filter membrane version

由袋体、管路、连接件、截留膜、过滤器组成，经辐照灭菌后提供客户使用；

It is composed of bag body, pipe, connecting piece, retaining film and filter. It can be used by customers after irradiation sterilization.

配置pH\DO电极(高配版)

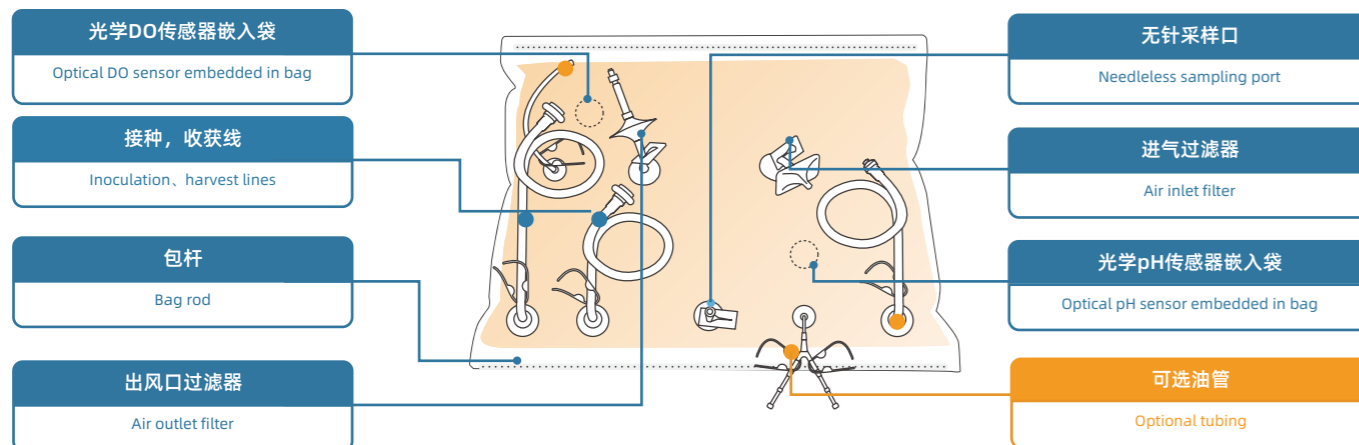
/Equipped with pH\DO electrode (high standard version)

由袋体、管路、连接件、ReadyMate无菌快接、过滤器、一次性电极组成，经辐照灭菌后提供客户使用

Composed of bag body, pipe, connector, ReadyMate sterile quick connection, filter and single-use electrode. It is provided to customers after irradiation sterilization

• 01

产品结构 / PRODUCT OVERVIEW



最大总容量 (L) Maximum total capacity (L)	2	10	20	50	pH值传感器 pH sensor	一次性光学传感器 Single-use optical sensor
工作容量 (L) Working capacity (L)	0.2-1	1-5	20-10	5-25	DO传感器 DO sensor	一次性光学传感器 Single-use optical sensor
工作温度 Operating temperature	10°C - 50°C				工作压力/测试压力 Working pressure/test pressure	0.1bar/0.25bar

• 02

质量要求 / QUALITY REQUIREMENT

- 1、生物安全: 符合USP<85>; USP<87>; USP<88>; ISO 10993-4; ISO 10993-5; ISO 10993-6: ISO 10993-10: ISO 10993-11。
1. Biosafety: USP<85>; USP<87>; USP<88>; ISO 10993-4 ISO 10993-5: ISO 10993-6: ISO 10993-10: ISO 10993-11.
- 2、化学兼容: 符合ASTM D543-06
2. chemical compatibility: compliant with ASTM D543-06
- 3、塑料理化属性:符合USP <661>
3. plastic physical and chemical properties: compliant with USP <661>
- 4、可提取物 & 颗粒物: 符合USP <665>; USP <788>
4. Extractable & particulate matter: compliant with USP <665>; USP <788>
- 5、声明: 符合European Pharmacopoeia tests, Ch.3.1.5; FDA 21 CFR 177.1520; TSE | BSE statement; REACH
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案例分享-CHO-K1 (GS系统)

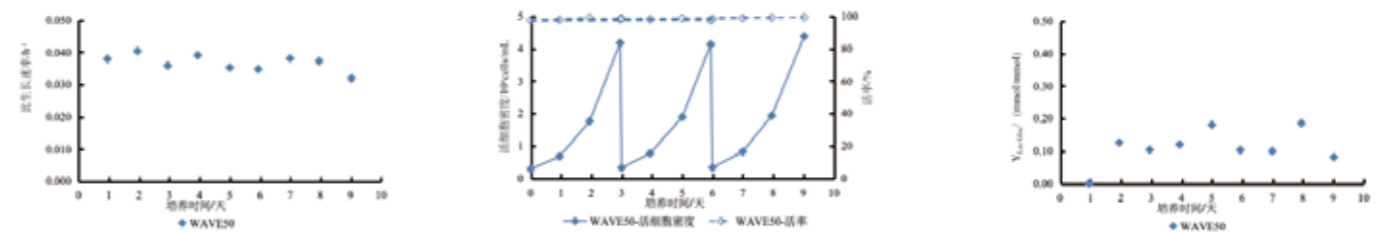
Case Sharing -CHO-K1 (GS System)

使用50L WAVE连续进行3批种细胞培养，第1批培养体积为10L，第2-3批培养25L，按工艺参数进行设置及过程控制。

种细胞培养72小时，细胞参数稳定（活细胞密度、活率、比生长速率），代谢参数稳定（YLac/Gluc），可满足种细胞培养需求。

Use 50L WAVE to continuously carry out 3 batches of seed cell culture, the 1st batch culture volume is 10L, the 2nd-3rd batch culture is 25L, set up and process control according to the process parameters.

The cell parameters are stable (viable cell density, viability, specific growth rate) and metabolic parameters are stable (YLac/Gluc) after 72 hours of seed cell culture, which can meet the needs of seed cell culture.



细胞参数 Cell parameter	接种密度 / Inoculation density	10 ⁶ cells/mL	0.3
	最大工作体积 / Maximum working volume	L	25
	工作体积 / Working volume	L	10/25
反应器参数 Reactor parameter	温度 / Temperature	设定值 / Set value	37 °C
	转速 / 角度 / Speed / Angle	设定值 / Set value	15rpm/6° / 20 rpm/8°
	pH	设定值 / Set value	7.05±0.2
	DO	设定值 / Set value	40%
	Air	设定值 / Set value	20-50mL/min / 40-70mL/min
	O ₂	设定值 / Set value	0-200mL/min / 0-400mL/min
CO ₂	设定值 / Set value	0-100mL/min	