



Biopharmaceutical

**WAVE BIOREACTOR**

Science to Success: Your Premier Bioreactor Partner



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# Wave Bioreactor reactor

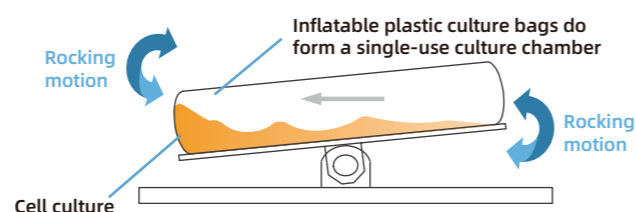
The wave bioreactor is designed for such as cell therapy, antibody drug seed amplification, and vaccine production. It is suitable for various types of cell cultures, including CHO, NSO, hybridoma, HEK293, insect/baculovirus, adenovirus, T cells, plant cells, and primary human cell lines. By controlling 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 PRODUCT OVERVIEW



## • 02 Working principle

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 its 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 Equipment characteristics

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 Fibra 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 provides accurate control of process parameters, process parameter record, comparison and other functions, helping users to optimize the process

## • 04 PRODUCT PARAMETER

Pallet size	10L	20L	50L
Bag volume	2L; 10L	10L;20L	20L;50L
Culture volume	1L; 5L	5L;10L	10L;25L
Control system	14-inch color control screen, Ethernet interface, USB interface		
Temperature control	Heating disc heating, PID automatic control, accuracy: $\pm 0.1^{\circ}\text{C}$ ; Control range: 25-40 $^{\circ}\text{C}$		
Rocking speed	1-40rpm; Control accuracy: Control accuracy 1rpm		
Angle of swing	2-12 $^{\circ}$		
ventilate	3 heat and mass flow meters (air, oxygen, carbon dioxide), range: 0-1L /min		
Exhaust gas control	Set the exhaust filter to heat		
pH	Single-use optical electrode, control range: 6-8; Control accuracy: 0.02; Automatic PID control		
DO	Single-use optical electrode, control range: 0-100%; Control accuracy: $\pm 2\%$ ; Automatic PID control		
Peristaltic pump	4 peristaltic pumps transfer materials		
Weighing module	Weighing range: 0-25kg; Control accuracy: $\pm 0.05\text{Kg}$ ; Can be associated with peristaltic pumps		
Power source	AC220V, 50/60Hz		

## Adapted single-use cell culture bags « Culture bag »

### Low configuration

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

### Custom culture bag

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.

### Fibra disk

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

### Integrated perfusion filter membrane version

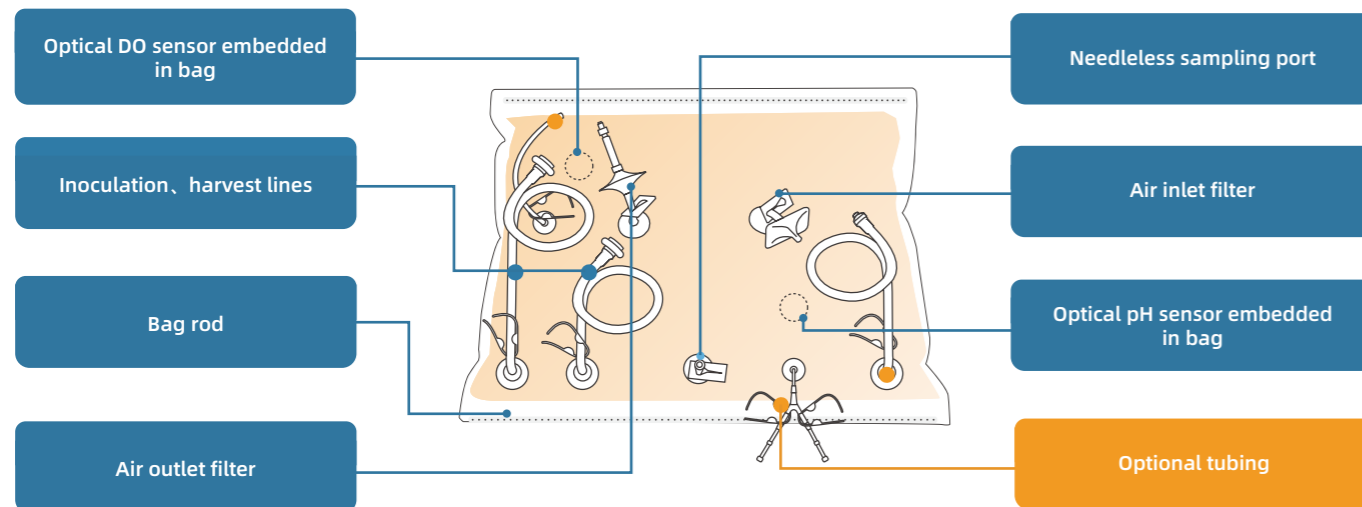
It is composed of bag body, pipe, connecting piece, retaining film, and filter. It can be used by customers after irradiation sterilization.

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

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

• 01

## PRODUCT OVERVIEW



Maximum total capacity (L)	2	10	20	50	pH sensor	Single-use optical sensor
Working capacity (L)	0.2-1	1-5	20-10	5-25	DO sensor	Single-use optical sensor
Operating temperature	10°C - 50°C				Working pressure/test pressure	0.1bar/0.25bar

• 02

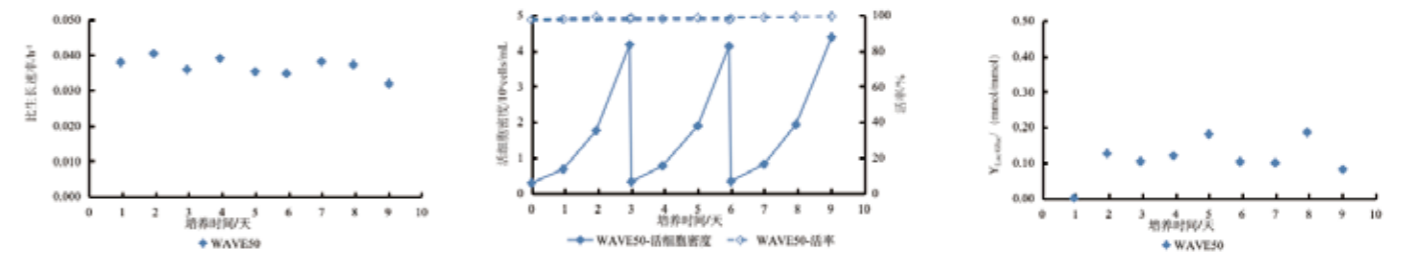
## Quality requirement

1. Biosafety: USP<85>; USP<87>; USP<88>; ISO 10993-4 ISO 10993-5: ISO 10993-6: ISO 10993-10: ISO 10993-11.
2. Chemical compatibility: compliant with ASTM D543-06
3. Plastic physical and chemical properties: compliant with USP <661>
4. Extractable & particulate matter: compliant with USP <665>; USP <788>
5. Declaration: compliant with European Pharmacopoeia tests, Ch.3.1.5; FDA 21 CFR 177.1520; TSE | BSE statement; REACH

## Case Sharing -CHO-K1 (GS System) « Case »

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 (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.



Cell parameter	Inoculation density	106cells/mL	0.3
	Maximum working volume	L	25
	Working volume	L	10/25
Reactor parameter	temperature	Set value	37 °C
	Speed/Angle	Set value	15rpm/6° / 20 rpm/8°
	pH	Set value	7.05±0.2
	DO	Set value	40%
	Air	Set value	20-50mL/min / 40-70mL/min
	O2	Set value	0-200mL/min / 0-400mL/min
CO2	Set value	0-100mL/min	