

## multiple parallel stainless steel fermenter for comparative

Multiple parallel stainless steel fermenter consists of 2 to 16 fermenters of the same specification, designed for complex experiments such as multi-peak comparison test, strain screening, fermentation process optimization, production process validation and so on.

### Multiple Parallel Stainless Steel Fermenter System

The multiple parallel stainless steel fermenter system enables simultaneous fermentation experiments under different conditions, improving research efficiency and reproducibility. With customizable volumes (10–5000L), automated control, and CIP cleaning, it is ideal for microbial fermentation, cell culture, enzyme engineering, and more.

### Main Features

1. **Multi-Tank Parallel Control:** Operate 2–16 fermenters of the same spec in parallel for comparative testing and process development.
2. **High-Efficiency Stirring:** Mechanical stirring with automatic lifting, 316L stainless shaft, multi-layer paddles, adjustable speed (50–1000rpm) for optimal mixing and oxygen transfer.



3. **Precise Temperature Control:** Electric heating + water circulation cooling, 20–65°C range,  $\pm 0.2^\circ\text{C}$  precision, over-temp and water cut-off protection.
4. **Intelligent Monitoring & Control:** PID system for real-time pH, DO, temp, and gas flow adjustment; remote monitoring via mobile app.
5. **High-Efficiency Aeration:** Dual-channel rotor flow meter, 0.01 $\mu\text{m}$  air filter, automatic sterile gas flow control for varied fermentation needs.
6. **Automated Replenishment & Foam Control:** Adjustable-speed peristaltic pumps, multiple replenishment modes (constant, exponential, linear, pH/DO-linked); foam detection and auto defoamer dosing for process stability.
7. **Fully Automated Cleaning:** CIP online cleaning of tanks and pipelines ensures hygiene and reduces manual intervention.

### Working Principle

1. Automated environmental control (temp, gas, stirring) maintains optimal fermentation conditions.
2. Real-time pH and DO regulation via PID, with automatic adjustment of replenishment, gas flow, and stirring.
3. Smart replenishment and foam control ensure consistent nutrient supply and process stability.
4. Centralized PLC management synchronizes data across tanks for comparison and optimization.

## Application Areas

1. **Biopharma:** Microbial fermentation, cell culture, protein drugs, antibiotics, vaccines, strain optimization, process validation.
2. **Food & Beverage:** Probiotics, fermented foods (yogurt, beer), nutritional supplements, functional foods.
3. **Agriculture & Environmental:** Biopesticides, fertilizers, organic waste treatment, anaerobic digestion, biodegradation.
4. **Chemical & Energy:** Biofuels (ethanol, biogas), organic acid/enzyme production, chemical fermentation.
5. **Research & Education:** Metabolic/genetic engineering, cell culture, strain screening, laboratory scale-up.