# MX-C
## Cell Disruptor

Cell disruption is the method or process for releasing biological molecules from inside a cell. The cell suspension and the microbeads are fully mixed under controlled rapid oscillation. The microbeads and the cells shear and collide with each other effectively breaking the cell wall and releasing its contents. Best suited for research work in laboratories ideal for accurate, reproducible, repeatable results.


### Features

- Easy to operate Rapid hands-free disruption
- Processes at a Constant, Controlled Shear Rate
- Simultaneous processing of multiple samples
- Maintains genome integrity of the biological samples
- Facilitates subsequent purification

### Key Applications

Suitable for all sample types; Lysing highly contagious samples; Lysis of yeast and fungi; Used for Isolation of PCRReady Genomic DNA from Fecal Samples; Used for Isolation of PCR-Ready Genomic DNA from Fungi and Bacteria Samples; Used for Isolation of PCR-Ready Genomic DNA from Soil Samples; DNA & RNA Purification; Lysis of bacteria; Lysis of soft tissues; Isolation of genomic DNA; Purification of DNA; Cell Lysis; Used to lyse cell wall of yeast; Break hard/brittle samples.

### The Cell Disruptor effectively solves the cell disruption difficulties caused by cell wall structure and cell number.

1. The cell wall of Gram-positive bacteria is mainly composed of peptidoglycan and acid polysaccharide. The cell walls of various yeasts and fungi are mainly composed of polysaccharides and proteins, and their dense network structure is not easy to break.
2. Some samples are more rare and precious and limited in number or volume.
3. Inappropriate crushing methods may cause genome breakage and affect subsequent experiments.

| Specifications | MX-C |
|---|---|
| Functions | Disrupts cells, yeast, bacteria, algae, fungi, etc. to prepare cell lysates for further processing |
| Mixing motion | High-speed circumferential vortex and oscillation function |
| Orbital diameter [mm] | 4 |
| Speed range [rpm] | 0-2500 (Adjustable) |
| Speed display | Scale |
| Capicity | 8×2mL |
| Voltage [VAC] | 200-240V/ 100-120V, 50/60 Hz, 60W |
| Dimension [mm] | 127×130×160 |
| Weight [kg] | 3.5 |

For most research of microorganism and algae, the cell wall lysis is the first step, no matter what the subsequent process is such as sequencing, identification and cloning, or intracellular substances research such as various proteins and other biomolecules. The existing common cell disruption methods has its own disadvantages which are explained below:

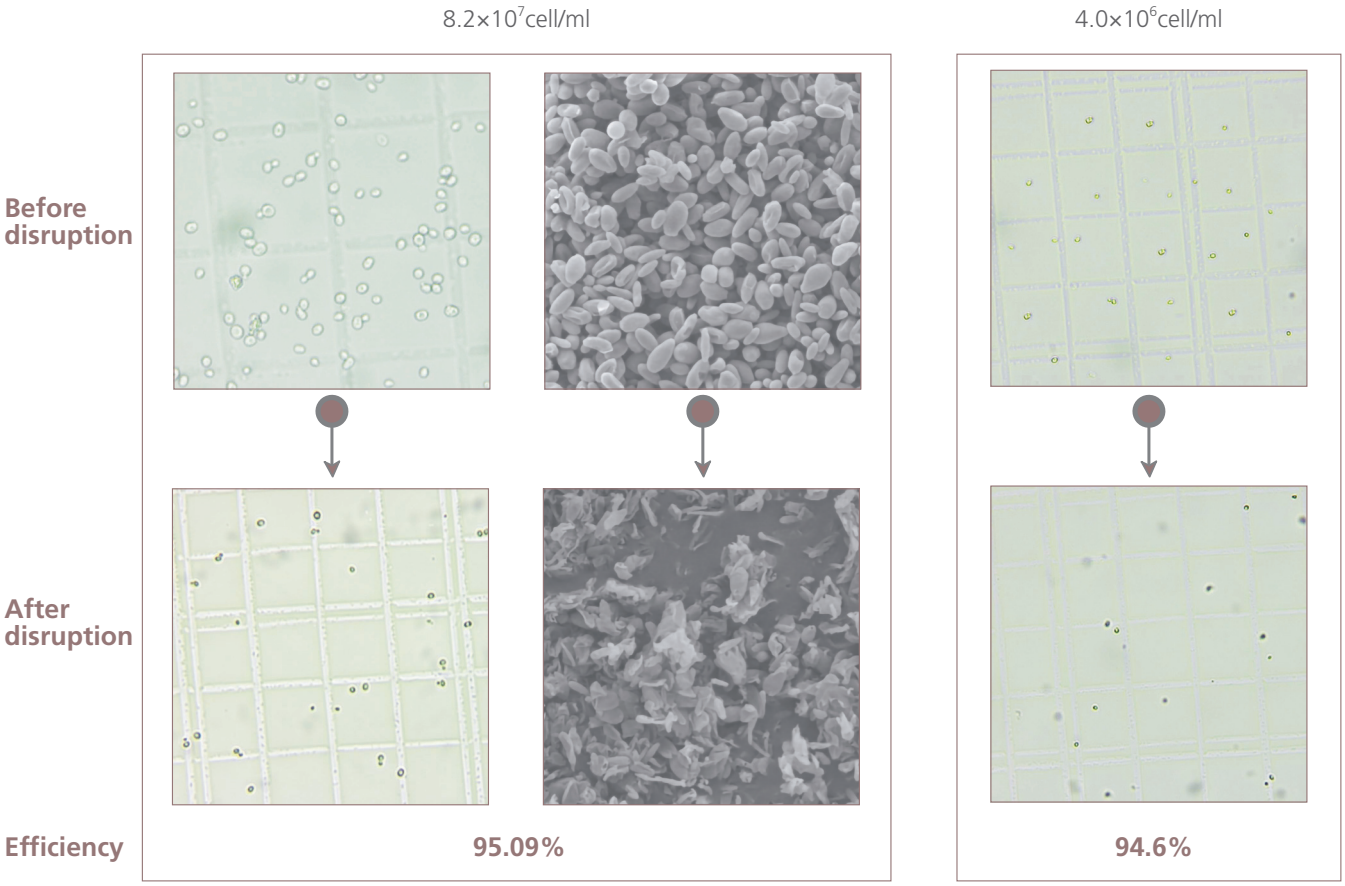
| Common methods | Disadvantage |
|---|---|
| Enzymatic method | It is not versatile. Different microorganism need different enzymes, and their effects are different. Enzymes cause product inhibition, and its price is high. |
| Chemical method | The addition of chemical reagents will form new pollution, adding trouble to further separation and purification. |
| Ultrasonic method | It is easy to generate heat during the ultrasonic process, which may cause protein denaturation and destroy molecular activity. |
| Liquid nitrogen grinding | The operation is required fast, and it is easy to be frostbite if the operation is careless. Only one sample can be processed one time. |
| Repeated freeze-thaw | This method can be used for bacteria with weak cell walls, but the process takes longer time. The freeze-thawing time and frequency need to be optimized to preserve cell lysate. |
| High-pressure homogenization | It is suitable for large number of samples. Gram-positive bacterial and fungal hyphae may cause blockage and damage to the instrument, and its cost is high too. |

## Application Examples

### 1 Yeast cells

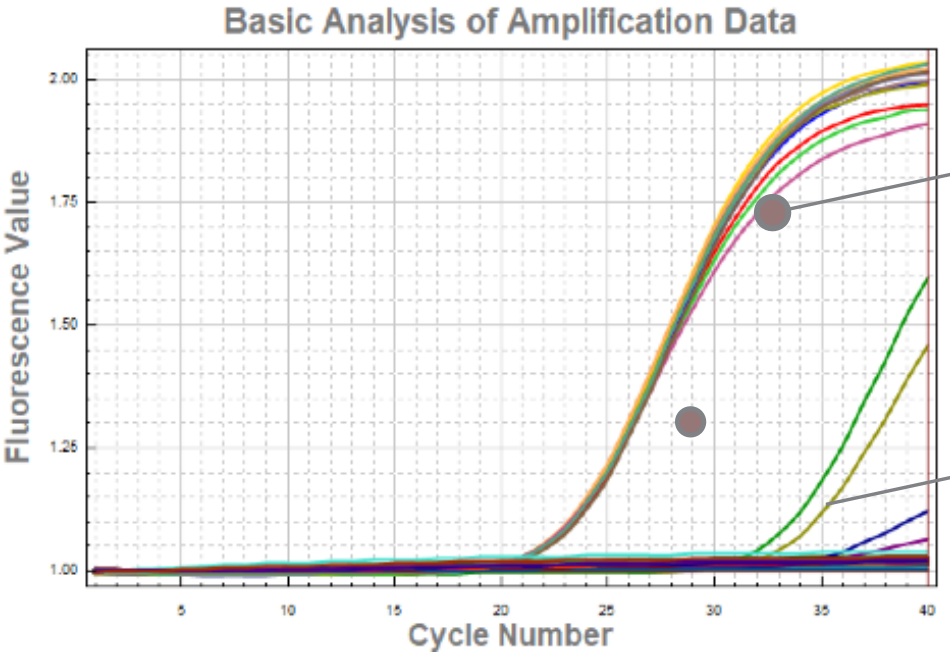
1ml yeast solution (OD600=1) is diluted 10 times and counted using microscope (magnification ×400/×1000). Add 0.5g 1mm/0.2mm mixed microbeads and 300ul yeast solution to the 2ml centrifuge tube. Set maximum rotation to disrupt for 5 minutes. Then count again using microscope quantification.

### Microscopic verification



## QPCR verification

Extract the genomes of $10^6$ cell for QPCR verification.



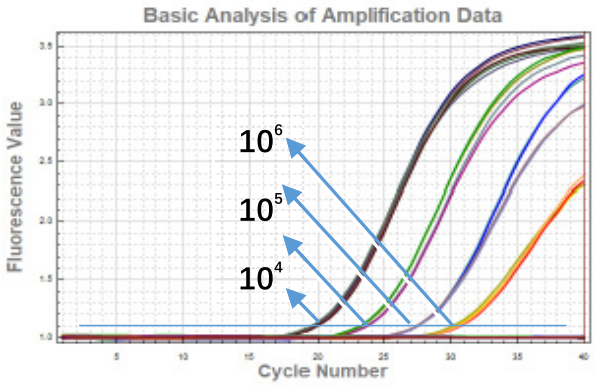

**After**

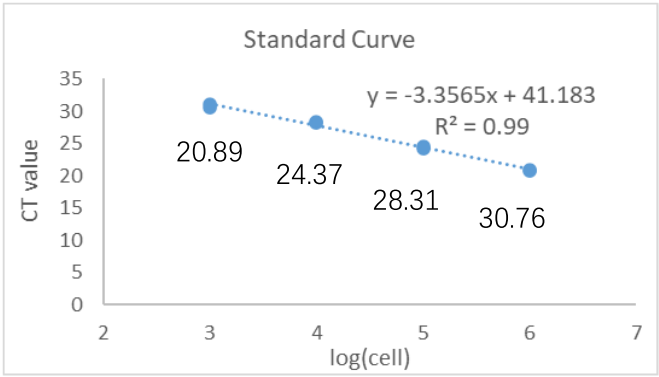
CT=22.83
Genome copy number increased $10^3$ times

**Before**

CT=33.08

A total of $10^6$ yeast cells were serially diluted to $10^5$, $10^4$, and $10^3$. Genome was extracted after cell disruption, and then verified by QPCR.



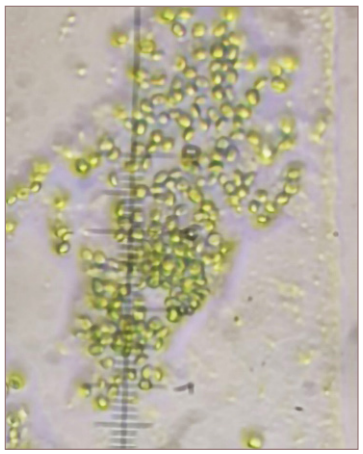

$R^2$ = 0.99. It indicate that the cell disruption efficiency is basically the same when cells number are in the range of $10^3$-$10^6$. This method is very suitable for rare-cell analysis.

# 2 Chlorella cells

Use the same method to disrupt Chlorella cells.

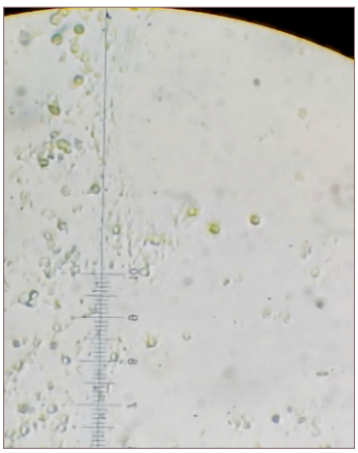
## Microscopic verification

**Untreated Solution**



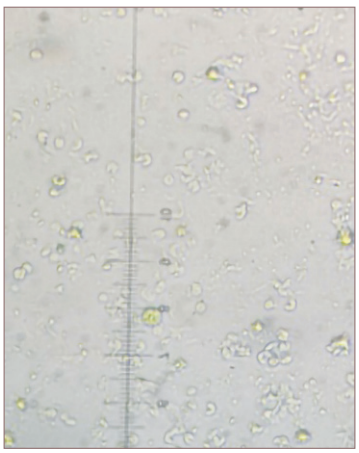
The cell structure can be clearly observed

**Disruption Time: 3min**



Large amount of cell debris and a small amount of unbroken cell structure can be observed.

**DisruptionTime:10min**



A large amount of cell debris is observed.

## Spectrophotometer verification

The broken cells were filtered with 0.45μm filter membrane. The spectral absorbance was measured with spectrophotometer. There was an obvious absorption at 260 nm and 280 nm after 3min disruption, but the difference of absorbance at 10 min and at 3 min was small.