

My work.

My life.

My choice.

**SANYO**

Think GAIA  
For Life and the Earth

**SANYO**

# Beat the Heat Campaign

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

*My Life. My Work. My Choice*

My life.  
My work.  
My choice.

Beat the heat



## Market Position

- Confusion or lack of understanding of UV method and efficacy.
- Current published data only shows the effectiveness of one method not comparative.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Celsis Incubator Study

- Determine the effectiveness of decontamination methods
  - Sanyo MCO18AIC UV & 20AIC;  
UV Decontamination plus InCu Safe
  - Dry Heat Sterilization
  - Moist Heat Sterilization

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Incubator Study - Objectives

- Objective stance from an independent testing laboratory confirming UV efficacy
- SANYO ultraviolet light sterilization process is as effective against bacteria, yeasts and molds
- UV = Heat sterilization at sustained temperatures ranging from +90°C to +140°C
- Heat sterilization technique cannot replicate an *in vitro* method of SANYO's Active Background Contamination Control™

www.sanyobiomedical.com

My life.  
My work.  
My choice.

Beat the heat

## Celsis Protocol

- Inoculate inCu saFe stainless steel, glass and silicone gasket components
- Bacteria Preparation: Three passes before use, then 24-hour growth. Yeast: Grown for 3-5 days. Mold: Grown for 5-7-days
- Run CO2 Incubators contaminated with test organisms in accordance with each manufacturer's instructions
- After exposure the inoculated coupons are removed from the chamber
- Compile results based on organism growth after sterilization in each incubator
  - Report initial count and log reduction.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

## Organism Selection

### Why were these organisms selected for this study?

- Bacteria, molds and yeasts are found virtually everywhere and are able to quickly colonize and flourish in the rich and relatively undefended environment provided by cell cultures. Because of their size and fast growth rates, these microbes are the most commonly encountered cell culture contaminants. In the absence of antibiotics, microbes can usually be readily detected in a culture within a few days of becoming contaminated, either by direct microscopic observation. The species of yeast and mold used in the study are those that are can robustly thrive in harsh conditions and are difficult to detect.

www.sanyobiomedical.com

My life.  
My work.  
My choice.

Beat the heat

## Celsis Incubator Study Results

- Compilation of results was based on organism growth following the manufacturer's recommended decontamination process (sterilization).
- Each sterilization method, including UV active background contamination control and high heat cycle, are equally effective in mitigating growth of the selected organisms.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

www.sanyobiomedical.com

The SafeCell™ UV system is designed to destroy many common organisms known to impact the cell culture environment.

Heat sterilization is an active process independent of the cell culture environment generally established at 37°C.

METHOD	UV	HIGH HEAT	
	SANYO	Brand F (+140°C)	Brand H (+90°C)

Reported initial count and log reduction in colony forming units (cfu).

TEST RESULTS, MAXIMUM LOG REDUCTIONS			
Bacteria	> 4.5	> 4.5	> 4.5
Yeast	> 2.9	> 2.9	> 2.9
Mold	> 2.7	> 2.7	> 2.7

SANYO ultraviolet light sterilization process is as effective against bacteria, yeasts and molds.

Independent testing confirms the efficacy of our patented SANYO SafeCell™ ultraviolet decontamination system compared to high-heat methods

DECONTAMINATION OPTIONS			
Overnight	✓	✓	✓
Active Background Contamination Control™	✓	⊘	⊘

Together with the passive resistance of copper-enriched stainless steel, the active effort to destroy airborne contaminants in vitro forms an effective Active Background Contamination Control™ unique to the SANYO incubator with UV decontamination function.

Heat sterilization offers no passive benefits to protect cell cultures in situ from airborne contamination.

Heat sterilization offers no passive benefits to protect cell cultures in situ from airborne contamination.

My life.  
My work.  
My choice.

## Results – Final Count

### How was the recovery analyzed and final results reported?

- Recovery is washed from the coupon and a plate count is performed to quantify the organisms remaining.
- Compiled results based on organism growth after sterilization in each incubator.
- Reported initial count and log reduction in colony forming units (cfu).
- The control count of the bacteria expressed in cfu/ml is compared to the final recovered amount in cfu/ml after each decontamination method is conducted in each incubator.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

## Results – log reduction

### Why are the majority of the log reductions equivalent for each decontamination method ?

- The majority of the log reductions for recovery after each decontamination method were ND (Non-detectable), less than 10 cfu/ml which demonstrates a minimum level of detection for an organism (i.e. ND) in microbiology. The equivalent log reductions in organism growth showed that each decontamination method are equally effective against selected organisms.

www.sanyobiomedical.com

My life.  
My work.  
My choice.

## UV Decontamination

### How can UV decontaminate and mitigate the growth of organisms?

- Microorganisms are deactivated by ultraviolet light, by specific incident energies.
- The efficacy of ultraviolet light at 253.7nm is a function of exposure over time for selected organisms. Some organisms require more exposure than others. The SafeCell™ UV system is designed to destroy many common organisms known to impact the cell culture environment.
- Ultraviolet light affects DNA by causing Pyrimidine dimers to form when adjacent Pyrimidine bases on the DNA strand become covalently linked (i.e. chemically bonded to one another). The dimer disrupts the normal replication of the DNA or transcription to make proteins and destroys contaminants. (i.e. Primarily UV light causes alterations in the structure of DNA that inhibits DNA replication and therefore an increase in the number of organisms).

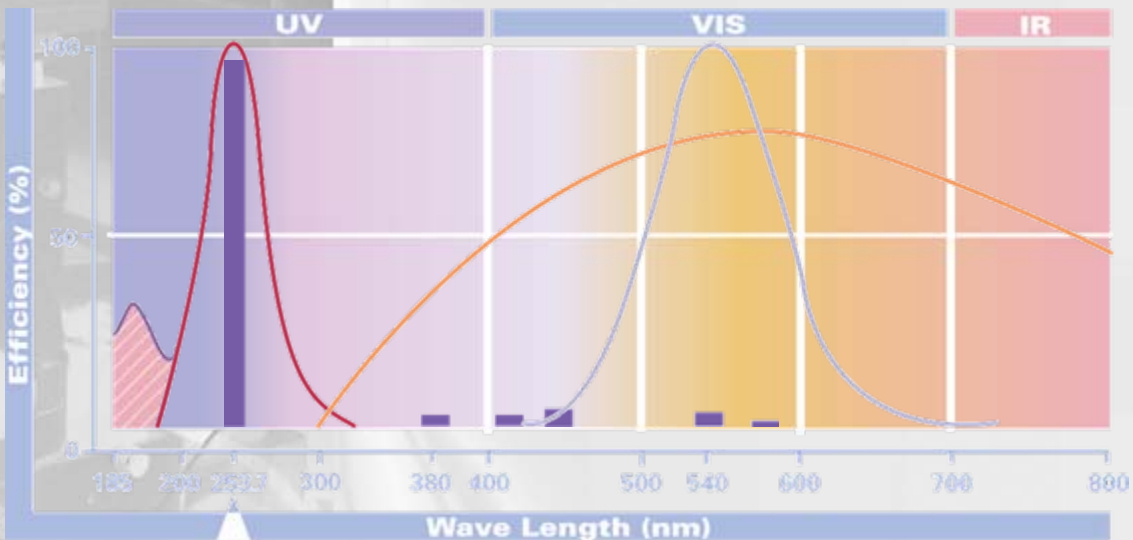
www.sanyobiomedical.com

My life.  
My work.  
My choice.

Beat the heat

www.sanyobiomedical.com

Unlike typical germicidal lamps, the long-life SafeCell™ UV lamp is designed to deliver straight line performance at approximately 253.7nm for maximum germicidal efficiency and long life.



The SANYO MCO-20AIC UV Lamp is a highly effective, ozone-free contamination control technique.

■ SANYO Lamp  
 ■ Ozone Release  
 ■ Germicidal Effect  
 ■ Eye Sensitivity  
 ■ Sunlight

My life.  
My work.  
My choice.

Beat the heat

# UV Efficacy – Mechanism of SANYO SafeCell UV System

**What is the mechanism by which UV effectively decontaminates in the Sanyo SafeCell system ?**

- A directional air-flow and containment plenum surrounds the UV exposed humidity reservoir in a removable, stainless steel pan.
- The mechanism employs active and passive systems working together in the SANYO performance model, contaminants that inevitably enter the chamber through routine door openings or other means are intercepted and destroyed while cell culture continues uninterrupted.
- The multi-faceted approach to contamination control is designed to destroy airborne particulates introduced during door openings, as well as contaminants that grow in the water reservoir.

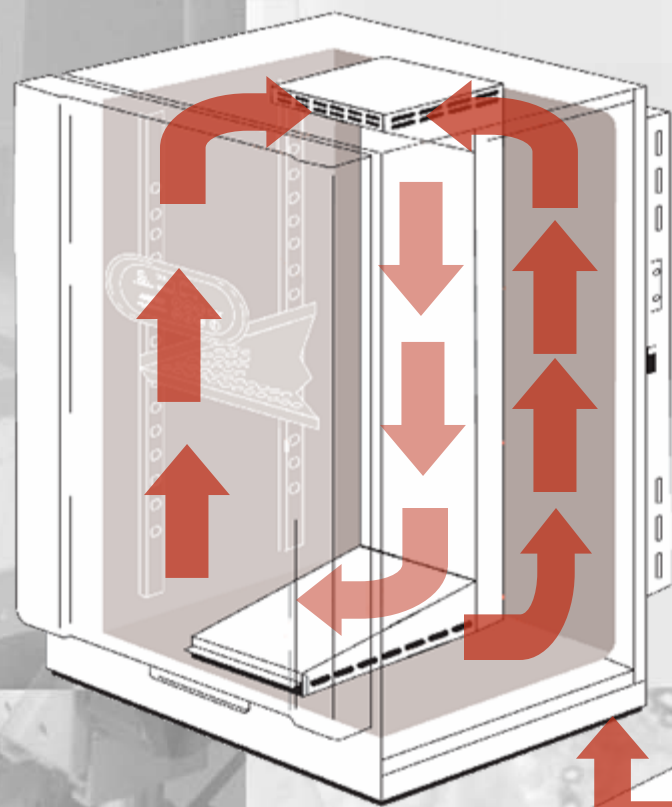
[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

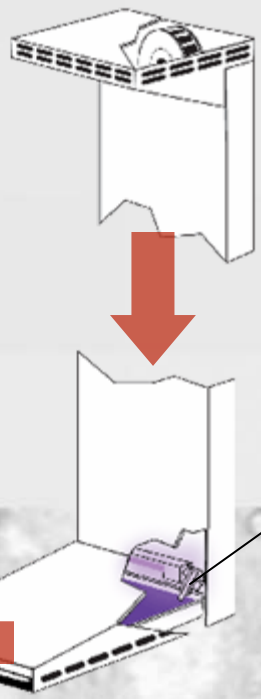
Think GAIA  
For Life and the Earth

**SANYO**

www.sanyobiomedical.com



The airflow process within the SANYO MCO-20AIC chamber reveals the relative position of the blower and UV lamp in relationship to the humidity pan and outflow ducts at the base of the chamber. The high-impact autoclavable plastic blower wheel easily snaps off for cleaning and replacement if required.



My life.  
My work.  
My choice.

Beat the heat



## Effect on cell cultures

### How does the Sanyo Safecell UV system not affect cell cultures during incubation?

- During normal operation when cells are being incubated within the chamber, the UV lamp is visibly isolated from the cell culture chamber by a plenum cover over the humidity pan, permitting UV decontamination of circulated, humidified air and humidity pan surface water to remain in process without damaging the cells.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Conclusions / Implications

- Independent testing confirms the efficacy of our patented SANYO SafeCell™ ultraviolet decontamination system compared to high-heat methods
- Heat sterilization offers no passive benefits to protect cell cultures *in situ* from airborne contamination
- UV sterilization technique employed by the SANYO incubator is equally effective against contamination as conventional high heat sterilization over a range of +90°C to +140°C.

www.sanyobiomedical.com

My life.  
My work.  
My choice.

Beat the heat

# Campaign Resources

www.sanyobiomedical.com

- Whitepaper
- Concise whitepaper
- Customer FAQ
- Presentation
  - UV = Heat
  - Feature & Benefit
- Byline
- Interactive CD

The collage features several documents:

- TECHNICAL DEVELOPMENT REPORT**: A vertical report on the left side.
- Application Note**: Titled "A Comparative Analysis of Ultraviolet Light vs High-Heat Sterilization in a Cell Culture CO<sub>2</sub> Incubator".
- TECHNICAL ARTICLE**: A central article with a table comparing UV and Heat sterilization methods.
- Whitepaper**: A document titled "A Comparative Analysis of Ultraviolet Light vs High-Heat Sterilization in a Cell Culture CO<sub>2</sub> Incubator" by Waseel Benzajem and Deepak Misra.

My life.  
My work.  
My choice.

Beat the heat

## Current Position

- In most laboratories, the greatest sources of microbial contamination are airborne particles and aerosols generated during culture manipulations.
- The microbial laden particles are relatively large (generally 4 to 28  $\mu\text{m}$  in diameter) and settle at a rate of approximately one foot per minute in still air.
- There are NO passive benefits from heat decontamination alone to protect cell cultures when the cycle is completed and interior components are replaced; the propensity for airborne contamination reoccurs through normal door openings.
- Despite exposure to high heat ranging from 90°C to 140°C, it is suggested that latent thermophilic or hyperthermophilic organisms can remain in the incubator chamber, assuming an even more aggressive expression than before the cycle.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Campaign Positioning

- UV = Heat (Advantages / Disadvantages)
- UV (proactive) > Heat
- Preventative Contamination Management
- Real Time Cell Protection with UV
- Optimal Contamination Detection
- Primary Airborne Decontamination System
- Stop contamination before it stops your work in progress...Proactive vs. Reactive
- Majority of lab contamination is airborne...are you safe without UV...with every door opening
- Consistent, reproducible, uninterrupted culturing environment...

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Real Time Cell Protection: Understanding an End User's Cell Culture Protocol

- Cell culture volume - Greater the volume of cell cultures the harder it becomes to maintain a stable environment due to the effect of desiccation and environmental factors that will increase the possibility of cross contamination
- Cell culture type - Identify whether they are using human or nonhuman cells; Human cells are more sensitive and will be more prone to contamination; Sensitive cell lines require close to perfect conditions without the interruption by small or large changes in pH, CO<sub>2</sub>, and O<sub>2</sub> levels.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

## Real Time Cell Protection: Understanding an End User's Cell Culture Protocol

- Incubation time - Longer periods will have a greater possibility for contamination
- Focus on showing how pH, CO<sub>2</sub> and O<sub>2</sub> are affected by environmental conditions
- These parameters can be changed by low to high levels of contamination or change in air quality of the laboratory
- Identify sources for contamination in their laboratory environment
- Cultures should be healthy with a viability of >90% and no signs of microbial contamination.
- Cultures should be in log phase of growth (i.e. cultures that are below their maximum cell density)

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

## Real Time Cell Protection: Cell line Growth & Viability

- Researchers need to produce the same quality of robust cell lines (i.e. efficient replication and transformation properties) for research in the present and future.
- Efficiency, integrity and robustness of a cell line can be correlated to the maintenance of a constant uniform environment.
- Efficiency and stringency of transfection conditions are important for improving selection of highly productive clones that are used as viable biological products after incubation.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

## Real Time Cell Protection: Cell line Growth & Viability

- This is an important factor as many researchers develop working models to experiment later in the process and therefore require equivalent environmental conditions in repeated trials.
- An incubator that is proactively working real time to produce stable and homogeneous conditions; pH, CO<sub>2</sub>, O<sub>2</sub>...etc
- Therefore, real time protection of the cell culture environment can further optimize growth conditions.

[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

My life.  
My work.  
My choice.

Beat the heat

# Sanyo ONLY Approach

www.sanyobiomedical.com

- The multi-faceted approach to contamination control is designed to destroy airborne particulates introduced during door openings, as well as contaminants that typically grow in the water reservoir.
- Active and passive systems working together in the SANYO performance model, contaminants that inevitably enter the chamber through routine door openings or other means are intercepted and destroyed while cell culture continues uninterrupted.

**SANYO**

There is no reason to turn your CO<sub>2</sub> incubator into an oven to decontaminate it.

**And we have the proof.**

Independent testing confirms the efficacy of our patented SANYO SaniCAP™ active decontamination system compared to highest industry standard for comparison.

What's more, SANYO Active Background Contamination Control™ Active inhibition ON setting to reduce contamination to one of the lowest of all right. All for the same value-of-useful component that makes components stop active contamination before it starts.

For test results and a copy of our White Paper contact your Sales Representative or visit [www.sanyobiomedical.com](http://www.sanyobiomedical.com) Search for: **My life. My work. My choice.**

**SANYO** | [www.sanyobiomedical.com](http://www.sanyobiomedical.com) | toll free 800-858-8442

Method	Contamination Level	Decontamination Time
SANYO SaniCAP™	100%	10 min
Industry Standard	10%	120 min

My life.  
My work.  
My choice.