Thermostable Media

DMEM^{TS} and RPMI 1640^{TS}

For Storage at Room Temperature

PAA

THE CELL CULTURE COMPANY

PAA Thermostable Media

The Medium Answer to a Large Problem

Liquid Media such as DMEM and RPMI 1640 consist of heat sensitive vitamins and minerals which traditionally must be stored in a temperature controlled environment of between 2 and 8°C therefore can only be kept at room temperature for a very short time. Thanks to a new and unique production process (patent pending) it is no longer necessary to refrigerate PAA Thermostable Media and even better, it can be kept at room temerature for long periods of time. This new technology means you can reduce the risk of media degradation associated with incorrect shipment and storage, save money on your storage costs and protect the environment as a refrigerator is no longer needed!

Fig. 1: Illustration of the organisational structure of a Clathrate

THERMO STABILITY IN NATURE

The Thermophile Archae Bacteria is known to survive under extreme conditions such as in hot springs on the ocean floor. They achieve this remarkable thermo tolerance by utilizing special amino acids, compatible solutes and ion aggregates which form stabilizing clusters within the cell. These are known as **Clathrates**. PAA Laboratories have successfully modelled this natural cellular thermo tolerance within its new range of Thermostable Media allowing them to remain stable at normal ambient temperatures (outside a refrigerator) for over a year.

THE DEVELOPMENT: THERMOSTABLE MEDIA

Following many years of research PAA Laboratories have developed a manufacturing treatment, consisting of several refurbishment steps, for the production of Thermo Stable DMEM and RPMI 1640. The production of Thermostable Media by this method does not have any adverse affect on the growth properties or product quality. In fact the researcher can be far more assured of the Mediums quality when it reaches his or her bench as worries regarding how well the bottles have been stored or whether it was transported in a temperature controlled environment are virtually eliminated.

THE PRINCIPLE OF THERMO STABILITY

For DMEM^{TS} and RPMI 1640^{TS} to become thermo tolerant several steps need to be achieved:

- Formation of ionic interactions between vitamins and amino acids with all other components of the media
- Intermolecular accumulation of single components
- Composition of crystal like bindings to higher structures and special crystal embedding (Clathrates)

The crystal like supra structure forms a stable balanced system that is thermo tolerant and can absorb heat without destruction of the single structures. The thermo tolerant supra structure would require a higher input of heat to weaken the intermolecular bindings.

THE MANUFACTURING PROCESS

The formation of these high level structures (Clathrates) is only achieved through the use of the highest quality raw materials, as even the smallest impurities would inhibit the granulation To produce clathrates within its media PAA Laboratories have introduced a new manufacturing treatment based on shock freezing and graduated thawing: the **Fractionated Cryo Treatment**.

RESULTS OF FRACTIONATED CRYO TREATMENT

- Formation of stable intermolecular clusters
- Formation of a reversible clathrate structure between the media components
- Thermo tolerance without the use of any additives

Stabilisation Study for long-term storage

During the validation study, the thermostable media and untreated control media DMEM and RPMI 1640 had been stored at 6°C, 16°C and 22°C (room temperature) over a period of 1, 6 and 12 months. At the time stated below, media samples had been taken, supplemented with 6% FBS and Glutamine and cultivated with selected cell lines (HeLa, CHO, Vero, BHK, MDCK, MRC-5, HEK 293). The media had been inoculated with 10^5 cells/ml and incubated at 37°C in 5% CO_2. After 3 days the number of cells and the concentration of amino acids and vitamins had been determined by HPLC (for results see Fig. 2 and 3).

RESULTS

The stability study clearly indicates that the thermostable media DMEM^{TS} and RPMI 1640^{TS} showed comparable growth properties after one year storage at 22°C compared to the control media stored at 6°C (Fig. 2). These results have been validated by the analysis of the respective amino acids and vitamins by HPLC (Fig. 3).

The chromatographs did not show any significant reduction in the level of Amino Acid Concentration.

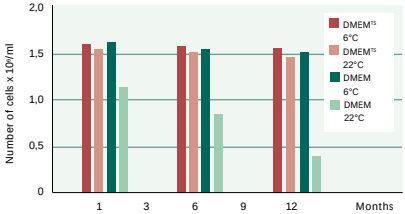

Fig. 2: Comparison of the growth properties of HeLa-cells after cultivation in new PAA DMEM^{TS} and untreated regular DMEM

FEATURES & BENEFITS

- Storable at Room Temperature
- Stable over 12 Months
- Tested on Multiple Cell Linies
- Without Chemical Stabilisers
- Validated in extensive Stabilisation Studies

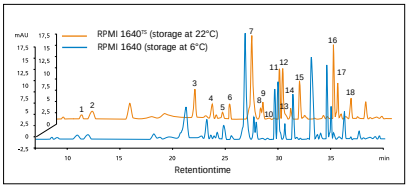

Fig. 3: HPLC profiles of the amino acids of RPMI 1640 and RPMI 1640^{TS} after 12 months storage

1 Asparagine
2 Glutamic Acid
3 Hydroxyproline
4 Serine
5 Threonine
6 Glycine
7 Arginine
8 Proline
9 Valine
10 Methionine
11 Isoleucine
12 Leucine
13 Tryptophan
14 Phenylalanine
15 Cysteine
16 Lysine
17 Histidine
18 Tyrosine

ORDER INFORMATION

E15-080	Dulbecco's MEM^{TS} Low Glucose (1g/l)	500ml
E15-082	Dulbecco's MEM^{TS} High Glucose (4,5g/l)	500ml
E15-084	RPMI 1640^{TS}	500ml

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