27th ESCV
EUROPEAN SOCIETY FOR CLINICAL VIROLOGY
THESSALONIKI, GREECE, SEPTEMBER 2025

Evaluation of Σ-MM™ Molecular Medium for the stability of SARS-CoV-2 virus for up to 90 days at different temperatures.

Giasemi C. Eptaminitaki, Alexandros Zafiropoulos, George Sourvinos

Laboratory of Clinical Virology, Medical School, University of Crete, Heraklion, Greece

Background

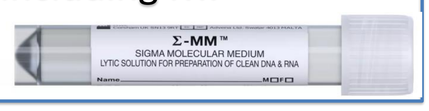
Accurate molecular detection of infectious diseases, such as COVID-19, depends not only on sensitive and specific testing methods, but also on the integrity and biosafety of collected clinical specimens. The pre-analytical phase that includes sample collection, storage, and transport of the samples, plays a critical role in ensuring the reliability of diagnostic results (1,2).

The ∑-MM™ Molecular Medium (Medical Wire and Equipment) is an advanced transport solution that rapidly inactivates a broad spectrum of microorganisms, including bacteria, mycobacteria, and viruses, within 60 seconds of contact. Its formulation includes reagents that neutralize pathogens and inactivate nucleases, thereby preserving both DNA and RNA for downstream molecular testing. Numerous clinical studies have demonstrated that ∑-MM™ effectively inactivates infectious agents, while maintaining nucleic acid stability, making it especially suitable for handling highly infectious specimens. The medium is compatible with any swab system and can be used directly for liquid specimen collection, offering flexibility across clinical settings.

Its ability to eliminate pathogen viability enhances laboratory biosafety, and its design for room temperature (RT) stability makes it a promising candidate. While prior evaluations have shown its utility for a range of pathogens, comprehensive data regarding its effectiveness in preserving SARS-CoV-2 RNA under extended storage periods and varying temperature conditions remain limited.

Objective

To evaluate the ability of ∑-MM™ to preserve SARS-CoV-2 RNA over 90 days under various temperature conditions, including RT.



Materials & Methods

• 42 SARS-CoV-2 positive samples (CT baseline: 19.9) collected in ∑-MM™.

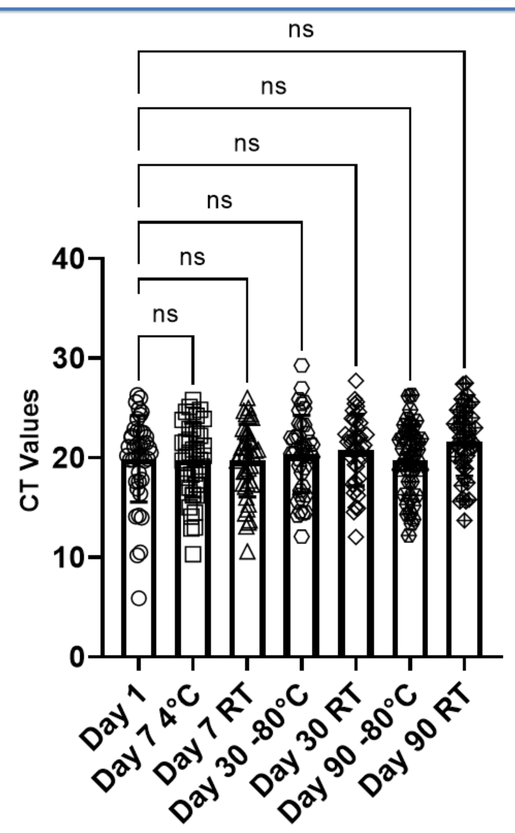
• Aliquots from the freshly collected samples were stored in conditions: at 4°C for 7 days, at RT for 7 days, at -80°C for one month, at RT for one month, at -80°C for three months, and at RT for three months.

• RNA extraction: MagMAX™ Viral/Pathogen II (MVP II) Nucleic Acid Isolation Kit (Applied Biosystems™).

• RNA detection: TaqPath™ COVID CE 19-IVD RT PCR kit (Applied Biosystems™) and measured at QuantStudio™ 5 RT PCR System (Thermo Scientific™).

• Statistical analysis: One-way ANOVA (GraphPad Prism 9).

Results



- CT values remained stable across all time points.
- No significant differences from Day 1 baseline ($p > 0.05$).
- Slight CT increase by Day 90 at RT, but no significantly.
- ∑-MM™ maintained RNA integrity at RT up to 90 days.

Conclusion

∑-MM™ is a safe, stable, and effective transport medium for diagnostics, offering the advantage of RT storage for up to 90 days without compromising RNA integrity. These results support its use in point-of-care testing, field diagnostics, and global surveillance efforts, where maintaining a cold chain is not always feasible. Future studies could extend this work by evaluating RNA stability beyond 90 days, assessing performance across additional viral targets, or exploring compatibility with alternative molecular testing platforms.

References

1. Nordin, N., Ab Rahim, S.N., Wan Omar, W.F.A., Zulkarnain, S., Sinha, S., Kumar, S., Haque, M., 2024. Preanalytical Errors in Clinical Laboratory Testing at a Glance: Source and Control Measures. Cureus 16, e57243.
2. Vasei, M., Jafari, E., Falah Azad, V., Safavi, M., Sotoudeh, M., 2023. Molecular Diagnosis of COVID-19; Biosafety and Pre-analytical Recommendations. Iran. J. Pathol. 18, 244–256.

Acknowledgements

Reagents provided by MWE.
MWE had no influence on study design, data collection, or interpretation.

This study was supported by MWE

mwe
BECAUSE RESULTS MATTER