TECHNICAL NOTE

Lyophilized TaqMan® PCR Components

Stability and Performance

ABSTRACT

PCR reagents are typically stored frozen to preserve activity. Lyophilization, drying under vacuum and low temperature, can create shelf-stable reagents that do not require a freezer for storage or shipping. To verify that lyophilization preserves performance, three key TaqMan PCR components were individually lyophilized, rehydrated, and compared to non-lyophilized controls in real-time quantitative PCR. A positive control containing Mycobacterium tuberculosis DNA was titrated from 10^6 copies down to 10 copies per reaction, and amplification was assessed immediately and after extended storage to simulate shipping and long-term use. These results confirm that Norgen's lyophilized TaqMan PCR components provide a reliable alternative to frozen controls, maintaining performance across both short- and long-term storage conditions.

Experimental Targets:
Mycobacterium tuberculosis (MTB)

METHODS & MATERIALS

Components Used:

- **Lyophilized PCR Components:** Three main components of the TaqMan PCR assay were lyophilized individually, stored under specific conditions, and rehydrated with water immediately before use.
- **Control Components:** Non-lyophilized components (NL) stored at –80 °C served as frozen controls in each assay.
- **Template DNA:** Mycobacterium tuberculosis (MTB) DNA positive control; initial concentration 106 copies/reaction, serially diluted to 10^4, 10^3, 10^2, and 10 copies per reaction.
- **Negative Control:** No-template control (NTC) to monitor contamination

Storage and Rehydration Conditions:

- **Time 0 (T0):** Lyophilized components (Lyo) rehydrated immediately after lyophilization and tested alongside NL components.
- **4-Month Stability:** Lyo stored at 4 °C for 4 months, then at room temperature for 2 weeks to simulate shipping, rehydrated, and tested.
- **Long-Term Rehydrated Stability:** Rehydrated reagents were tested immediately, then leftover rehydrated material was stored at –20 °C for 13 months and retested.

Analytical Method:

- **Assay:** Real-time quantitative PCR (qPCR); amplification signals measured as cycle threshold (Ct) values for each DNA dilution.

» **Data Analysis:** Amplification curves for Lyo (blue) and NL (green) were compared across dilutions. Stability was assessed by comparing Ct values and curve linearity across storage conditions.

RESULTS & DISCUSSION

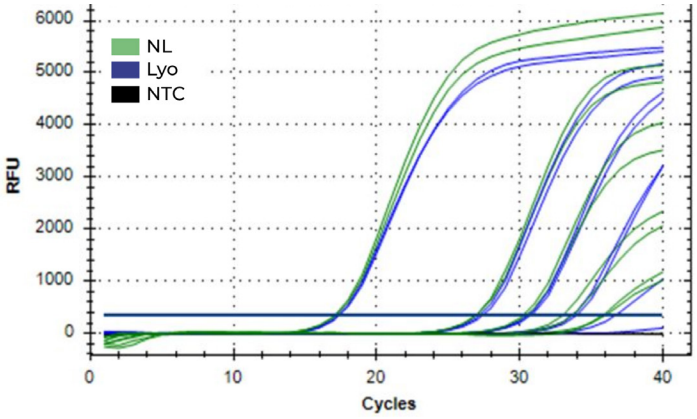

Figure 1: Amplification performance immediately after lyophilization (T0).

Lyo rehydrated at T0 produced amplification curves nearly identical to those obtained with NL across all dilutions (10^6 down to 10 copies). Ct values were equivalent, demonstrating that the lyophilization process does not compromise sensitivity or efficiency. No amplification was observed in the NTC.

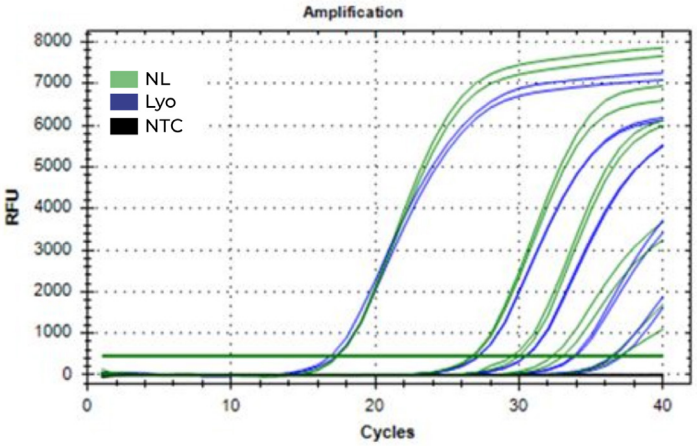

Figure 2: Stability after 4 months at 4 °C plus 2 weeks at room temperature.

Lyo stored at 4 °C for 4 months and then at room temperature for 2 weeks (simulating shipping) were rehydrated and compared to NL. Amplification curves remained nearly identical to NL across all tested dilutions, indicating that Lyo retain full activity after extended cold storage and short periods at ambient temperature. No amplification was observed in the NTC.

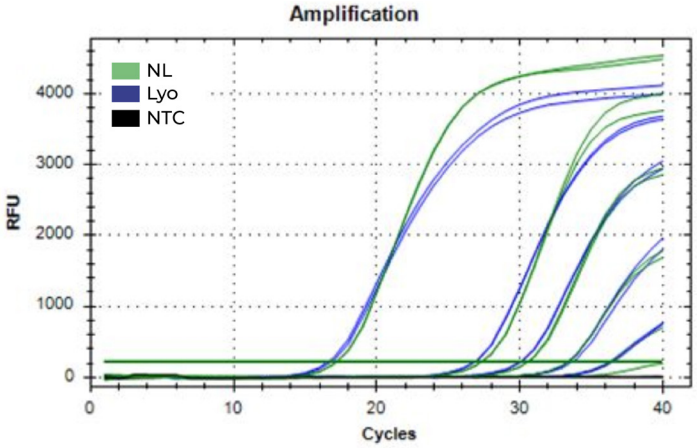

Figure 3: Long-term stability of rehydrated reagents.

Lyo were stored at 4 °C for 2 months, then at room temperature for 2 weeks before rehydration. Subsequently, rehydrated reagents were stored at –20 °C for 13 months. Amplification curves remained linear across dilutions and comparable with NL, demonstrating that rehydrated Lyo maintain activity during long-term freezer storage. No amplification was observed in the NTC.

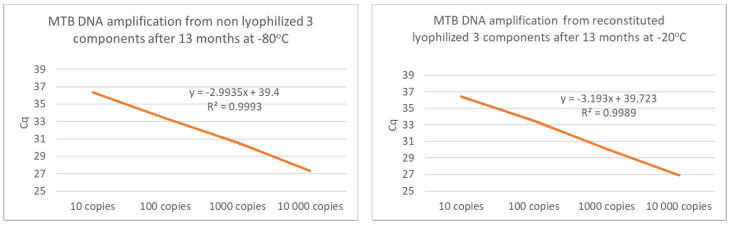

Figure 4: Linearity and quantitative performance across dilutions after extended storage

Across all conditions and time points, both lyophilized and frozen reagents produced linear amplification curves over the five-log dynamic range from 10^4 to 10 copies. This linearity confirms quantitative reliability and demonstrates that lyophilized components can be used for sensitive qPCR without loss of dynamic range.

CONCLUSION

Norgen's lyophilized TaqMan PCR components can be rehydrated and used immediately or stored for months without requiring a –80 °C freezer. Amplification results from lyophilized reagents were virtually identical to frozen controls from 10^6 down to 10 DNA copies per reaction, proving that lyophilization preserves assay sensitivity and efficiency. After storage at 4 °C for up to 4 months followed by 2 weeks at room temperature to simulate shipping, lyophilized reagents continued to match frozen controls across all dilutions. Rehydrated reagents stored at –20 °C for 13 months maintained consistent, linear amplification curves, demonstrating long-term stability. These results show that lyophilized PCR reagents offer freezer-free convenience, reliable shipping stability, and long-term reliability without compromising performance.

LYOPHILIZED TAQMAN PCR KITS

Cat. #	Product Name	PCR	Probe/Primer & Control Set
TM33350L	Saccharomyces cerevisiae TaqMan PCR Lyophilized Kit	✓	✓
TM36350L	CMV TaqMan PCR Lyophilized Kit	✓	✓
TM67050L	Xylella fastidiosa TaqMan PCR Lyophilized Kit	✓	✓
TM66250L	Candidatus liberibacter solanacearum TaqMan PCR Lyophilized Kit	✓	✓
TM29250L	HBV TaqMan PCR Lyophilized Kit	✓	✓
TM37150L	Clostridium difficile TaqMan PCR Lyophilized Kit	✓	✓
TM44750L	Toxoplasma gondii TaqMan PCR Lyophilized Kit	✓	✓
TM72450L	Trichinella spiralis TaqMan PCR Lyophilized Kit	✓	—
TM34050L	Candida albicans TaqMan PCR Lyophilized Kit	✓	✓
TM35150L	Erwinia amylovora TaqMan PCR Lyophilized Kit	✓	✓
TM38550L	Vibrio cholerae TaqMan PCR Lyophilized Kit	✓	✓
TM41050L	EBV TaqMan PCR Lyophilized Kit	✓	✓
TM31550L	HPV High and Low Risk TaqMan PCR Lyophilized Kit	✓	✓
TM30650L	Streptococcus agalactiae TaqMan PCR Lyophilized Kit	✓	✓
TM33150L	Mycoplasma TaqMan PCR Lyophilized Kit	✓	✓
TM64450L	Legionella Sp. TaqMan PCR Lyophilized Kit	✓	✓
TM42550L	Chlamydia/Neisseria gonorrhoeae TaqMan PCR Lyophilized Kit	✓	✓
TM42150L	Mycobacterium tuberculosis TaqMan PCR Lyophilized Kit	✓	✓