

DNASTable® preserves genomic DNA for long-term storage at room temperature

Introduction

Millions of nucleic acid samples are currently being processed, distributed and stored worldwide. Despite significant technological advances, samples are still stored using conventional cold-storage methods at -80°C, -20°C or 4°C, and shipments routinely made using cold-packs or dry ice. Biomātrica®, Inc. has exploited the basic principles of anhydrobiosis found in nature to develop DNASTable®, a proprietary novel dry storage medium. DNASTable allows dry storage of genomic and plasmid DNA for long time periods, eliminating the need for cold storage and shipments. Samples stored dry in DNASTable can be transported over extended distances and time under fluctuating temperatures without fear of sample loss or degradation. **Long-term stability studies performed under accelerated aging conditions indicate the equivalence of greater than 30 years of room temperature storage.** The data presented below demonstrates that storage of genomic DNA samples in DNASTable at ambient temperatures results in recovery of fully intact DNA that is functional for downstream applications without further purification.

Materials and Methods

Storage and re-hydration of genomic DNA in DNASTable: 20 ng of human genomic DNA (gDNA) were applied to DNASTable or empty control wells and allowed to dry overnight in a laminar flow hood before sealing and storage. Long-term stability of DNA (26 months) was assessed at ambient temperature on the laboratory bench and also under accelerated aging conditions **equivalent to 30 years of room temperature storage** (elevated temperatures at 60°C). The genomic samples were quantified using qPCR analysis. Samples stored dry with or without DNASTable were re-hydrated with 10 µl water for 15 min at room temperature. Identical DNA samples were stored at 4°C or -20°C as controls. **qPCR analysis:** A theoretical total concentration of 1 ng per reaction was quantified using a primer/probe set for the RNaseP gene (each sample set performed in triplicate), and the final amount of gDNA remaining in each well after 26 month of storage was calculated.

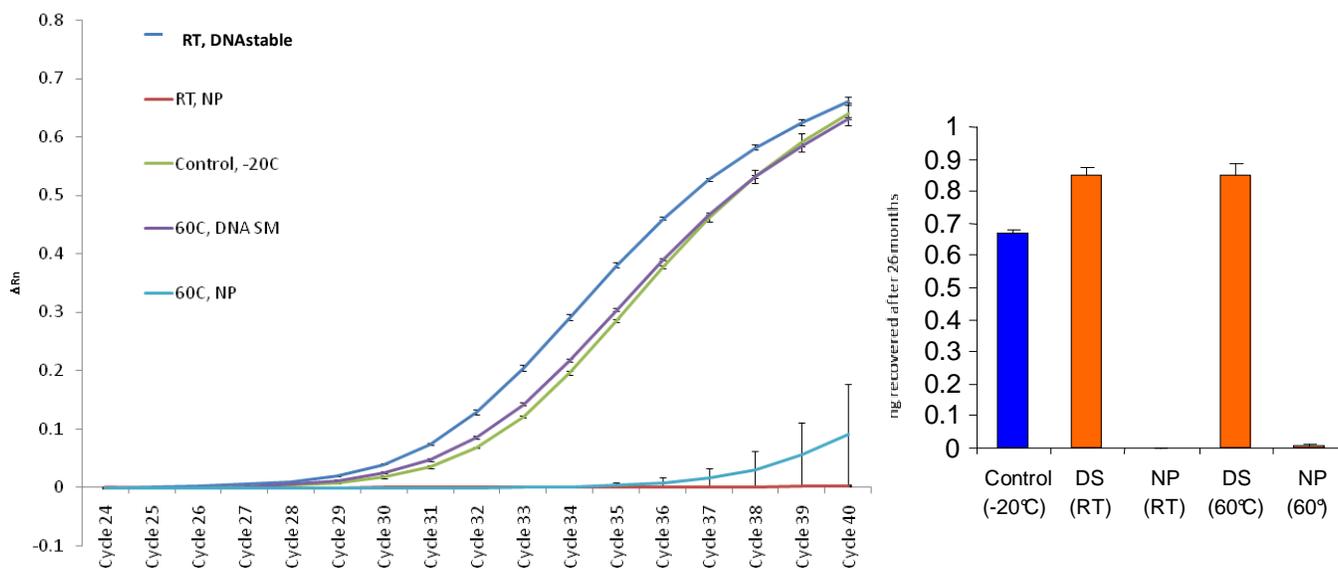


Figure 1: Left panel: qPCR traces of triplicate experiments with standard deviation displayed. **Right panel:** amount of DNA recovered (adjusted to final input concentration). Samples were stored in DNASTable (DS) or left unprotected (NP) for 26 months at either ambient room temperature (RT) or under accelerated aging conditions **equivalent to 30 years of room temperature storage** (60°C). An identical aliquot of control DNA was stored at -20°C for 26 months. qPCR of the RNaseP gene shows significant recovery of the original gDNA stored in DNASTable which outperforms performance of the -20°C freezer control after an equivalent storage time interval.

Results and Discussion

The protective properties of DNASTable inhibit degradation of DNA and allow the recovery of viable genomic DNA even after prolonged dry storage under fluctuating room temperature conditions. Genomic DNA stored in DNASTable for over 2 years at ambient temperature was recovered intact and could be successfully amplified and quantified (Figure 1). Genomic DNA was protected in DNASTable under accelerated aging conditions for 26 months at 60°C, which is equivalent to 30 years of storage at room temperature. DNASTable allows safe storage and transport of DNA in dry form at ambient temperatures. This innovative new technology will allow significant reductions in energy costs and lab space, liberating some key resources for scientists at all levels to help improve efficiency and promote innovation.