ZYMO RESEARCH
The Beauty of Science is to Make Things Simple®

Prevent Nucleic Acid Degradation Before Extraction

The Secret To Maintaining Sample Integrity

The Importance Of Sample Collection & Preservation

It is imperative to maintain sample integrity at the time of collection as improper preservation can affect the quality of downstream purification. Moreover, unprotected samples may undergo compositional changes and bias due to nucleic acid degradation, cellular growth/decay, and issues related to the logistics of collection.

Simplified Preservation And Purification

To address this problem, Zymo Research has linked the sample collection, protection and nucleic acid purification workflow with a single preservation reagent, DNA/RNA Shield™. DNA/RNA Shield™ stabilizes nucleic acids without the need for cold storage (-80 °C), protecting samples even at ambient temperatures for up to 30 days. This eliminates the need for costly storage conditions and specialized sample collection procedures, while maintaining a preserved snapshot of the DNA/RNA profile even through multiple freeze thaw cycles. This reagent drastically streamlines the process of sample collection and nucleic acid purification. It is compatible with all Zymo Research purification kits, and unlike other preservatives such as RNAlater®, does not need to be removed prior to sample processing. Simply add binding reagent to a sample in DNA/RNA Shield TM and then purify (Figure 1).

DNA/RNA Shield™ is offered in a variety of collection vessels to best suit the needs of your workflow: Blood Collection Tube, Fecal Collection Tube, Lysis Tube, or Swab & Collection Tube. To try a sample of this streamlined workflow, identify your preferred sample type and click on the desired kit to request one today.

Protection From Freeze-Thaw

Time, storage temperature, and freeze-thaw cycling all contribute to issues with sample stabilization. However, DNA/RNA Shield™ provides worry-free protection against these changes. By stabilizing both DNA and RNA even at ambient temperatures, DNA/RNA Shield™ eliminates the need for costly storage conditions and specialized sample collection procedures. However, samples stored at lower

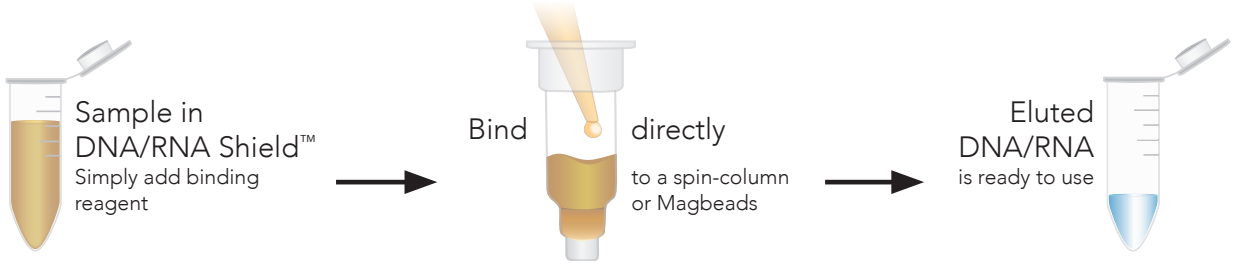

Figure 1: Streamlined workflow from samples protected by DNA/RNA Shield™ followed by purification by Zymo Research DNA and RNA extraction kits.

Sample Type	DNA Kit	RNA Kit
Cells	Quick-DNA ™ Plus Kits	Quick-RNA ™ Plus Kits
Tissue		
Whole Blood, Saliva & Biological Fluids		
Viral Samples		
Fecal, Soil, & Microbial Samples	ZymoBIOMICS® DNA Kits	ZymoBIOMICS® RNA Kits

temperatures are also protected from the negative effects of freeze-thaw (Figure 2). Therefore, sample integrity is maintained as a preserved snapshot of the DNA/RNA that reflects the original profile from the initial time of collection regardless of storage conditions.

Stabilization During Storage At Ambient Temperature

Additionally, DNA/RNA Shield™ lyses cells, inactivates nucleases, and chemically stabilizes the nucleic acids. For example, analysis of DNA and RNA purified from blood stored in DNA/RNA Shield™ shows there is no change in DNA or RNA levels for up to 30 days storage at ambient temperatures (Figure 3).

Maintenance Of Sample Microbial Composition

The effect of DNA/RNA Shield™ is easily observed by maintaining the microbial composition of a stool sample. Without proper stabilization, high levels of variability and bias are introduced where some species of bacteria outgrow, while others do not. However, when DNA/RNA Shield™ is added to the sample, the microbial profile is preserved over time and prevents any shifts or bias (Figure 4). It provides an easy and effective method to stabilize both DNA and RNA over time, at various temperatures, and despite freeze thaw cycles.

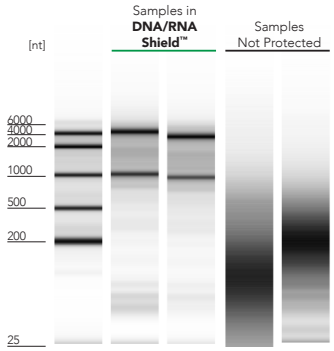

Figure 2: The total RNA profile is stabilized from freeze-thaw in whole blood samples protected by DNA/RNA Shield™. Whole blood samples +/- DNA/RNA Shield™ were subjected to > 2 freeze thaw cycles. Total RNA was subsequently purified using the Quick-RNA™ Whole Blood kit and analyzed by TapeStation.

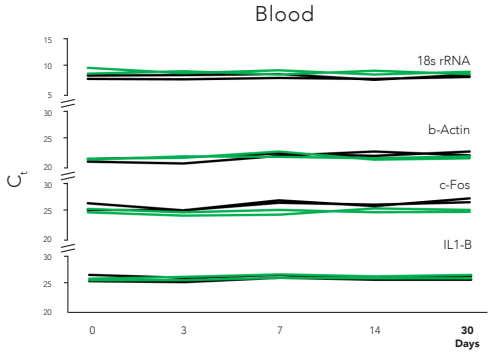

Figure 3: DNA and RNA in blood samples is effectively stabilized in DNA/RNA Shield™ at ambient temperature over time. Graphs show (RT)qPCR results from RNA isolated from blood samples stored with DNA/ RNA Shield™ at various time points for various common targets. Samples ran in quadruplicate.

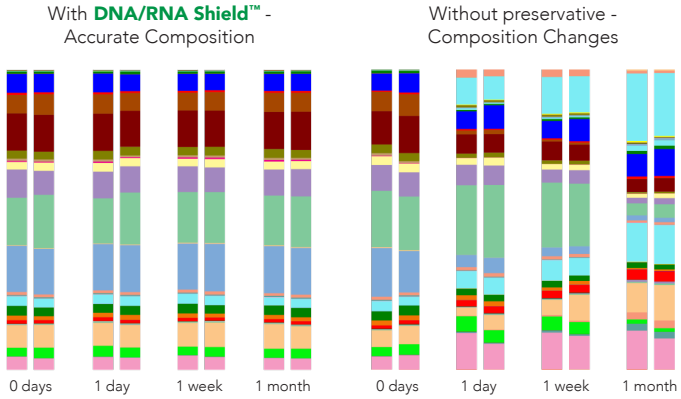

Figure 4: Microbial composition of stool samples preserved by DNA/RNA Shield™ versus samples left unprotected. Microbial composition (indicated by different colors) of stool samples were stored over time at ambient temperature with and without protection by DNA/RNA Shield™. DNA was extracted with ZymoBIOMICS® DNA Miniprep Kit and then subjected to 16S rRNA targeted sequencing.