4 years of proven optimal quality with the DNA Stabilization Solution from 300K Solutions

DNA is relatively stable, but it is susceptible to degradation processes such as hydrolysis, oxidation, radiation, and various other destabilizing conditions. Researchers require high-quality DNA for both clinical and research purposes. The most widely accepted method for DNA preservation involves extremely low-temperature freezing (-80ºC). However, this method not only requires a significant investment in proper infrastructure capable of sustaining these extreme conditions but also poses a high risk of sample loss or compromised quality due to undetected variations in storage conditions.

To prove the effectiveness of our solution, we conducted a long-term study to assess the purity, functionality, and integrity of this molecule.

DNA was obtained from blood samples of two healthy donors using three different extraction methods: Salting out, Phenol/Chloroform, and the QIAmp DNA Blood Maxi Kit (QIAGEN). The resulting aliquots from each method were stored under different conditions for up to 4 years: ultra-freezed at -80ºC, freeze-dried with 300K DNA Stabilization Solution and stored at 22ºC, and freeze-dried with 300K DNA Stabilization Solution and stored at 60ºC. This last storage temperature creates extreme degradation conditions, enabling us to extrapolate calculations for the equivalent years of degradation at room temperature.

Purity by spectrophotometry

Purity can be assessed through absorbance ratios 260/280 and 260/230. In this comparison, no significant differences are observed between the metrics of fresh DNA and over the course of time for any of the established conditions (*Table 1*). It is worth noting that 4 years under accelerated aging conditions correspond to 53 real years at room temperature during which the DNA would retain its initial purity.

Storage time	Sample ID	A260/280 nm	A260/230 nm
T0	**Fresh**	**1,81**	**1,89**
1 month	-80 ºC	1,81	1,99
	22 ºC	1,83	2,10
	60 ºC	1,82	2,00
3 months	60 ºC	1,8	1,92
6 months	-80 ºC	1,83	1,95
	22 ºC	1,83	2,06
	60 ºC	1,82	2,01
12 months	-80 ºC	1,81	1,95
	22 ºC	1,81	2,00
	60 ºC	1,81	1,83
18 months	-80 ºC	1,84	1,99
	22 ºC	1,82	1,97
	60 ºC	1,81	1,91
24 months	-80 ºC	1,8	2,18
	22 ºC	1,8	2,17
	60 ºC	1,81	2,08
48 months	**-80 ºC**	**1,85**	**1,85**
	22 ºC	**1,8**	**1,78**
	60 ºC	**1,83**	**1,70**

Tabla 1. Means comparison of absorbances obtained from purified DNA immediately after extraction with QIAmp DNA Blood Maxi Kit (QIAGEN) and purification (T0) up to 4 years later (48 months) using different storage methods: ULT at -80ºC, drying with 300K Solutions DNA Stabilization Solution at 22ºC, and drying with 300K Solution DNA Stabilization Solution at 60ºC.

Integrity and functionality assessment by multiplex long PCR

The integrity and functionality of the DNA were evaluated by performing a multiplex long PCR. The purified products on agarose gel show a 17.5 kb band across all time frames, though with lower intensity in the accelerated condition at 60ºC after 4 years of storage, equivalent to 53 actual years of storage at room temperature (*Figure 1*).

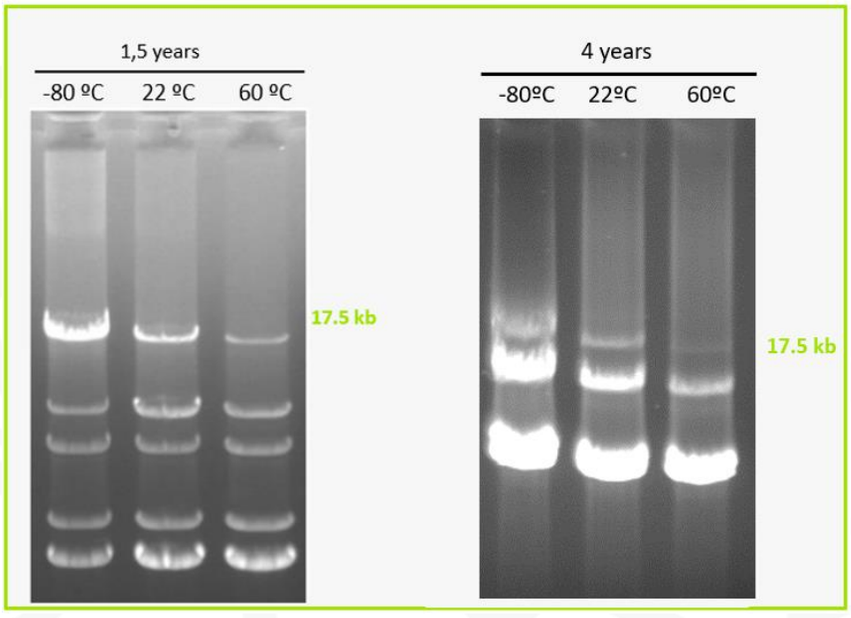

Figura 1. DNA extracted using the QIAmp DNA Blood Maxi Kit (QIAGEN) and stored under the conditions previously stated was subjected to a multiplex long PCR. The image displays the products of this PCR analyzed by agarose gel electrophoresis at 0.8% after 18 and 48 months of storage. A 17.5 kb band is present in all samples.

We have verified that **300K Solutions DNA Stabilization Solution** effectively maintains the optimal purity, integrity and funtionality of purified DNA up to 4 years after its extraction under room temperature conditions, turning room temperature long-term storage into a feasible alternative.

Considering the increasing use of -omics techniques in both precision medicine and research, we have also conducted two of the most commonly used genetic analyses, *Whole Exome Sequencing* and *Single Nucleotide Polymorphism Array*, to ensure the functionality of the samples stored using our technology in several downstream applications.

You can further check these results through this link or by scanning the QR code.