

# Streamlined DNA Extraction from Whole Blood and Saliva on Omega Bio-tek's MagBinder® Fit<sup>24</sup> Automation Platform

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## Introduction

Biological specimens, such as blood and saliva, offer significant clinical potential for their use in diagnostics to genomic-based analyses. The genetic information stored in DNA allows for personalized medicine and targeted genetic testing. It also aids in detecting infectious agents and enables advanced diagnostic techniques like next-generation sequencing for comprehensive genomic analysis. Extraction of high-quality DNA in a reliable and reproducible manner meeting the throughput requirements is crucial for not only successful downstream implementation but also to enhance clinical impact. Omega Bio-tek has developed a semi-automated solution to extract DNA from 250 µL of blood and 500 µL of saliva with the MB Fit24™ Blood & Tissue DNA SLKit (B6399-5-48PF) on the MagBinder® Fit<sup>24</sup> with minimal manual intervention that is achieved in approximately 60 minutes. The MagBinder® Fit<sup>24</sup> (B1-001-24) is a nucleic acid purification system used together with prefilled reagent cartridges to extract DNA or RNA from up to 24 samples in a single run. Here, we demonstrate this workflow's capability of extracting DNA from whole blood and stabilized saliva. Genomic DNA yield, integrity, and qPCR analyses were performed.

## Materials and Methods

Saliva samples were collected from a single donor using DNA Genotek's Oragene Discover (Cat# OGR-600). Human whole blood from a single donor was collected in K3 EDTA tubes and obtained from Innovative Research. 500 µL aliquots stabilized saliva (n=3) and 250 µL aliquots of whole blood (n=6) were used as input for DNA extraction using the MB Fit24™ Blood & Tissue DNA Kit on the MagBinder® Fit<sup>24</sup> following the manufacturer's protocol. DNA yield and quality were determined via Thermo Scientific's NanoDrop® 2000c. DNA integrity and size were determined via Agilent's TapeStation 2200.

To evaluate the suitability of the purified DNA for downstream applications, real-time PCR was performed using human-specific primers on 10-fold and 100-fold dilutions of DNA extracted from both blood and saliva samples.

## Results and Discussion

The DNA yields and absorption ratios obtained from saliva and whole blood samples using the NanoDrop® 2000c system are shown in Table 1. A260/A280 ratio values of approximately 1.8 indicate high purity of the isolated DNA, free of contaminating RNA and salts. Both the A260/A280 and A260/A230 ratios indicate high-quality DNA which is suitable for use in a variety of downstream applications.

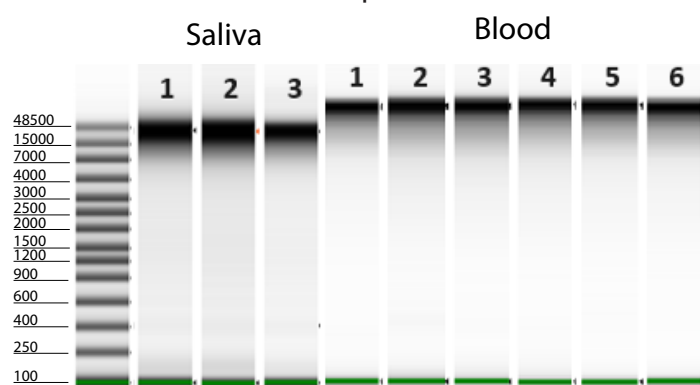
Average DNA Yield from Saliva and Whole Blood Samples

Sample	Yield (µg)	A260/A280	A260/A230
Saliva 1	7.53	1.70	1.64
Saliva 2	7.46	1.79	2.03
Saliva 3	8.98	1.84	1.62
Blood 1	9.65	1.86	2.30
Blood 2	10.80	1.89	2.23
Blood 3	8.89	1.86	2.09
Blood 4	10.4	1.9	2.36
Blood 5	10.94	1.89	1.88
Blood 6	10.28	1.9	2.23

**Table 1.** The average DNA yield from 250 µL whole blood samples and 500 µL stabilized saliva samples were obtained using the MB Fit24™ Blood & Tissue DNA Kit and eluted in 100 µL volume.

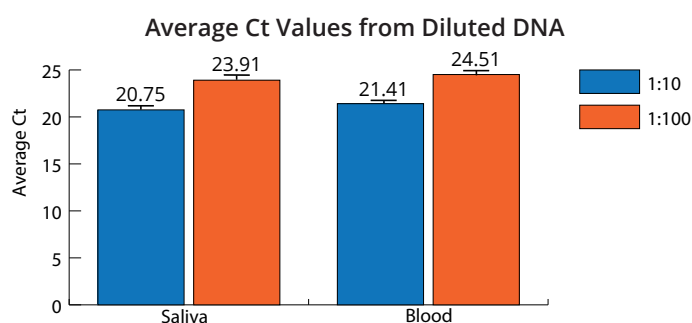
Purified DNA obtained from saliva and blood samples was analyzed on the TapeStation 2200 to measure the size and integrity of the extracted genomic DNA. The results of TapeStation analysis are shown in Figure 1 and indicate that the DNA extracted is of high molecular weight and migrated as a well-defined band above the largest ladder peak (48,500 bp) for the blood samples.

TapeStation® Analysis on Purified DNA from Stabilized Saliva Samples



**Figure 1.** The size of genomic DNA purified from stabilized saliva and whole blood samples using the MB Fit24™ Blood & Tissue DNA Kit was analyzed on the Agilent TapeStation® 2200.

To establish the suitability of the DNA isolated from both saliva and blood for a variety of downstream applications, real-time PCR was performed using human-specific primers. The average Ct value of DNA diluted 10-fold and 100-fold are shown in Figure 2. The  $\Delta C_t$  values of the dilutions for both saliva and blood samples were  $\sim 3.1$ , which indicate positive amplification and efficiency, thereby endorsing the downstream suitability of the extracted DNA.



**Figure 2.** Average Ct values obtained amplifying the purified DNA from blood and saliva samples using the MB Fit24™ Blood & Tissue DNA Kit.

## Conclusions

Omega Bio-tek's MB Fit24™ Blood & Tissue DNA Kit performed on the MagBinder® Fit24 offers a semi-automated extraction solution for gDNA purification from whole blood and saliva samples. Implementing the MB Fit24™ Blood & Tissue Kit on the MagBinder® Fit24 allows the user to run 24 samples in approximately 60 minutes with minimal offline preparation and manual intervention. The extracted DNA's high molecular weight and quality confirm its suitability for subsequent applications like PCR and NGS.

## Product Information

Product No.	Description
B6399-5-48PF	MB Fit24™ Blood & Tissue DNA Kit
B1-001-24	MagBinder® Fit24