Automated DNA Extraction Workflow Using Rhinostics' HIPPOstic Swabs and Omega Bio-tek's Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit

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Introduction

With the rapid advancement of therapeutic and diagnostic technologies, there is a critical need for high throughput extraction workflows that yield high-quality DNA in a convenient and timely manner. Buccal swabs are an ideal collection method for these workflows that not only allow non-invasive sampling, but are also easy to store and transport.

Omega Bio-tek has developed a system for high throughput DNA extraction using the Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit (M6399-01PF96) in conjunction with Rhinostics' HIPPOstic (HS-S000001) collection device, providing an efficient workflow from sample collection to DNA extraction. The prefilled format of Omega Bio-tek's Kit reduces hands-on preparation time, freeing up lab workers to accomplish other tasks, in addition to improving extraction accuracy by eliminating opportunities for user-associated errors. Here, we illustrate the superior performance of the Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit integrated with the HIPPOstic collection system for DNA extraction compared to an extraction kit from competing Company Q. Extraction performance was evaluated by yield, integrity, and qPCR to demonstrate the workflow's suitability for downstream applications.

Materials and Methods

Eight subjects self-collected sixteen samples of cheek swabs, swabbing one sample from each cheek using the HIPPOstic system. The subjects followed the HIPPOstic collection protocol from Rhinostics for sample collection.

After collection, DNA extraction was performed on a KingFisher® Flex 96 magnetic processor from Thermo Fisher Scientific using the Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit with one sample from each subject, following the manufacturer's protocol. Extraction was also carried out using Company Q's Kit with the other corresponding sample from the same subject, following manufacturer's protocol. The extractions were evaluated by yield and absorbance ratio using both the NanoDrop™ and PicoGreen™ quantification systems. DNA integrity and downstream suitability were analyzed using Agilent's TapeStation® and qPCR, respectively. The complete workflow is illustrated in **Figure 1.**

Figure 1. Illustration of the workflow from sample collection using Rhinostics' HIPPOstic system to DNA extraction with Omega Bio-tek's Mag-Bind® Blood & Tissue DNA HDQ 96 Kit.

Results and Discussion

A comparison of extracted DNA yield values from NanoDrop and PicoGreen quantification are shown in **Figure 2.** The differences in the DNA yield across samples can be attributed to inter-donor variability. The yield trends are similar for the two quantification methods used. The DNA yield from 6 out of 8 samples was greater for Omega Bio-tek compared to Company Q, and the remaining two seem comparable according to PicoGreen. The A260/A280 ratios were comparable between kits, ranging from 1.82-2.34.

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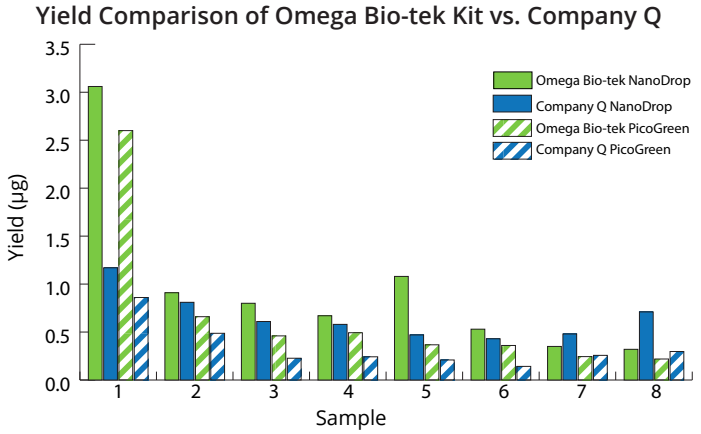

Figure 2. 6 out of 8 samples extracted using the Mag-Bind® Blood & Tissue DNA HDQ 96 Kit result in higher yield when compared to Company Q.

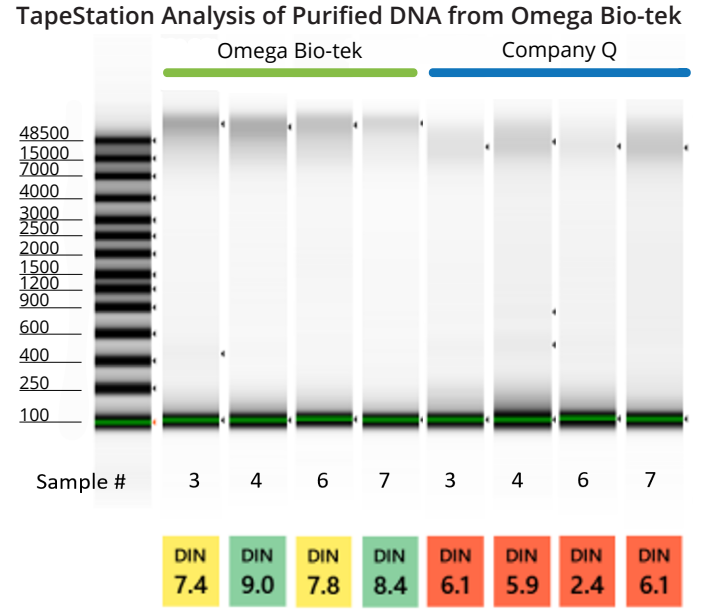

Figure 3. The Mag-Bind® Blood & Tissue DNA HDQ 96 Kit elutes high integrity DNA, as shown by the DIN scores from TapeStation Analysis, out performing Company Q's Kit.

TapeStation analysis of 4 representative extractions using Omega Bio-tek's Kit and corresponding competitor's Kit are shown in **Figure 3.** The DIN scores using Omega Bio-tek's Kit were all greater than 7, indicating high integrity of DNA extracted. In comparison, DIN scores using Company Q's Kit were all less than 7 and lower than their corresponding counterparts, indicating higher quality gDNA extracted using Omega Bio-tek's Kit. The purified DNA following Omega Bio-tek's Kit migrated as a well-defined band above the largest ladder peak (48,500 bp) with the software analyzing it to be > 60 kb for all the samples. In comparison, the average DNA size using Company Q's Kit was ~18 kb. These results indicate DNA extracted using Omega Bio-tek's Kit is of higher molecular weight compared to Company Q.

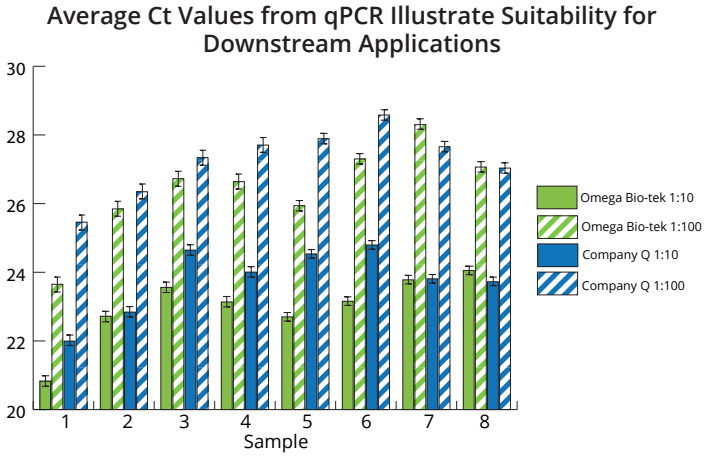

Figure 4. Average Ct values from qPCR performed using eight swab samples collected using Rhinostics' HIPPOstic collection system.

To demonstrate the suitability of DNA for downstream applications, qPCR was performed on each sample. The results of this amplification are shown in **Figure 4.** The ΔCts obtained from both extraction Kits were comparable and close to the theoretical 3.3 value, indicating no qPCR inhibition. The Ct values at 10-fold and 100-fold dilutions were lower using Omega Bio-tek's Kit for the first 6 samples, corroborating the higher yield seen with Omega Bio-tek's Kit compared to Company Q's. As expected, the Ct's at both dilutions were comparable for the remaining two samples owing to similar yields, irrespective of the extraction kit used.

Conclusions

Integrating the Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit with Rhinostics' HIPPOstic collection device presents an efficient and convenient high throughput workflow for DNA extraction. The prefilled format of the Mag-Bind® Kit, along with its ability to be automated on most open magnetic processors, cuts down hands-on time, saving you time and effort. The data shown here proves its suitability for downstream applications, in addition to its ability to out perform the competition.

Product Information

Product No.	Description
M6399-01PF96, 4 x 96 preps	**Mag-Bind® Blood & Tissue DNA HDQ Prefilled 96 Kit**
HS-S000001, HS-S000011	**HIPPOstic™ Collection Device**

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