

Comparison of DNA yield and integrity of saliva samples collected and stored in go DNA™ and Oragene™•DNA saliva collection kits

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Compared to other saliva collection devices, Oragene•DNA collection kits offer superior results with respect to DNA yield and integrity, while also stabilizing DNA at ambient temperature and preventing DNA degradation. The objective of this study was to demonstrate that go DNA collection kits perform equivalently to Oragene•DNA collection kits, which are considered the gold standard.

Introduction

Saliva collection is less invasive than blood collection and is equivalent as a source of genomic DNA.

Due to their proven performance, Oragene•DNA saliva self-collection kits are both the market leader and the benchmark against which saliva collection devices are compared.

In this white paper, we compare the performance of saliva samples collected using go DNA and Oragene•DNA collection kits and demonstrate that go DNA collection kits are an equivalent alternative to the gold standard Oragene•DNA collection kits for the collection and stabilization of DNA extracted from saliva.

Materials and methods

Paired saliva samples were collected from 29 participants using go DNA and Oragene•DNA collection kits. Participants used an alternating spit technique in which they spit into each collection device, alternating between devices until each collection kit contained 2 mL of saliva. The saliva samples were then stored at ambient temperature.

Purification of genomic DNA was performed according to the respective prepIT™•L2P purification protocols for each collection kit,^{1,2} using a 500 µL input volume for all samples. DNA concentration was measured by Quant-iT™ PicoGreen™ dsDNA Assay, using 5 µL of a 50-fold dilution of each sample, and the total DNA

yield per 2 mL of saliva was calculated. Approximately 50 ng of DNA from each sample was run on a 0.8% agarose gel, which was then stained using SYBR™ Gold Nucleic Acid Gel Stain and photographed under UV light. The molecular weight of the extracted DNA was determined by comparison to a 1 kb DNA Ladder.

Extracted samples were analyzed using the Illumina Infinium™ Global Screening Array. Samples with a concentration above 50 ng/µL were normalized to 50 ng/µL, while samples with a concentration below 50 ng/µL were loaded undiluted. Four (4) µL of the normalized gDNA (50 ng/µL or less) was input into the Infinium Assay.

Results

The go DNA collected saliva samples had a mean total DNA yield of 50.9 µg and a median total DNA yield of 40.6 µg. The Oragene•DNA saliva samples had a mean total DNA yield of 49.2 µg and a median total DNA yield of 40.3 µg (Figure 1).

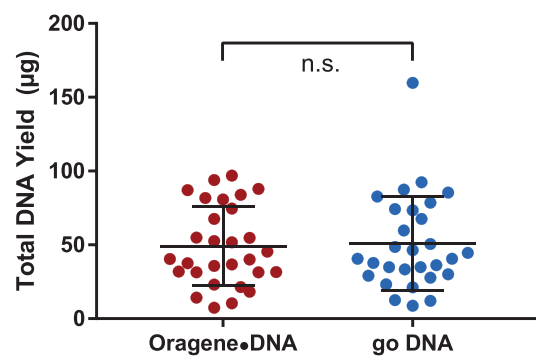


Figure 1. Total DNA yield in 29 paired Oragene•DNA and go DNA collection kits' saliva samples. The horizontal line represents the mean value and the error bars represent \pm standard deviation. Wilcoxon matched-pairs signed-rank test p-value = 0.7493, Oragene•DNA collection kits (mean: 49.2 µg, median: 40.3 µg), go DNA collection kits (mean: 50.9 µg, median: 40.6 µg).

DNA integrity of the saliva samples was assessed using agarose gel electrophoresis. All samples produced a well-defined, high molecular weight (> 23 kb) band, demonstrating DNA integrity (Figure 2).

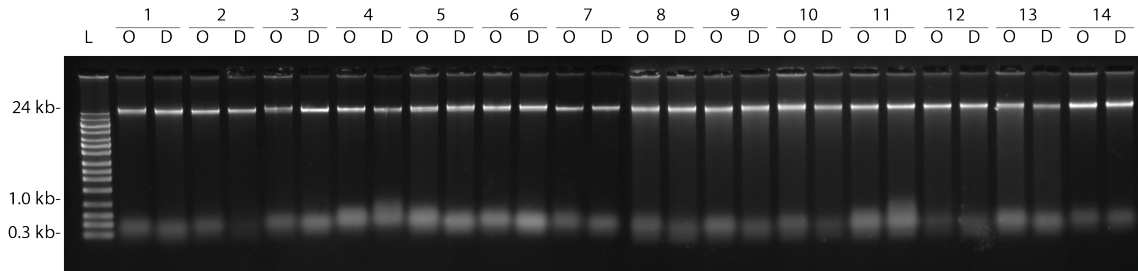


Figure 2. Agarose gel electrophoresis of DNA extracted from 14 representative saliva samples, comparing paired samples from Oragene•DNA (O) and go DNA (D) collection kits. A 1 kb DNA Ladder, which contains 15 discrete fragments ranging from 300 bp to 24,000 bp, was used as the marker in lane 1 (L). No RNase treatment was performed; co-purified RNA is visible in lower bands.

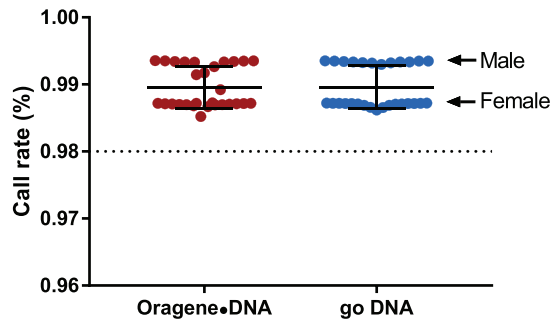


Figure 3. Microarray call rates from 29 paired saliva samples from each kit. The horizontal line represents the mean value and the error bars represent \pm standard deviation. Wilcoxon matched-pairs signed-rank test p -value = 0.5793, Oragene•DNA collection kits (mean: 0.9895, median: 0.9872), go DNA collection kits (mean: 0.9896, median: 0.9872). The horizontal dashed line represents a 98% call rate.

Call rates for all samples were above 98%, demonstrating that samples from Oragene•DNA and go DNA collection kits are compatible with downstream microarray applications (Figure 3).

The bimodal distribution of the call rate data is due to the presence of Y chromosome probes on the Global Screening Array, which results in additional “no-calls” for samples that were collected from female participants compared to those from male participants.

Conclusions

DNA extracted from saliva samples collected in go DNA collection kits was equivalent to DNA obtained from Oragene•DNA collection kits. Both DNA collection kits yielded the same quantity and quality of extracted DNA and performed equivalently on the Illumina Infinium Global Screening Array. Thus, go DNA collection kits are a suitable alternative to Oragene•DNA collection kits for the collection and stabilization of DNA from saliva.

References

- 1 Laboratory protocol for manual purification of DNA from 0.5 mL of go DNA sample. PD-PR-00914. DNA Genotek Inc.
- 2 Laboratory protocol for manual purification of DNA from 0.5 mL of sample. PD-PR-006. DNA Genotek Inc.

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