RHINOSWAB PERFORMANCE: SUPERIOR SAMPLE CAPTURE AND ELUTION EFFICIENCY

Two studies have now been completed to assess the performance of the Rhinoswab against a current commercially available standard of care nasal swab (Copan ESwab™).

Both studies have confirmed that the Rhinoswab outperforms the standard of care nasal swab (Copan ESwab™) in two key performance factors: sample capture and elution efficiency.

RHINOSWAB SAMPLE CAPTURE STUDY

THE OBJECTIVE OF THE NASAL SWAB YIELD STUDY WAS TO COMPARE THE MEAN SAMPLE CAPTURE PERFORMANCE OF THE RHINOSWAB AGAINST THE COMMERCIALLY AVAILABLE STANDARD OF CARE NASAL SWAB (COPAN ESWAB™) AT VARIOUS INSERTION TIME POINTS.

DESIGN

An comparative experiment to measure the absorption profile of Rhinoswab when worn in the nose for different time periods (15 seconds, 1 minute and 2 minutes) versus the Copan ESwab™, used as per standard collection protocol of 15 seconds in each nostril.

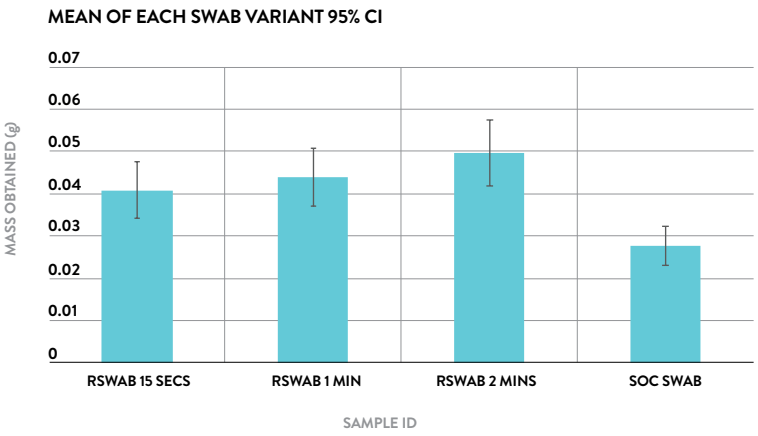
METHOD

There were 50 study participants, all healthy volunteers of different ages and ethnic backgrounds. A total of 311 samples were self collected with the time of collection noted. The swab protocol was randomised to compare the Copan ESwab™ and Rhinoswab at 15 seconds, 1 minute and 2 minutes.

Swabs were measured before and after insertion to assess the sample mass collected. The sample mass obtained from each swab was determined by measuring the swab before and after nasal insertion using a calibrated Sartorius analytical scale (precision 0.0001g).
The before and after weight was noted as well as the time of day that the sample was obtained.

RESULTS

1. When compared to the Copan ESwab™ it was found that Rhinoswab collected a statistically significant (95% CI) greater average sample mass at every sample collection protocol (15 seconds, 1 minute, and 2 minutes).



The performance improvement offered by Rhinoswab in terms of sample capture is shown in the table below.

SWAB	STANDARD OF CARE (Copan ESwab)	RHINOSWAB	PERFORMANCE IMPROVEMENT
15 seconds insertion each nostril	0.0278g		
15 seconds insertion		0.0408g	1.47 times greater than SOC swab
60 seconds insertion		0.0438g	1.57 times greater than SOC swab
120 seconds insertion		0.0496g	1.78 times greater than SOC swab

2. The time of day the sample was collected did not show any significant variation in the sample mass collected.

EVALUATION OF RHINOSWAB ELUTION EFFICIENCY

AN INDEPENDENT LABORATORY, GNOMIX (ADELAIDE, AUSTRALIA) WAS ENGAGED TO COMPARE THE ELUTION EFFICIENCY OF THE RHINOSWAB COMPARED TO THE STANDARD OF CARE NASAL SWAB (COPAN ESWAB™).

METHOD

An aliquot of gamma-irradiated (inactivated) SARS-CoV-2 virus with a nominal CT value of 18 (assay dependent) was diluted 1/200 in a stock solution of donated saliva to represent a high virus burden sample and 1/2000 in to represent a low virus burden sample.

Two protocols were followed:

1. To reflect the standard of care, the high and low virus burden samples were applied as 4 x 5µl spots (20µl) onto 10 Rhinoswabs and 5 standard of care nasal swab (Copan ESwab™).
2. To evaluate the inherently greater potential capture area of the Rhinoswab (with dual swab heads) in comparison to the standard of care nasal swab (Copan ESwab™) 4 x 8µl spots (32µl) were applied onto 10 Rhinoswabs.

In both instances each swab was then placed into a 5ml tube containing 1ml of Saline, vortexed vigorously for 30 seconds and left to elute for 1 hour at room temperature.

Following elution, 140µl of eluate was extracted and reverse transcription and qPCR were performed using the QuantiNova Pathogen +IC Kit (QIAGEN) in combination with the SARS-CoV-2 N1+N2 assay kit (QIAGEN). The QuantiNova IC RNA, extraction negative control and PCR negative control were included on each run.

RESULTS - PROTOCOL 1 - At Standard Load

The study found that the CT scores for the two swabs were comparable at 20 µl loading for both high and low virus burdens.

	RHINOSWAB	COPAN ESWAB™
High Virus Burden 20 µl (1ml Elution) Average Ct	25.45 (± 0.24)	25.75 (± 0.43)
Low Virus Burden 20 µl (1ml Elution) Average Ct	29.15 (± 0.24)	30.39 (± 1.03)

The study also evaluated the sample yield or average sample recovery for the Rhinoswab compared to the standard of care nasal swab (Copan E-Swab™).

	RHINOSWAB	COPAN ESWAB™
High Virus Burden 20 µl (1ml Elution)	16.34 µl (82%)	14.50 µl (73%)
Low Virus Burden 20 µl (1ml Elution)	21.80 µl (~100%)	17.33µl (87%)

These results suggest a superior elution efficiency for the Rhinoswab when comparing identical initial loadings of both the high and low virus burden sample.

PROTOCOL 2 - At Greater Load Potential

	RHINOSWAB
High Virus Burden 32 µl (1ml Elution)	21.00 µl (66%)
Low Virus Burden 32 µl (1ml Elution)	28.70 µl (90%)

These results suggest that it is possible to recover more virus from the extra loading capacity, at both high and low virus burden, although there appears to be slightly diminished overall efficiency.

DISCUSSION

Under the conditions tested and with the materials supplied, the Rhinoswab demonstrated not only a comparable but also a superior elution efficiency to the commercially available Standard of Care nasal swab (Copan ESwab™) at both 20µl at High Virus burden and 20µl at Low Virus burden.

The study also showed it was possible to recover more virus from the extra loading capacity of Rhinoswab.

Contact us to discuss how RHINOSWAB may help deliver a better sampling solution for your needs.
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