Application Note: S+C - 001
August 2011

Spin+Collect™ Improves Sample Recovery from Swabs

Introduction

Swabs are widely used for taking clinical samples, sampling environmental surfaces and collecting DNA for forensic analysis. In diagnostics, swabs are routinely used in conjunction with molecular technologies to effectively detect and quantitate microorganisms as well as DNA. One of the common difficulties encountered in this process is the inability to transfer the majority of sample material, e.g. pathogen DNA, from the swab to a solution that can be used for nucleic acid isolation. To overcome this, swabs are often supplied with specialist transport media developed to diffuse the organisms out of the swab matrix. The weakness in this method is that the media dilutes the sample making the extraction process and onward analysis inefficient.

For materials sampled, transported, or stored on dry swabs, there is an additional disadvantage that the swab matrix can irreversibly retain between 70-300µL of liquid, there by reducing dramatically the total yields that could be available. Additionally, this also introduces quantitative variables between swab types and sample variances that cannot be overcome by simple mechanical compression of swab against the side of the vessel.

For instance, when trying to extract and quantitate HSV and Treponema pallidum from dry swabs, it was found that a large and variable proportion of DNA was retained within the swab material which affected the sensitivity of detection.

The Spin + Collect™ sample recovery kit **(Cat. No. SC/ST -100)** overcomes this issue, and significantly improves sample recovery from swabs while also directly increasing the DNA yields which in turn improves the sensitivity for DNA testing.

Materials and Methods

Commercially available lysis buffer was added to duplicate sets of microfuge tubes - 50µL, 100µL, 200µL, and 300µL.

Multiple swabs were obtained following which a single swab was placed in each microfuge tube. One set of tubes was processed by manually compressing the swab head and then pipetting the remaining liquid. The other set of tubes was processed using the Spin+Collect™ extraction method and centrifuged at 13,000 rpm for 2 min as per the instructions. The total volume of liquid was then recovered and accurately measured.

Results

Figure 1: Percentage return of original volume of lysis buffer: 50uL (yellow box) 100uL (orange box) 200uL (green box) and 300uL (blue box)

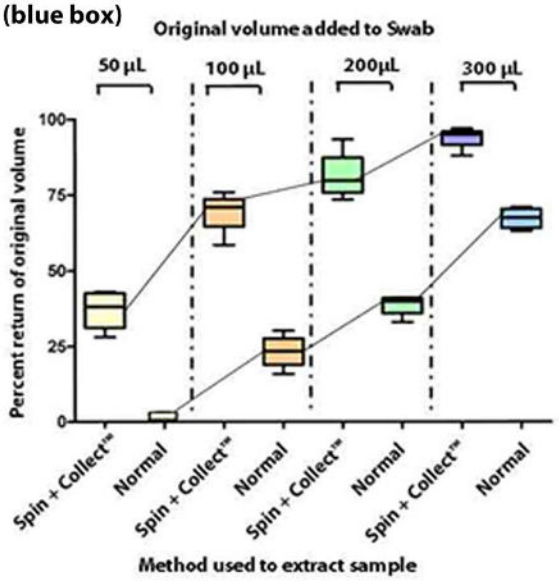
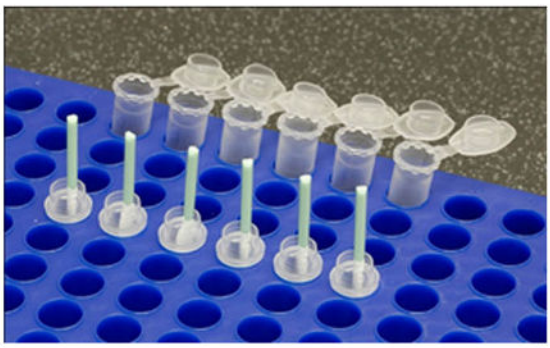


Figure 1 shows- liquid recovery was significantly higher when using the Spin+Collect™ method and greatest percentage gains were seen for the smaller volumes. It was observed that with 50µL no liquid was retrieved from the swab processed using the normal mechanical compression method.

Figure 2: Spin+Collect™

The Spin+Collect™ (Figure 2) has 4 internal fins to expose the maximum surface area of the swab whilst the sample is being eluted from the swab. Furthermore, the fins grip the swab tightly so that the swab is removed together with the vessel in a single rapid step (Figure 3).

Figure 3: Internal Fins Gripping the Swab in the Spin+Collect™



Conclusion

The results indicate that sample yields can increase over 25% when using the Spin+Collect™ sample recovery kit. The improved reproducibility of liquid volumes also reduces the sample variability between different swab types creating significantly greater consistency of results. The Spin+Collect™ sample recovery kit provides a simple and reliable method to improve sample yields when used in conjunction with swabs.

The results were presented by Dr Panagiotis Pantelidis, Molecular Immunobiologist from the Department of Immunology at Imperial College Healthcare NHS Trust.

Other Isohelix DNA Sampling and isolation Products

Isohelix DNA Buccal Swabs.
High yields, blood alternative, reproducible, easy to use, different formats for various extraction methodologies. SK-1, SK-2, SK-3 and SK-4.

Isohelix DNA Isolation and Handling kits
DNA isolation kits optimised for high yields of intact DNA from buccal swabs. DDK-3/50

Isohelix DNA Silica Gel Capsules
For use with SK-1 swab kits, air-dries swab in tube giving extended storage times without loss of stability. SGC-3/50

Isohelix DNA Quality Check Kit
PCR kit to confirm quality of DNA prior to onward experimentation DQC-50

Isohelix Buccalyse Kit
A quick and simple one tube method for extracting PCR-ready DNA from buccal swabs. BEK-50

Cell Projects through its division **Isohelix** specialises in Buccal Cell DNA sampling and isolation technologies and offers a range of Isohelix products with a full technical support program.
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