

Bader, Keith, et al., "Automated Surface Swab Sampling: A Statistical Comparison of a Novel Approach to Existing Methods". Keith Bader, VP Cleaning Sciences Hyde Engineering - keith.bader@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.collier@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.collier@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.collier@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.collier@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.collier@hyde-ec.com; Michael Lund, Senior Lab Scientist - michael.lund@hyde-ec.com; Nicole Coller, Principal Engineering - nicole.com; Nicole Coller, Principal Engine

Swabbot teamed with Hyde Engineering + Consulting at the Analytical Laboratory to perform a comparative study of hand, remote, and automated sampling. Swabbot designed and built a robot to automate the swabbing process for many surfaces, reducing the need for confined space entries, therefore decreasing risk to personnel while increasing accuracy.

HAND vs REMOTE vs AUTOMATED SWAB SAMPLING

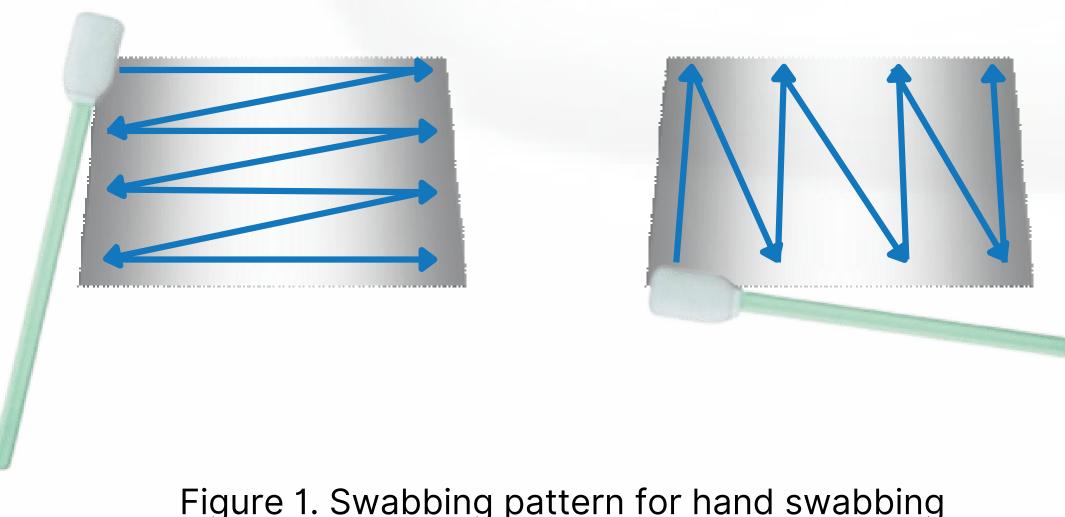
Swabbing effectiveness is dependent on:

- Swab pressure
- Contact time
- Stroke consistency
- Swabbed surface area
- Swab head size
- Swab material
- Wetting diluent
- Wetting technique
- Number of swabs

When compared to more traditional swal Swabbot returned responses that wer recovery than either the hand or rem







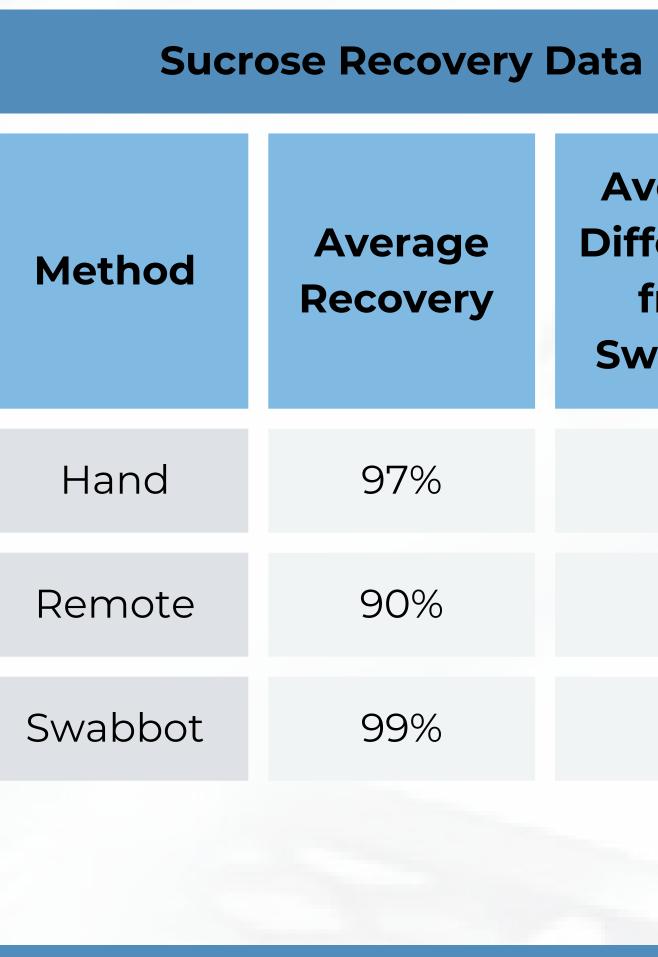
Automated Surface Swab Sampling: A Statistical Comparison of a Novel Approach to Existing Methods



Figure 2. Hand swab sampling during recovery study at Hyde Analytical Laboratory

abbing methods, the
ere closer to 100%
mote swabbing.

Figure 1. Swabbing pattern for hand swabbing and that performed by Swabbot





BSA



Average

Difference

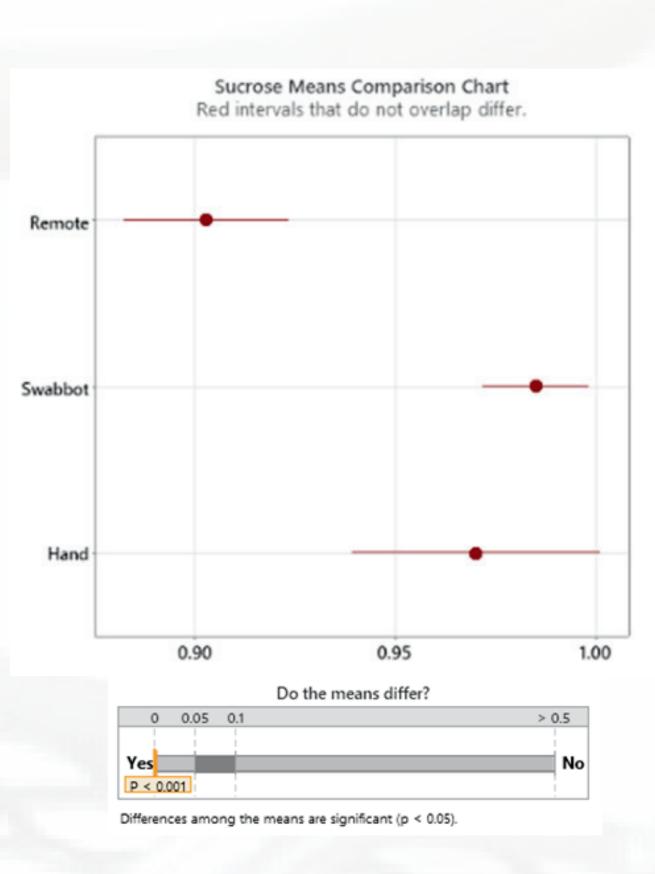
from

Swabbot

2%

9%

Conclusions: The Swabbot sampling robot performed accurately and repeatable for both soils tested. When compared to more traditional swabbing methods, the Swabbot returned responses that were closer to 100% recovery than either the hand or remote swabbing. A one-way ANOVA analysis indicated that the Swabbot swabbing samples are different than remote swabbing for both soils, and different from the hand swabbing for BSA (one of the two soils tested).



ecovery	Data

Average ecovery	Average Difference from Swabbot
103%	5%
86%	14%
99%	_

Figure 4. (left) Initial rendering of Swabbot automated remote swabbing

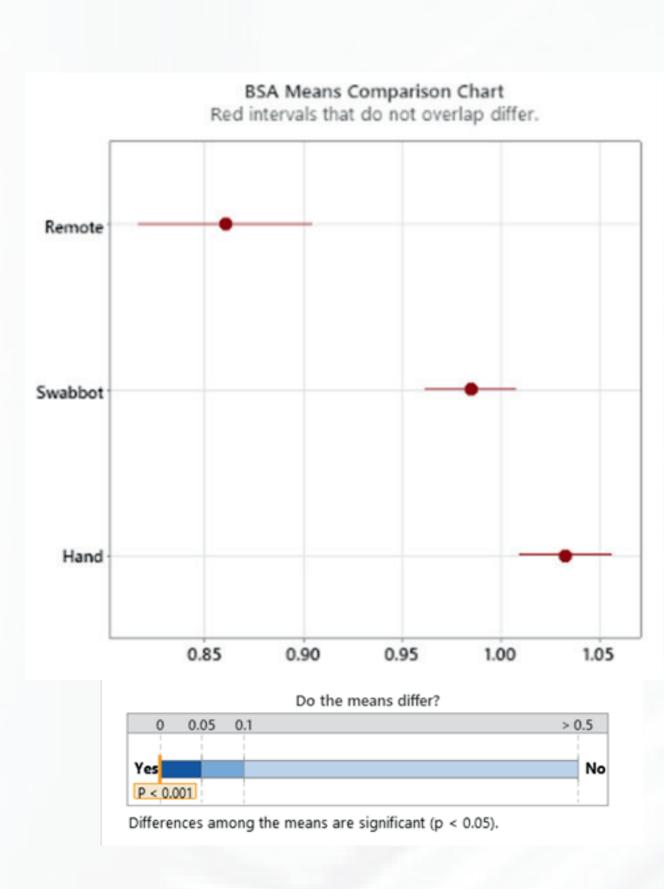


Figure 3. Remote swabbing recovery study at Hyde Analytical Laboratory

