2242

A COMPARISON OF TWO FLOCKED SWABS: THE COPAN ELUTION SWAB (ESWAB) AND THE PURITAN HYDRAFLOCK® FLOCKED SWAB

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ABSTRACT

BACKGROUND
The use of the most appropriate collection and transport system device is critical for preservation and isolation of clinically significant organisms. Over the past few years, several studies have evaluated the performance of traditional cotton/dacron swabs versus the nylon flocked swab.[2][3][4] Things are changing in microbiology labs due to the increased demands for automation. Transport device platforms must now support molecular testing, virology testing and rapid antigen testing, as well as traditional culture methods. As a result, many labs are moving to replace their traditional swabs with superior performing, multi-purpose flocked swabs.

PURPOSE
In this study, we compared two flocked swab transport systems; the Copan Liquid Amies Elution swab (ESwab) and the Puritan® Liquid Amies Collection and Transport System (HydraFlock® Swab).

METHOD
We used the qualitative Roll-Plate method as described in CLSI M40-A[1] to evaluate the two devices listed in **Table 2**, for viability of clinically significant aerobes. Three ATCC strains listed in **Table 1** were inoculated in triplicate from microtiter wells containing 100µl of standardized suspensions onto appropriate agar plates listed in **Table 3**. Testing was performed at room temperature for the time periods 0, 24 and 48 hrs. Culture plates were read manually and compared to the zero hour colony counts. The difference in counts between the two brands were recorded for the various dilutions and time points.

RESULTS
Organism dilutions which produced countable colonies within the range 30-300 CFU's were averaged and compared to the zero hour baseline counts. Estimated CFU's that were greater than 300 were approximated and included for comparison. Both swabs tested met the CLSI criteria for maintenance of the viability of the organisms tested, however, the Copan ESwab produced higher counts for all organisms at all time points.

CONCLUSIONS
In this study, the Copan ESwab demonstrated superior performance evidenced by higher colony counts for all organisms tested. Both swabs maintained organism viability for 48 hours but the higher colony counts demonstrated with the Copan product can have important implications in situations such as surveillance screening (MRSA, GBS etc) when there may be very few organisms present.

INTRODUCTION
Many clinical studies have compared transport devices for their ability to promote organism survival, maintain minimal overgrowth, and also to provide maximum absorption and release of organisms. These are undoubtedly critical factors in the isolation of clinically significant isolates. The superior fluid dynamics of the flocked swab over conventional cotton/dacron swabs has been demonstrated. In this study, we compared the performance of 2 currently available flocked swab devices. (**Table 2**)

METHOD
The following stock cultures as listed in **Table 1** were used in this study:

TABLE 1: LIST OF ATCC STRAINS

ORGANISM	ATCC® NUMBER
Haemophilus influenzae	ATCC® 10211
Neisseria gonorrhoeae	ATCC® 43069
Streptococcus pyogenes	ATCC® 19615

The following transport devices were evaluated for performance characteristics:

TABLE 2: SWAB TRANSPORT DEVICES

SWAB TRANSPORT DEVICE	LOT NUMBER	EXPIRATION DATE
ESwab - Liquid Amies Elution Swab - Copan, Murrieta, CA, USA	A21000	2013-10
Puritan® Liquid Amies - HydraFlock® Flocked Swab - Guilford, Maine, USA	120801	2014-02

TEST PROTOCOL
- For each organism, a 0.5 McFarland standard representing a 1.5 X 10^8 CFU/ml was prepared in 0.85% physiological saline (pH 6.8-7.2) from 18-24 hr. cultures using a BioMerieux turbidity meter.
- From this working suspension, four 1:10 serial dilutions were prepared. Due to the superior absorption characteristics of the flocked swab, higher dilutions were made in order to obtain countable colonies.
- 0.5 ml of the McFarland standard was added to 10 ml of saline. From this solution, serial dilutions of 1:100, 1:1000 and 1:10,000 were prepared.
- Using an Eppendorf repeater pipette, 100 µl volumes of each organism suspension was added to the appropriate wells of a microtiter plate.
- Swabs were placed in the wells for 10 seconds and allowed to absorb the 100 µl volume of suspension.
- The swabs were then inserted into the appropriate transport device.
- For baseline counts (zero time), three swabs of each dilution were removed from the transport medium after 15 minutes and spread over the surface of appropriate plates as listed in **Table 3**.
- The remaining swabs were held for 24 and 48 hours at room temperature and then plated in the same manner as the zero hour swabs.
- Plates were inoculated and then incubated at 35°C for 48 hours.
- Counts were then recorded at the end of each time period.

TABLE 3

SPECIES	MEDIA	INCUBATION TEMP. (ºC)	ATMOSPHERE	TESTING TIME (HOURS)
H. influenzae	Chocolate	35-37	5% CO^2	0, 24, 48
N. gonorrhoeae	Chocolate	35-37	5% CO^2	0, 24, 48
S. pyogenes	5% SBA	35-37	5% CO^2	0, 24, 48

RESULTS:
- Colony counts of >300 colonies were approximated and averaged for each of the 3 swabs for each time point and dilution.
- Counts at zero hours were compared to counts at 24 and 48 hours.
- Both swabs met the CLSI criteria for maintenance of the viability of the organisms tested, however, the Copan ESwab produced higher counts for all organisms at all time points.

COMPARISON OF ORGANISM RECOVERY FROM COPAN ESWAB AND PURITAN FLOCKED SWAB

ROLL PLATE METHOD
Colony Count (% Survival)* at Room Temperature/10^4 dilution

ORGANISM	SWAB	0 HR	24 HR	48 HR
H. influenzae	Copan (Eswab)	>300 (100%)	150 (50%)	8 (2.6%)
	Puritan Flocked Swab	>300 (100%)	70 (23%)	1 (0.3%)
N. gonorrhoeae	Copan (Eswab)	300 (100%)	90 (30%)	4 (1.3%)
	Puritan Flocked Swab	300 (100%)	60 (20%)	0 (0%)
S. pyogenes	Copan (Eswab)	>300 (100%)	300 (100%)	290 (97%)
	Puritan Flocked Swab	>300 (100%)	150 (50%)	125 (42%)

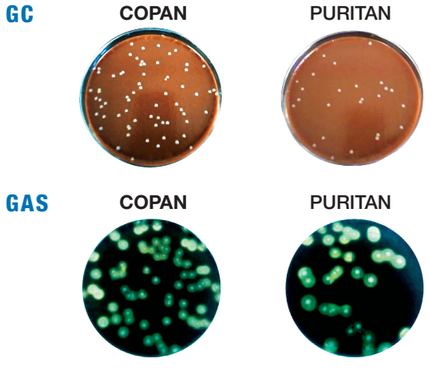
*% Recovery is calculated relative to the zero-hour count (100%)

OBSERVATIONS:
- In this authors opinion, the Copan ESwab device offered greater ease of use in regards to issues such as opening the sealed packaging and breaking the swab off at the designated score point.
- Another observation was the fact that the Copan flocked swab seems almost more sponge-like in texture and appeared to absorb the fluid from each microtiter well more readily than the Puritan product.

CONCLUSIONS:
- In this study, the Copan E-Swab demonstrated superior performance as seen by the higher colony counts for all organisms tested.
- The ability to isolate organisms present in low numbers can have important implications in the clinical setting. This is especially true in surveillance screening for MRSA, GBS, KPC's etc. It is especially crucial that your swab can unleash trapped organisms from the swab matrix in order to isolate disease causing pathogens for which numbers are limited.

LEGEND

GC: Copan GC 10^4 at 0hr 70 CFU
GC: Puritan GC 10^4 at 0hr 25 CFU
GAS: Copan GAS 10^3 at 0hr 80 CFU
GAS: Puritan GAS 10^3 0hr 32 CFU



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