



Comparison of the integrated MALDI-Trace system to manual specimen accessioning in preparation of specimens for MALDI-TOF analysis

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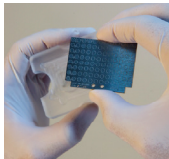
Introduction

MALDI-TOF has become a popular method for identification of microorganisms in the clinical laboratory. This method involves the transfer of 96 or more isolates to a single target plate for analysis and laboratories with high volume testing may use multiple target plates concurrently. Therefore, it is critical to have an efficient method to ensure isolate traceability from the original culture through MALDI-TOF analysis.

We compare a manual accessioning method to accessioning using the MALDI-Trace (Copan, Brescia, Italy) across 3 technologists for the preparation of 90 urine cultures (3 batches of 30 positive plates per technologist) for MALDI-TOF analysis.

Method

A total of 30 routine urine cultures were selected for analysis on 3 different days (90 cultures total). Each set of 90 cultures was processed by 3 different technologists in parallel using routine manual accessioning methods and the MALDI-Trace (Copan, Brescia, Italy). The time from receipt of cultures to initiation of MALDI-TOF analysis was recorded for each method. The MALDI-Trace was interfaced with the MALDI Biotyper (Bruker, Billerica, MS) to enable transfer of specimen information and MALDI-TOF analysis parameters.



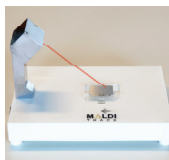
Insert MALDI Target into MALDI-Trace carriage with embedded RFID chip.



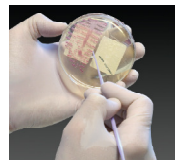
Scan culture accession barcode



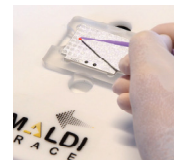
MALDI-Trace identifies open spot on target plate. Option to enter culture note, isolate #



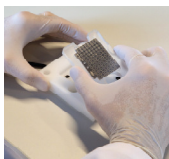
Laser illuminates corresponding spot on target plate for spotting of isolate



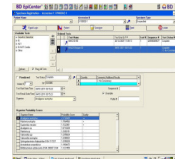
Selected isolate colony for MALDI analysis



Transfer colony to spot on target plate illuminated by laser



Transfer MALDI target/Trace carriage to docking station linked to MALDI-TOF

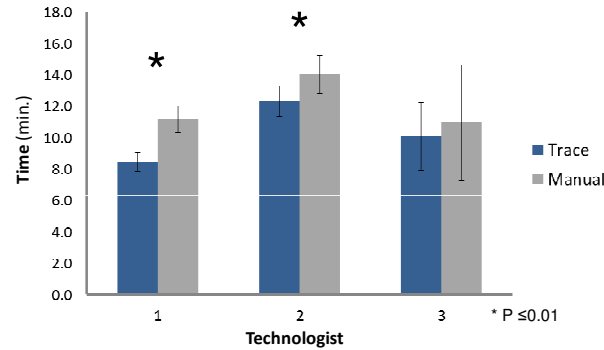


Isolate information automatically transferred to MALDI software



Insert target plate into MALDI-TOF; start run.

Figure 1. Time from receipt of 30 culture plates to initiation of MALDI-TOF analysis



Each of 3 technologists were given 3 sets of 30 urine cultures. Bars represent the mean time from receipt of 30 cultures to initiation of analysis program using MALDI-TOF. Error bars represent one standard deviation.

Table 1. Individual technologist results, average from 3 sets of 30 cultures

	Manual (min.)		MALDI-Trace (min.)		p	Time saved 30 cultures (min.)	Time saved per culture (sec.)
	Avg	SD	Avg	StdDev			
Tech #1	11.20	0.84	8.46	0.60	0.002	2.74	5.48
Tech #2	14.04	1.22	12.34	0.96	0.013	1.70	3.41
Tech #3	10.97	3.68	10.08	2.16	0.214	0.89	1.77

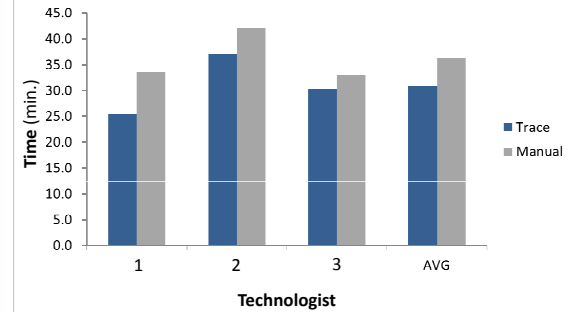
Results and Conclusions

- MALDI-Trace reduces technologist time for accessioning and set up of cultures for MALDI-TOF analysis by an average of 3.55 sec./culture. This can result in savings of several weeks of technologist time for high volume laboratories.

- No transcription error or isolate transposition were observed using either manual or MALDI-Trace based accessioning and setup of cultures, however, use of barcode and laser directed placement of isolate on MALDI target plate reduces the potential for error.

- Automated uploading of target plate parameters including specimen information and number/location of isolates to be analyzed into the MALDI-TOF software eliminates time of manual setup of MALDI-TOF analysis parameters.

Figure 2. Total time from receipt to analysis for 90 culture plates



Each of 3 technologists were given 3 sets of 30 urine cultures. Bars represent the cumulative time from receipt of 3 culture sets (90 total plates) to initiation of analysis program using MALDI-TOF.

Table 2. Individual technologist results, cumulative 90 cultures

	Manual (min.)	MALDI-Trace (min.)	Time saved 90 cultures (min.)	Time saved per culture (sec.)
Tech #1	33.60	25.38	8.22	5.48
Tech #2	42.13	37.02	5.11	3.41
Tech #3	32.91	30.25	2.66	1.77
Avg.	36.21	30.88	5.33	3.55

Figure 3. Potential savings by volume of urine cultures processed

