CHU Sainte-Justine

**Hôpital Sainte-Justine**
**CHU Mère-enfant**
3175, Côte Ste-Catherine
Montréal, Québec
Tel.: (514) 345-4642
Fax: (514) 345-4913

# Evaluation of the ISOPLATER 180 for Automated Primary Plating of Clinical Specimens

M. Valsorda, P. Lebel, J.-R. LaPointe, L. Kemp, C. Laferriére

## Abstract

The ISOPLATER is designed to automate and standardize the streaking of Petri dishes. We have evaluated the ISOPLATER in a large pediatric microbiology laboratory, comparing its automated streaking to the standard manual method.

Two hundred ten specimens were set up both by ISOPLATER and manual methods, using standardized inocula on paired plates incubated indentically: 99 urines (of which 15 were positive), 31 throat swabs, 19 vaginal secretions, 18 sputa, 18 stools, 18 pus, and 10 blood cultures. Incubation was done aerobically and anaerobically as needed by the specimen type.

No differences were observed on paired plates regarding: colony, morphology or numbers, spreading, isolated colonies, background flora, or contamination. Colony sizes were smaller and zones of hemolysis less well-defined on the plates streaked by the ISOPLATER when incubated in air, but no differences were observed when paired plates were incubated in CO2. Streaking delayed up to 30 minutes after inoculation did not change the final results of the culture, as evaluated in 12 urine and 8 throat cultures.

We conculde that the ISOPLATER gave results comparable to those of conventional manual streaking for a good variety of clinical specimens. The automatic streaker was easy to use, reliable and well-accepted by the technologists.

## Conclusion

The ISOPLATER 180 is an automated streaking machine - reliable and easy to use in a large diagnostic microbiology laboratory.

The reading of automatically streaked plates compares to the reading of manually streaked with respect to colony count, morphology, spreading and background flora. Colony isolation tends to improve with the automated process. These observations take into account the recommended specimen collection and incubation conditions for the studied clinical specimens.

Streaking delayed up to 30 minutes after inoculation did not change the final results of the cultures in the studied specimens.

Cross-contamination was not observed as monitored by the uninoculated blood agar plates introduced into the automated process.

## Introduction

The economic pressures of the 1990's require us to automate the different technical stages in the clinical diagnosis laboratory. THE ISOPLATER 180 (Vista Technology Inc., Edmonton, Alberta, Canada) is an automated petri dish streaker. The machine automatically rotates the load carousel to bring in a stack of plates, downloads a dish, removes the lid, orients the dish, transfers the dish with its lid, streaks in four successive quadrants for isolation, replaces the lid and uploads the completed dish into the unload carousel. Spreading over the entire surface of an agar plate is accomplished by four individual nichrome loops which are sterilized by electrical heating between dishes. We have evaluated the efficiency of the ISOPLATER 180 regarding the variety of different clinical specimens.

## Objectives of the Study

1. Inoculum size determination, applied to the automated spreading method for the variable microbial density of the clinical specimens received in diagnostic microbiology laboratory.
2. Comparative culture results of the inoculated agar plates spread manually versus automatically for a variety of clinical specimens.
3. Reliability of the results once time is increased between inoculation and automated spread.
4. Cross-contamination assessment resulting from the automated process of agar plate spreading.

## Stage 1 - INOCULATION SIZE DETERMINATION

**METHOD:**

Specimens:

| | |
|---|---|
| 10 positive blood cultures: | 1 drop versus 2 drops. |
| 10 respiratory specimens: | 10¢ versus 25¢ size. |
| 9 stools: | Standard versus pea size. |
| Urine: | Straight line covering half diameter of the agar. |

Parameters to be compared:

| | |
|---|---|
| Morphology of the colonies: | Spreading Isolation |
| Colony count: | Background flora |

**RESULTS:**

| | |
|---|---|
| Blood cultures: | 1 drop. |
| Respiratory specimens: | 10 ¢ size. |
| Stool: | Pea size. |
| Urine: | Straight line from the edge of the agar to the center. |

**Clinical specimens were therefore inoculated according to these results.**

| | |
|---|---|
| Low microbial density (1 drop): | body fluids normally sterile. |
| Moderate microbial density (10 ¢ size): | wound, throat, vagina, sputum. |
| High Microbial density (Pea size): | stool. |

Incubation and specimen collection conditions were similar for the compared groups.

## Stage 2 - COMPARATIVE CULTURE RESULTS OF THE INOCULATED AGAR PLATES SPREAD MANUALLY VERSUS AUTOMATICALLY FOR A VARIETY OF CLINICAL SPECIMENS

**METHOD:**

Clinical specimens studied:

- 10 blood cultures
- 19 vaginal specimens
- 18 expectorations of which 7 were from cystic fibrosis patients
- 99 urines of which 15 positives
- 15 pus of which 6 were negatives
- 31 throat
- 18 stool

Parameters to be compared: as in previous stage

Specimen collection and incubation conditions were identical for the compared groups.

Care was given to alternate order of inoculation for both methods.

**RESULTS:**

Colony size was smaller on blood agar plates incubated in room air for various treated specimens. This observation was not reproduced on reapeated experiments and was not observed when agar plates from same specimens were incubated in 5% $CO_2$ atmosphere.

On one pharyngeal specimen inoculated on blood agar plate and incubated in room air, 8 hemolytic colonies seen on the plates automatically spread were not seen on the agar plate spread manually. This observation was likely related to the order of inoculation.

Colony isolation was slightly superior when plates were spread by the ISOPLATER 180.

Other studued paarameters: morphology, spreading, count of colonies and background flora were identified.

## Stage 3 - EFFECTS OF INCREASING TIME INTERVALS BETWEEN INOCULATION AND AUTOMATED SPREADING ON CULTURE RESULTS

**METHOD:**

Twenty clinical specimens (12 urines, 8 throats) were automatically streaked at 0, 15 and 30 minutes following manual inoculation.

Culture results were compared for the studied parameters.

**RESULTS:**

No differences were observed with respect to all studued parameters with 0, 15 and 30 minutes delay for the 20 studied specimens.

## Stage 4 - CROSS CONTAMINATION ASSESSMENT OF THE AUTOMATED PROCESS OF AGAR PLATE STREAKING

**METHOD:**

One uninoculated 5% sheep blood agar plate was placed n the portable carousels after every 20 plates and processed.

Plates were incubated at 35°C in room air for 48 hours.

**RESULTS:**

No growth was observed on any of the uninoculated blood agar plates introduced into the automated process at every 20 plates.