ESCMID EUROPEAN SOCIETY OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

33rd ECCMID EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES

Copenhagen, Denmark
15–18 April 2023

catlab

Does total lab automation (TLA) system affect the viability of *Neisseria gonorrhoeae* in genital samples cultures?

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Background

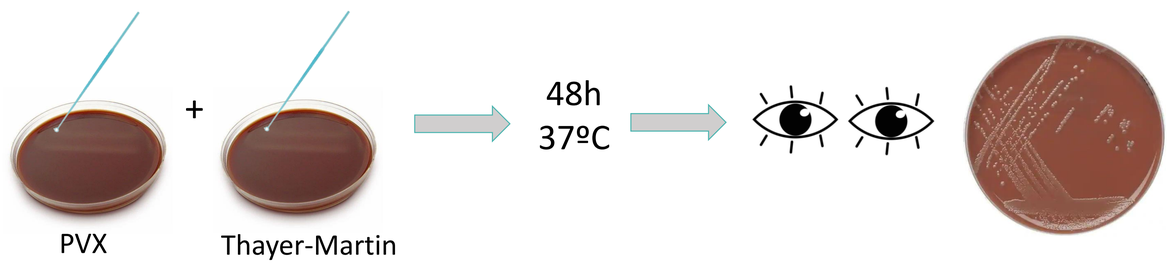
Sexually Transmitted Infections (STI) have increased worldwide in recent years. *Neisseria gonorrhoeae* is a fastidious microorganism commonly isolated in STI screenings. Its lability is a concern in microbiology laboratories as isolation is needed for antimicrobial susceptibility testing.

TLA has led to culture modifications in inoculation protocols (from manual to automated) for samples such as genitals specimens. This could affect the isolation of some pathogens. Therefore, we proposed a study to evaluate if the TLA process affects the isolation of *N. gonorrhoeae*.

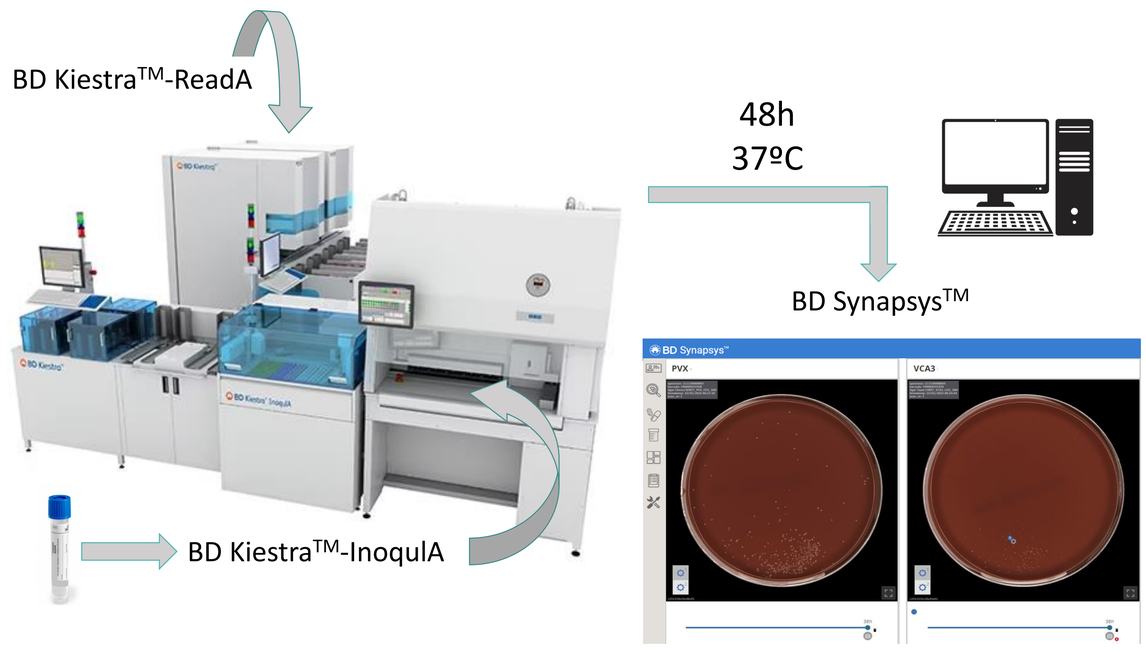
Methods

Two periods were compared:

1. Genital samples were manually inoculated at least in chocolate PolyViteX (PVX) (bioMérieux) and Thayer-Martin (bioMérieux) agar at 37ºC in a CO_2 incubator during 48h, followed by conventional plate interpretation.



2. BD Kiestra™TLA-System was used. 10 µl of urethral and endocervical samples were inoculated using BD Kiestra™-InoqulA in PVX and Thayer-Martin plates with magnetic beans and automatically transported to CO_2 incubator (BD Kiestra™-ReadA). After 48h incubation, a picture was captured and results were analyzed with BD Synapsys™. Urethral samples were received in gel swabs, and a 1ml dilution was performed before TLA inoculation. The endocervical samples arrived in liquid swabs (DeltaSwab Amies), however due to frequent clot problems, a 1:1 dilution was done before TLA inoculation.



A RT-PCR multiplex (Allplex™ STI Essential-Assay) was performed on all samples.

Results

1st period

In the first period, a total of 2946 samples were processed:

- 2946 genital samples
  - 2371 endocervical samples (80.5%)
  - 575 urethral samples (19.5%)

2nd period

In the second period, there were 3103 samples:

- 3103 genital samples
  - 2536 endocervical samples (81.5%)
  - 567 urethral samples (18.5%)

Sensitivities of the two periods were calculated (shown in table 1).

	***N. gonorrhoeae* detection in pre-TLA period**			***N. gonorrhoeae* detection in TLA-period**		
	RT-PCR	Culture isolation	Culture sensitivity	RT-PCR	Culture isolation	Culture sensitivity
Endocervical positives	30 (1.26%)	12 (0.51%)	0,40	36 (1.42%)	9 (0.35%)	0,25
Urethral positives	61 (10.61%)	46 (8%)	0,75	96 (16.93%)	81 (14.28%)	0,84
Total positives	91 (3.08%)	58 (1.96%)		132 (4.25%)	90 (2.90%)	
TOTAL	**2946**		**0,64**	**3103**		**0,68**

Table 1. Comparison of the results in the two periods.

Conclusions

- Processing automated genital samples does not affect the viability of *N. gonorrhoeae*.
- In urethral samples, a slight improvement in culture sensitivity was observed by using TLA.
- However, a decrease in *N. gonorrhoeae* isolation was found in endocervical samples. This could be due to dilution of the pre-inoculated process performed to avoid clot errors in TLA pipetting. Based on this theory, RT-PCR was conducted in diluted and non-diluted samples, and a 5 CT reduction was observed.