

# Whatman FTA<sup>®</sup> for Microbial Inactivation

Inactivate microbes  
and ensure lab safety.

Molecular characterization of environmental samples and microbial cultures often requires handling potentially harmful organisms. Many of these organisms are difficult to lyse, adding time consuming steps to DNA preparation. Whatman FTA<sup>®</sup> technology instantly lyses and inactivates even the most difficult microbes, such as yeast and many bacteria. When samples come in contact with the surface of an FTA Card, nucleic acids are captured and protected, while DNA-damaging enzymes and chemicals are inactivated. DNA can be stored safely at room temperature for years and can be easily sent to colleagues without special handling. For the greatest level of protection for lab staff and sensitive DNA samples, choose safe, easy-to-use FTA Cards.

## Features and Benefits

- **Instant microbial inactivation**  
Potentially harmful biological samples applied to FTA are instantly inactivated, ensuring lab personnel safety.
- **Safe, secure storage and shipping**  
Samples can be stored at room temperature and handled safely, without fear of contamination. Ship safely via regular mail.
- **Lyse resistant samples easily**  
Resistant cell walls are lysed on contact.
- **Fast and easy collection**  
Simply apply a biological sample to card and nucleic acids are immediately captured.

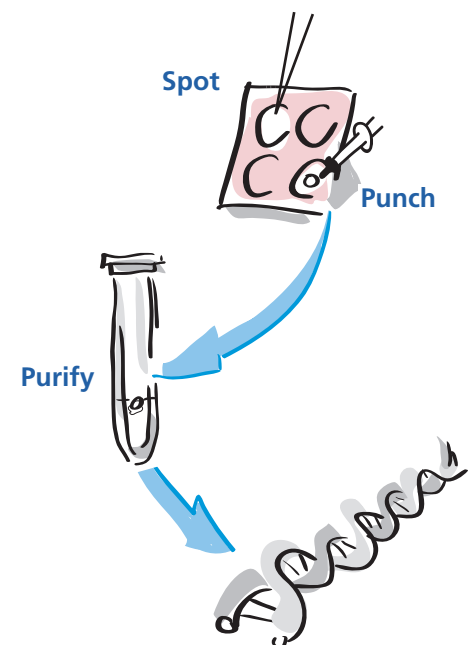
## MICROBIAL INACTIVATION TEST

FTA was tested under a variety of conditions to determine whether diverse bacterial species are inactivated after application onto FTA.

In the first study, high titre ( $10^7$ – $10^8$  CFU/mL) cultures of both reference and clinical bacterial strains were applied to FTA. One hour after application a disk was taken and streaked onto a culture plate which was incubated at optimal conditions for each bacterial species tested.



## Three easy steps to pure DNA



Whatman<sup>®</sup>

## RESULTS

All strains were completely inactivated at high cell concentrations ( $10^7$ – $10^8$  CFU/mL) with no residual activity, except the species of the following taxa: *Nocardia*, *Corynebacterium*, *Staphylococcus* (Gram-positive); *Bacillus*, *Clostridium* (Spore formers); *Mycobacterium* (Acid fast).

Where viable cell growth was recovered at high titre, two treatment conditions were evaluated.

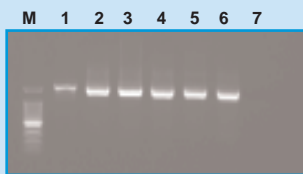
### Condition 1

- The species were applied to FTA at lower titres
- 1 hour after application a punch was taken and streaked onto a culture plate
- Exact culture was performed as required for each species

### Condition 2

- High titres ( $10^8$  CFU/ml) of all resistant bacteria was pre-treated for 5 minutes with a lysis reagent (L6 buffer<sup>1</sup>) to disrupt the cell walls
- The pre-treated bacterial culture was applied directly to the FTA matrix
- The inactivation test was repeated

- All species were completely inactivated at lower cell concentrations ( $<10^4$ – $10^5$  CFU/mL) with no residual growth activity
- All bacterial species pre-treated with L6 were inactivated
- PCR amplification of the 16S rRNA gene showed no interference by the L6 treatment (Fig.1)



**Figure 1.** 16S rRNA gene PCR analysis of L6 treated cells. Lanes: 1 *Mycobacterium*, 2 *Nocardia*, 3 *Corynebacterium*, 4 *Bacillus*, 5 *Staphylococcus*, 6 *Clostridium*, 7 Negative Control and M 100 bp ladder

Other studies were performed to determine the ability of FTA to inactivate virus and to quantitatively determine the anti-microbial effects of FTA. Table 1 shows that FTA inactivates virus at levels greater than 99.99% and that FTA inhibits bacteria and yeast by causing a 2–6 log reduction in growth.

**Table 1: Viral and Bacterial Inactivation**

Viruses	HSV-1 (>99.9996% inactivation) <sup>2</sup> Coxsackie Virus, CVB-4 (>99.99% inactivation) <sup>3</sup>
Bacteria	<i>Staphylococcus aureus</i> (4.86–5.46 Log reduction) <sup>2</sup> <i>Pseudomonas aeruginosa</i> (3.15–5.12 Log reduction) <i>Escherichia coli</i> (2.77–6.30 Log reduction) <i>Salmonella choleraesuis</i> (2.58–6.41 Log reduction) <i>Candida albicans</i> (yeast) (1.96–3.06 Log reduction)

## CONCLUSION

- FTA inactivates the growth of diverse microbial organisms
- FTA allows for the safe shipping and handling of DNA at ambient conditions
- FTA inactivates a large number of organisms at high cell concentrations
- FTA inactivates all bacteria tested at cell concentration of  $10^4$  CFU/mL or below
- Prior treatment with L6 lysis buffer effectively ensures that all bacteria are inactivated when presented at high cell concentration ( $10^7$ – $10^8$  CFU/mL)

References: <sup>1</sup>Boom, R, CJ Sol, MM Salimans, CL Jansen, PM Wertheim-van Dillen, and J van der Noordaa, "Rapid and simple method for purification of nucleic acids." *J. Clin. Microbiol.*, Mar 1990; 28(3): 495-503.

<sup>2</sup>ViroMed BioSafety Laboratory Study 2000. <sup>3</sup>Flinders University Study.

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## Whatman Quality

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