Pilot Evaluation of Commercial Liquid Culture Method for Isolation of Mycobacteria in Resource-Poor Settings

Dear Editor,

High infrastructural costs and lack of trained manpower make setting up of automated mycobacterial culture facilities difficult. Amongst those offering culture, great disparity exists in techniques used. Though a few reference laboratories and hospitals offer automated rapid culture technology, the high cost prevents their widespread use. A vast majority of mycobacteriology laboratories continue to use the conventional Lowenstein-Jensen (LJ) medium.

Evaluating cheaper and rapid culture methods is, thus, vital in tuberculosis control and management.1 We undertook a pilot study to compare mycobacterial recovery rates and detection time of the Bio FM culture medium (M/s Bio-Rad Ltd), the mycobacteria growth indicator tube (MGIT) 960 system (M/s BD Ltd) and LJ medium (M/s EOS labs, Mumbai, India). The Bio FM medium, a Middlebrook 7H9 medium with OADC (Oleic Acid - Albumin Fraction V, Bovine Dextrose - Catalase (beef) - Sodium Chloride) and VCA (Vancomycin - Colistin - Amphoterocin B) supplements, contains a chromogenic indicator that changes to dark blue/violet in response to mycobacterial growth. A total of 20 sputum specimens with known smear findings were included, four specimens from each category (negative, scanty, +, 2+ and 3+) of smear grading (Revised National Tuberculosis Control Programme).

Table 1: Detection time of Mycobacteria by MGIT, BioFM and LJ

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean (days)</th>
<th>Range (days)</th>
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<tbody>
<tr>
<td>MGIT</td>
<td>10.23</td>
<td>4 - 20</td>
</tr>
<tr>
<td>BioFM</td>
<td>10.47</td>
<td>6 - 19</td>
</tr>
<tr>
<td>LJ</td>
<td>21.82</td>
<td>14 - 35</td>
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</table>

Specimen digestion and decontamination was done by the NaOH (Sodium Hydroxide) -NALC (N-acetyl-L-cysteine) method, followed by centrifugation for 20 minutes at 3000 revolutions/minute. 0.5 ml of each concentrate was added into the 3 media. MGIT vials were monitored by the MGIT 960 system while the Bio FM and LJ media were examined up to 42 days and 56 days respectively for mycobacterial growth. Isolates were identified by P-nitro-a-acetylamino-b-hydroxypropiophenone (NAP) testing. 17 of the 20 specimens turned culture positive while three smear negative specimens remained culture negative. All isolates were identified as M. tuberculosis complex. Surprisingly, no discrepancy was seen in the recovery rates of the 3 media. The time to mycobacterial detection was shortest with MGIT and longest with LJ media (Table 1). The detection time of BioFM was comparable with MGIT and outperformed the LJ media, similar to other international study findings.18

Our pilot study, thus, indicates that BioFM media
comparos well with MGIT in terms of recovery rate and
detection time, and detects mycobacterial growth much
faster than the LJ medium. The Bio FM vial is about 30%
cheaper than the MGIT vial and does not need any capital
investment. Thus, it can be used in settings where cost and/
or infrastructural limitations prohibit usage of fully automated
systems. Also, its usage will facilitate reporting of TB cultures
earlier than the conventional LJ method at a more reasonable
cost to the patient, thereby improving overall patient
management. Nevertheless, larger studies are recommended
to evaluate the sensitivity, specificity and contamination rates
of the medium, before putting to diagnostic use.

Acknowledgment
We thank M/s Biorad Ltd. for providing BioFM media
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