



Validation of bleach-treated smears for the diagnosis of Pulmonary Tuberculosis

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Objective



To determine the performance of bleach treated smears followed by short-term digestion, overnight sedimentation and centrifugation compared to direct smears using culture as gold standard



Methods (1)



- **Consecutive TB suspects visiting health centres in Awassa, southern Ethiopia, submitted spot, morning and spot sputum samples**
- **The samples were pooled and direct smears were examined after ZN staining and aliquots cultured onto Löwenstein-Jensen media.**



Methods (2)



The remaining samples were treated with household bleach and divided into three aliquots for:

- Short-term digestion (30 minutes)
- Centrifugation at 3000 g
- Overnight sedimentation

All smears were stained by ZN and examined under light microscope



Results (1)



- **Of 497 pooled samples, Acid-fast bacilli were detected in**
 - 126 (25%) pooled samples by direct smear
 - 141 (28%) after short-term digestion,
 - 169 (34%) after overnight sedimentation
 - 198 (40%) after centrifugation ($P < 0.001$).



Results (2)



| Sputum processing technique | Sensitivity % (95% CI) | Specificity % (95% CI) | PPV % (95% CI) | NPV % (95% CI) |
|------------------------------------|-------------------------------|-------------------------------|-----------------------|-----------------------|
| Direct smear | 51.1(44.6–57.5) | 96.9(94.4–98.6) | 93.7 (88.3-97.0) | 70.0 (64.7-74.1) |
| Short-term digestion | 53.2(46.8–59.6) | 93.6 (89.7-95.8) | 87.2 (80.9-90.2) | 70.0(64.7-74.3) |
| Overnight sedimentation | 57.6(51.1–63.8) | 86.5 (82.0-90.2) | 78.7 (72.0-84.4) | 70.1 (65.0-74.9) |
| Centrifugation | 63.6(57.3–69.7) | 80.8 (75.8-85.2) | 74.2 (67.8-80.0) | 71.9 (66.6-76.8) |



Discussion & Conclusions



- Bleach treatment of sputum and centrifugation significantly improves the sensitivity of smear microscopy for the diagnosis of TB in a high TB burden area



Future perspectives



- **Evaluation of the operational advantages of the improved yield of bleach techniques under operational and programme conditions**
- **Standardization of the techniques for better comparison across different settings**