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Direct Nitrate Reductase Assay: Rapid Detection of MDR-TB in Low Resource Settings

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ABSTRACT

Conventional methods based on measurement of growth in culture media containing antibiotics are available for detection of drug resistance in Mycobacterium Tuberculosis requiring several weeks for results. Newer methods like BACTEC are costly. Hence a simple and rapid alternative method of Nitrate Reductase Assay (NRA) was used in this study to detect resistance to Isoniazid (INH) and Rifampicin (RIF). Sputum samples were collected from patients attending DOTS centre at NKPSIMS from July 2012 to May 2013. Smear AFB Positive samples were only included. After decontamination, 112 sputum were inoculated on plain LJ and 3 Middle Brook 7H9 media (One Plain MB with KNO3, one with KNO3 and INH, one with KNO3 and RIF). Nitrate reduction was tested on Days 7, 10, 14 and 18 of incubation. Control strain H37Rv was used as positive control for nitrate reduction. Eleven samples were contaminated. NRA was performed on 101 samples. Fourteen were resistant to INH, whereas 6 were resistant to RIF and INH. Maximum (46) samples were nitrate positive on day 14. Twenty Eight and 22 samples were positive on day 10 and day 18 respectively. Positivity was seen as early as 7th day in only 5 samples. The present study concludes that this test, being easy, rapid, simple and time saving, can be applied directly on sputum positive patients without waiting for the culture. Thus, NRA can be used as rapid detection test for MDR-TB cases in low resource settings.