Drug susceptibility testing of *Mycobacterium tuberculosis* by a nitrate reductase assay applied directly on microscopy-positive sputum samples

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Aims and objectives: Current methods for drug susceptibility testing (DST) of *Mycobacterium tuberculosis* (MTB) are either costly or slow. As the prevalence of multidrug-resistant (MDR) strains increases, the need for fast, reliable, and inexpensive methods is obvious. This study evaluated a rapid colorimetric nitrate reductase assay (NRA) for direct DST of MTB directly from clinical sputum samples.

Methods: A total of 111 sputa with positive microscopy results for acid-fast bacilli (AFB) with more than 10 AFB per high-power field were used in the study. The samples were decontaminated using the modified Petroff method. The NRA results were compared with the reference indirect proportion method.

Results: The sensitivity and the specificity of the direct NRA were 90% and 97.3%, 92.6% and 98.2%, 52.9% and 100%, and 28.6% and 100% for rifampin, isoniazid, streptomycin, and ethambutol, respectively. The results were in most cases available in 28 days (84.3%).

Conclusions: The direct NRA could be used as a rapid, inexpensive, and accurate method to determine rifampin and isoniazid susceptibility directly from sputum. The technique might become a valid alternative to traditional methods, especially in low-income countries.

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