

Effect of Sodium Hydroxide on Growth of Drug Resistant and Sensitive *Mycobacterium tuberculosis*

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ABSTRACT

The definitive diagnosis of tuberculosis (TB) requires recovery of *Mycobacterium tuberculosis* (MTB) on culture media and identification using differential *in vitro* tests. Specimens submitted to the TB culture laboratory especially sputum are contaminated to varying degrees by more rapidly growing pathogenic and/or residential flora. These organisms overgrow the entire surface of the medium before MTB starts to grow. Specimens must, therefore, be subjected to a digestion and decontamination procedure that liquefies the organic debris and eliminates the unwanted micro-organisms. To eliminate the unwanted microorganisms, 1N NaOH (4%NaOH) is commonly used in the decontamination process for 15 minutes.

To assess the effect of 1N NaOH on growth of both drug resistant and drug sensitive MTB isolates, 268 archived MTB isolates with predetermined drug susceptibility to first line anti-TB drugs (Isoniazid, Rifampicin, Ethambutol and Streptomycin), were randomly selected and sub-cultured on Lowenstein-Jensen (LJ) medium. A 6ml suspension of growth for each isolate was standardized and distributed equally into six sterile centrifuge tubes. To three of the tubes an equal volume of 1N NaOH was added (exposed) and an equal volume of sterile distilled water added to each of the three remaining tubes (controls). The tubes were let to stand at room temperature in three sets of two (exposed and control) within 10, 15 and 20 minutes. The tubes were then centrifuged for 15 minutes at 3000g and washed with sterile distilled water, the deposit was re-suspended with 1 ml sterile distilled water, cultured onto LJ medium and incubated for four weeks. The growth was graded as 1+ (20-100 colonies), 2+ (101-200 colonies) and 3+ confluent growth. This study did not observe any growth scores below 1+ or with a range of 1-19 colonies.

Out of the 268 isolates, 134 isolates were sensitive to all the drugs while 134 isolates were resistant to one or more of the first line anti-TB drugs. Among the resistant isolates 50 were MDR. Both the drug sensitive and drug resistant MTB strains showed a significant reduction in growth when compared to controls ($p < 0.05$). After exposure to 1N NaOH, 29.9% of drug sensitive strains, 70.9% of the resistant strains and 80% of the MDR strains had their growth reduced. The reduction on the growth that was observed at 10 minutes is what was observed up to the 20th minute. There was a significant difference in the effect of 1N NaOH on the growth of drug sensitive and drug resistant MTB isolates. This effect was more on multi-drug resistant strains.