

ห้องสมุดงานวิจัย สำนักงานคณะกรรมการวิจัยแห่งชาติ



E42175

**COMPARISON OF DIRECT AND INDIRECT DRUG SUSCEPTIBILITY  
TESTING OF MYCOBACTERIUM TUBERCULOSIS  
USING MTT ASSAY**

**RATCHANEEPORN KHUMMIN**

**A Thesis Submitted to the Graduate School of Naresuan University  
in Partial Fulfillment of the Requirements  
for the Master of Science Degree in Biomedical Sciences  
February 2012  
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This thesis entitled "Comparison of Direct and Indirect Drug Susceptibility Testing of *Mycobacterium tuberculosis* using MTT Assay" submitted by Miss Ratchaneeporn Khummin in partial fulfillment of the requirements for Master of Science Program in Biomedical Sciences is hereby approved.

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**Title** COMPARISON OF DIRECT AND INDIRECT DRUG  
SUSCEPTIBILITY TESTING OF  
*Mycobacterium tuberculosis* USING MTT ASSAY

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NTB (Nontuberculous mycobacteria)

#### ABSTRACT

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This study aimed to compare the sensitivity of MTT methods in rapid drug susceptibility testing for *Mycobacterium tuberculosis* using two methods. One was an indirect MTT method (the samples were cultured and then tested for drug susceptibility, using the TBI & S test kit from the Department of Microbiology, Faculty of Medicine, Siriraj Hospital, Thailand.) The other was a direct MTT method (direct clinical specimen to test for drug susceptibility using the same test kit). 150 clinical specimens with AFB positive from the Office of Diseases Prevention and Control 9<sup>th</sup> Phitsanulok between, 1 June 2007 to 1 March 2009 were used and divided into 2 periods of incubation time for testing; 7 days and 14 days.

The susceptibility results showed the directed MTT were not correlation with indirecte and proportional method in after incubation time at 7 days. Whereas the concordant was showed at the incubation times of 14 days

These results suggested that the direct method could be helpful in rapid drug susceptibility testing of *M. tuberculosis* using the TBI & S test kit when the incubation time was 14 days.

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## ABBREVIATIONS

µg	=	microgram
µg/ml	=	Microgram per militre
µL	=	Microlitre
AFB	=	Acid fast bacilli
AIDS	=	acquired immunodeficiency syndrome
CDC	=	Centers for Disease control and prevention
DNA	=	Deoxyribonucleic acid
DST	=	Drug susceptibility test
e.g.	=	for example
EMB	=	Ethambutol
FDA	=	Food and Drug Administration
g.	=	gram
HIV	=	Human immunodeficiency virus
INH	=	Isoniazid
LAM	=	lipoarabinomannan
LAMP	=	loop mediated isothermal amplification
LJ	=	Löwenstein Jensen
M	=	Molar
MGIT	=	Mycobacteria Growth Indicator Tube
mL	=	milliliter
MRD-TB	=	Multi-drug resistant
MTB	=	<i>Mycobacterium tuberculosis</i>
MTBC	=	<i>Mycobacterium tuberculosis</i> complex
MTT	=	(3-(4,5-dimethylthiazol – 2-yl)-2,5-diphenyltetrazolium bromide, a tetrazole )
NAA	=	Nucleic Acid Amplification
NAT	=	Nucleic acid testing
NTM	=	Non tuberculous mycobacteria
°C	=	Degree Celsius

## ABBREVIATIONS (CONT.)

PCR	=	polymerase chain reaction
PNB	=	p - nitrobenzoic acid
PZA	=	Pyrazinamide
QFT-G	=	Quanti Feron –TB Gold test
RCF	=	relative centrifugal force
RDTs	=	rapid diagnostic tests
RFLP	=	restriction fragment length polymorphism
RIF	=	Rifampicin
RNA	=	Ribonucleic acid
Rpm	=	revolutions per minute
rRNA	=	ribosomal RNA
SM	=	Streptomycin
TB	=	Tuberculosis
TST	=	Tuberculin skin test
USA	=	United States of America
UV	=	Ultraviolet
WHO	=	World Health Organization
XDR-TB	=	Extensively drug resistant
ZN	=	Zinc