

**NITRATE- AND NITRITE-REDUCTASE ACTIVITIES IN *MYCOBACTERIUM*  
*AVIUM* A5**

By

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Thesis submitted to the Faculty of the  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of

**MASTER OF SCIENCE**

in

**BIOLOGICAL SCIENCES**

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June, 2006

Blacksburg, Virginia

Keywords: *Mycobacterium avium*, nitrate- and nitrite- reductases, and nitrate reduction test

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## Nitrate- and Nitrite-reductase Activities in *Mycobacterium avium* A5

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Biology

(ABSTRACT)

*Mycobacterium avium* is human and animal opportunistic pathogen responsible for disseminated disease in immunocompromised patients. Mycobacteria have a capacity to adapt to the environmental conditions by inducing enzyme activities and altering their metabolism. *M. avium* A5 cells were grown in a defined minimal medium (Nitrogen Test Medium) with glutamine, nitrite, nitrate, or ammonia as sole nitrogen source at a concentration of 2 mM at 37°C aerobically. The strain grew well on all the nitrogen sources except nitrite. It grew slowly on nitrite with a generation time of 6 days and cultures were not viable after 4 weeks of storage. These data confirm that *M. avium* can utilize a single nitrogen source in a defined minimal medium as documented by McCarthy (1987).

*M. avium* genome has been sequenced and contains genes sharing sequence similarities to respiratory nitrate reductase and dissimilatory nitrite reductases. Because, *M. avium* can use nitrate or nitrite as sole nitrogen source for growth (McCarthy, 1987), it must have assimilatory nitrate- and nitrite-reductases. Nitrate- and nitrite-reductase activities of *M. avium* cells growing aerobically or undergoing anaerobic shift in the presence of ammonia, nitrate or ammonia and nitrate in combination were measured. *M.*

*avium* produced nitrate- as well as nitrite-reductase activity. Nitrite- and nitrate- reductases used either NADH or NADPH as an electron donor. Nitrite reductase activity was greater than nitrate reductase activity. This observation supports the rapid reduction of nitrite and slow reduction of nitrate in *M. avium* as documented by McCarthy (1987) and explained why *M. avium* gives a negative result by the standard nitrate reductase test. In addition to assimilatory enzyme activity, *M. avium* A5 also produced dissimilatory nitrate- and nitrite-reductase activities.

## **ACKNOWLEDGEMENTS**

I would like to thank Dr. Joseph Falkinham, III for giving me the opportunity to work under his guidance, encouraging me during challenging times of graduate studies and research work and developing a positive attitude towards life. I would also be thankful to Dr. Eugene M. Gregory and Dr. Biswarup Mukhopadhyay for their time, continuous assistance and valuable suggestions in my research.

The last two years which I spent at Virginia Tech, are the most memorable years of my life though I missed my family very much. It would not have been possible without the help of people over here. I would like to thank all the people in my lab for making the lab a place filled with a lot of fun, enthusiasm and adventures. Specially, I am grateful to Myra Williams who has been always there to assist me. I would like to thank the following people for their friendship: Amy Lewis, Justin Tanner, and Ashley Harrow. It had always been a great pleasure interacting with the administrative staff in the Department of Biological Sciences. I am thankful to Sue Rasmussen for her efforts and help.

Last but certainly not the least, I am deeply indebted to Dr. Maurice Valett and his family for their hospitality, valuable friendship, treating me like a family member and making me feel like home in this foreign country.

## TABLE OF CONTENTS

<b>ABSTRACT.....</b>	<b>II</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>IV</b>
<b>TABLE OF CONTENTS.....</b>	<b>V</b>
<b>LIST OF TABLES.....</b>	<b>VII</b>
<b>LIST OF FIGURES.....</b>	<b>VIII</b>
<b>INTRODUCTION.....</b>	<b>1</b>
<i>Mycobacterium avium</i> Complex (MAC) Epidemiology.....	1
<i>M. avium</i> Complex Ecology.....	1
Mycobacterial Adaptation.....	2
Bacterial Nitrate- and Nitrite-Reductases.....	3
<i>M. avium</i> and Nitrate- and Nitrite-Reductases.....	4
Nitrate- and Nitrite-Reductases in <i>M. avium</i> Genome.....	5
<i>M. avium</i> Structural Features.....	5
Hypothesis.....	8
Rationale of the Experimental Approach.....	9
Research Objectives.....	12
<b>MATERIALS AND METHODS.....</b>	<b>13</b>
Mycobacterial Strain.....	13
Growth Medium.....	13
Growth of <i>M. avium</i> A5 in Different Nitrogen Sources.....	13
Growth of the Cultures for Enzyme Assays.....	15
Anaerobic Shift.....	15
Anaerobic Shift using Anaerobic Chamber.....	15
Isolation of Crude Extract, Membrane, and Soluble Fractions.....	16
Lowry's Assay and Protein Content of the Cell Fractions.....	16
Enzyme Assays.....	17
Measurement of Nitrate- and Nitrite-reductase Activity.....	17
Measurement of ammonia, nitrate and nitrite concentrations.....	18
<b>RESULTS.....</b>	<b>19</b>
Growth of <i>M. avium</i> A5 on different Nitrogen Sources.....	19
Anaerobic shift.....	21
Sonication and Isolation of Cell Fractions.....	21
Lowry's Assay and Protein Content of the Cell Fractions.....	21
Nitrate- and Nitrite-reductase Assays.....	28
Anaerobic Shift using Anaerobic Chamber.....	33
Enzyme Assays using NADPH as Cofactor.....	34

**TABLE OF CONTENTS (CONTINUED)**

**DISCUSSION.....39**  
Introduction.....39  
*M. avium* Growth on Nitrogen Sources.....39  
Mycobacterial Adaptation.....40  
Mycobacterial Breakage.....41  
Enzyme Assays.....42  
Cofactors.....42  
Interpretation of Enzyme Activities.....43  
Nitrate Reductase Test.....47  
Future Experiments..... 47

**LITERATURE CITED.....49**

## LIST OF TABLES

<b>Table 1.</b> Data obtained from <i>Mycobacterium avium</i> genome sequencing listing genes involved in nitrate- and nitrite-reduction.....	7
<b>Table 2.</b> Growth conditions.....	10
<b>Table 3.</b> Assumptions for enzyme activities.....	11
<b>Table 4.</b> Growth of <i>M. avium</i> A5 in different nitrogen sources.....	27
<b>Table 5.</b> Protein concentrations of <i>M. avium</i> A5 cell fractions as derived by Lowry's Assay..	29
<b>Table 6.</b> Nitrate- and nitrite-reductase activities of membrane fractions of <i>M. avium</i> A5 cells grown under different conditions using NADH as electron donor .....	35
<b>Table 7.</b> Nitrate- and nitrite-reductase activities of membrane fractions of <i>M. avium</i> A5 cells grown under different conditions using NADPH as electron donor.....	36
<b>Table 8.</b> Nitrate- and nitrite-reductase activities of membrane of <i>M. avium</i> A5 cells undergoing anaerobic shift in anaerobic chamber using NADH as electron donor .....	37
<b>Table 9.</b> Nitrate- and nitrite-reductase activities of membrane of <i>M. avium</i> A5 undergoing anaerobic shift in anaerobic chamber using NADPH as electron donor.....	38
<b>Table 10.</b> Interpretation of enzyme activities.....	44

## LIST OF FIGURES

<b>Figure 1.</b> Growth of <i>M. avium</i> A5 on glutamine.....	22
<b>Figure 2.</b> Growth of <i>M. avium</i> A5 on ammonia .....	23
<b>Figure 3.</b> Growth of <i>M. avium</i> A5 on nitrate.....	24
<b>Figure 4.</b> Growth of <i>M. avium</i> A5 on nitrite.....	25
<b>Figure 5.</b> Growth of <i>M. avium</i> A5 on nitrite.....	26
<b>Figure 6.</b> Analysis of Enzyme Activity Measurements.....	31