

**EVALUATION OF ISOLATES AND IDENTIFIED PHENOLICS  
FROM *PELARGONIUM SIDOIDES* AGAINST *MYCOBACTERIUM  
TUBERCULOSIS*, OTHER BACTERIA AND FUNGI**

**BY**

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## DECLARATION

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Date: 2005.06.22

## **DEDICATION**

This thesis is dedicated to Kulani Charity (Khonamanje), for her positive support when I was away for my studies

## ABSTRACT

Anecdotal evidence of two South African Geranium species (*Pelargonium reniforme* and *Pelargonium sidoides*) from the United Kingdom with regard to plants being used against tuberculosis, which lacked scientific evidence' prompted us to investigate these two plants for their antimicrobial properties. The German herbal remedy ('Umckaloabo') is prepared from these two plant species and is currently being sold for bronchitis.

Acetone, chloroform and ethanol extracts were investigated against three bacteria (pathogens causing bronchitis), three fungi (fungal species associated with the upper and lower respiratory tract) and *Mycobacterium tuberculosis*. This is the first report on the extracts' activity against *Moraxella catarrhalis*, and three fungi (*Asperigilus niger*, *Rhizopus stolonifer* and *Fusarium oxysporum*). Acetone and ethanol root extracts of *P. sidoides* and its combination with *P. reniforme* exhibited activity against bacteria at 5.0 mg/ml concentration. The fungi were significantly inhibited by the acetone and ethanol extracts of *P. reniforme* and the ethanol extract of *P. sidoides* at a concentration of 5.0 mg/ml. Antituberculosis activity was observed on acetone, chloroform and ethanol root extract of *P. reniforme* and chloroform extract of *P. sidoides* at 5.0 mg/ml concentration.

The isolation and purification of compounds were attempted using two different approaches, of which the second approach resulted in isolation of **four compounds and two flavonoids**. One flavonoid (**epigallocatechin**) is isolated for the first time from *P. sidoides*. Laboratory investigations showed no activity of compounds isolated against *M. tuberculosis*.

As Mycobacteria are intracellular pathogens, antimycobacterial activities may be due to either direct or indirect effects. Though the compounds in this study did not show antituberculosis activity, it can be speculated that the anecdotal evidence of TB-patients could be due to their immunostimulant activity.

## List of Abbreviations

<b>AIDS</b>	Acquired immune deficiency syndrome
<b>ATCC</b>	American type culture collection
<b>CFU</b>	Colony forming units
<b>DMSO</b>	Dimethyl sulphoxide
<b>EB</b>	Ethambutol
<b>GI</b>	Growth index
<b>HIV</b>	Human immunodeficiency virus
<b>INH</b>	Isoniazid
<b>INT</b>	2-(4-iodophenyl)-3-(4-nitrophenyl)-5-phenyl
<b>MDR</b>	Multidrug-resistant
<b>MIC</b>	Minimal inhibitory concentration
<b>MRC</b>	Medical Research Council
<b>NMR</b>	Nuclear magnetic resonance
<b>PDA</b>	Potato dextrose agar
<b>RIF</b>	Rifampin
<b>SD</b>	Standard deviation
<b>SM</b>	Streptomycin
<b>TB</b>	Tuberculosis
<b>TLC</b>	Thin layer chromatography
<b>TMP</b>	Traditional medicinal practitioners
<b>USA</b>	United State of America
<b>USSR</b>	Union of Soviet Socialist Republics
<b>UV</b>	Ultra violet light
<b>WHO</b>	World Health Organization

## Table of contents

Declaration.....	ii
Dedication.....	iii
Abstract.....	iv
List of Abbreviations.....	v
List of Tables.....	x
List of Figures.....	xii
<b>Chapter 1: Introduction</b>	
<b>1.1 Background.....</b>	<b>1</b>
1.1.1 Utilization of herbal drugs.....	1
1.1.2 Medicinal plant-industry in Africa.....	3
1.1.3 Future of traditional medicine.....	8
<b>1.2 Tuberculosis.....</b>	<b>8</b>
1.2.1 Epidemiology.....	8
1.2.2 <i>Mycobacterium tuberculosis</i> .....	10
<b>1.3 Other bacterial infections.....</b>	<b>12</b>
1.3.1 <i>Haemophilus influenza</i> .....	14
1.3.2 <i>Moraxella catarrhalis</i> .....	15
1.3.3 <i>Streptococcus pneumonia</i> .....	16
1.3.4 Gram-positive and Gram-negative bacteria.....	16
<b>1.4 Fungal infections.....</b>	<b>17</b>
1.4.1 <i>Aspergillus niger</i> .....	20
1.4.2 <i>Fusarium oxysporum</i> .....	21
1.4.3 <i>Rhizopus stolonifer</i> .....	21
<b>1.5 Literature review.....</b>	<b>22</b>
<b>1.6 <i>Pelargonium reniforme</i> Curtis and <i>Pelargonium sidoides</i> DC.....</b>	<b>23</b>
<b>1.7 Scope of thesis.....</b>	<b>24</b>
1.7.1 Antibacterial, antifungal and antituberculosis activity of <i>P. reniforme</i> and <i>P. sidoides</i> .....	24

1.7.2 Bioassay guided fractionation of <i>P. sidoides</i> .....	24
1.8 Structure of thesis.....	24
<b>Chapter 2: Importance of <i>P. reniforme</i>, <i>P. sidoides</i> and their phytochemical constituents</b>	
2.1 Introduction.....	26
2.2 Selection of plants.....	27
2.3 <i>P. reniforme</i> and <i>P. sidoides</i> .....	28
2.4 Phytochemical constituents of <i>P. reniforme</i> and <i>P. sidoides</i> and their uses.....	30
2.4.1 Coumarins from <i>Pelargonium</i> .....	31
2.4.2 Essential oils from <i>Pelargonium</i> .....	32
2.4.3 Flavonoids from <i>Pelargonium</i> .....	34
2.4.4 Tannins from <i>Pelargonium</i> .....	35
<b>Chapter 3: Antibacterial activity of <i>P. reniforme</i> and <i>P. sidoides</i></b>	
3.1 Introduction.....	37
3.2 Materials and methods.....	38
3.2.1 Plant material.....	38
3.2.2 Preparation of plant extracts.....	38
3.3 Bacteria.....	39
3.4 Antibacterial assay.....	39
3.5 Results and Discussion.....	40
3.6 Conclusion.....	42
<b>Chapter 4: Antifungal activity of <i>P. reniforme</i> and <i>P. sidoides</i></b>	
4.1 Introduction.....	43
4.2 Materials and methods.....	44
4.2.1 Preparation of plant extracts .....	44
4.3 Fungi.....	44
4.4 Antifungal assay.....	45

4.5 Results and Discussion.....	44
4.6 Fungal inhibition.....	47
4.7 Conclusion.....	49
<b>Chapter 5: Antituberculosis activity of <i>P. reniforme</i> and <i>P. sidoides</i></b>	
5.1 Introduction.....	50
5.2 Materials and methods.....	51
5.2.1 Preparation of plant extracts .....	51
5.2.2 <i>Mycobacterium tuberculosis</i> .....	51
5.2.2.1 Antituberculosis assay.....	51
5.3 Results and Discussion .....	56
5.3.1 Inhibitory activity of plant extracts.....	56
5.4 Conclusion.....	59
<b>Chapter 6: Evaluation of different extracts from <i>P. sidoides</i></b>	
6.1 Introduction.....	60
6.2 Materials and methods.....	64
6.2.1 Preparation of plant extracts.....	64
6.3 Bacteria.....	64
6.4 Antibacterial assay.....	64
6.5 Antituberculosis assay.....	66
6.6 Results and Discussion.....	66
6.6.1 Antibacterial and antibacterial bioassays of extracts of <i>P. sidoides</i> .....	66
6.7 Conclusion.....	70
<b>Chapter 7: Bioassay guided fractionation of <i>P. sidoides</i></b>	
7.1 Introduction.....	71
7.2 Materials and methods.....	72
7.2.1 Preparation of plant extracts .....	72
7.2.2 Sephadex LH-20 and silica gel column separation.....	72



7.3 Results and Discussion.....	78
7.3.1 Antituberculosis results.....	78
7.3.2 Identification of the isolated compounds.....	80
7.4 Conclusion.....	88
Chapter 8: Evaluations of the isolated compounds.....	89
8.1 Introduction.....	89
8.2 Bioassay on <i>M. tuberculosis</i> .....	89
8.3 Results and Discussion.....	90
8.4 Conclusion.....	92
Chapter 9: General Discussion and Conclusion.....	93
Chapter 10: References.....	96
Chapter 11: Acknowledgements.....	113
Chapter 12: Appendices– Publications	
12.1 Publication resulting from this thesis.....	115
12.2 Article in preparation.....	115

## List of Tables

<b>Table 1.1</b> .....	<b>5</b>
The world's 25 best selling pharmaceuticals in 1991	
<b>Table 1.2</b> .....	<b>6</b>
Selection of indigenous medicinal plants used in the South Africa	
<b>Table 1.3</b> .....	<b>7</b>
Uses of medicinal plants	
<b>Table 1.4</b> .....	<b>14</b>
Gram-positive and Gram-negative bacteria associated with upper and lower respiratory infections	
<b>Table 1.5</b> .....	<b>19</b>
Fungal pathogens associated with upper and lower respiratory infections	
<b>Table 3.1</b> .....	<b>42</b>
Antibacterial activity of extracts of <i>P. reniforme</i> and <i>P. sidoides</i> against of <i>H. influenza</i> , <i>M. catarrhalis</i> and <i>S. pneumonia</i>	
<b>Table 4.1</b> .....	<b>46</b>
Antifungal growth on exposure to acetone and ethanol root extracts of <i>P. reniforme</i> and <i>P. sidoides</i>	
<b>Table 5.1</b> .....	<b>57</b>
Antituberculosis activity of the root extracts against the sensitive strain (H37Rv) of <i>M. tuberculosis</i> as determined by the radiometric method $\Delta$ GI value (mean $\pm$ SD) of the control vial was $20 \pm 1.4$ for the sensitive strain	
<b>Table 5.2</b> .....	<b>58</b>
Antituberculosis activity of the shoot extracts against the sensitive strain (H37Rv) of <i>M. tuberculosis</i> as determined by the radiometric method $\Delta$ GI value (mean $\pm$ SD) of the control vial was $20 \pm 1.4$ for the sensitive strain	
<b>Table 6.1</b> .....	<b>68</b>
Antibacterial activity (MIC <sup>a</sup> mg/ml) of <i>P. sidoides</i> extracts	

<b>Table 6.2</b> .....	<b>69</b>
Antituberculosis activity of the root extracts against the sensitive strain (H37Rv) of <i>M. tuberculosis</i> as determined by the radiometric method $\Delta$ GI value (mean $\pm$ SD) of the control vial was $20 \pm 1.4$ for the sensitive strain	
<b>Table 7.1</b> .....	<b>79</b>
Antituberculosis activity of the fractions against the sensitive strain (H37Rv) of <i>M. tuberculosis</i> as determined by the radiometric method $\Delta$ GI value (mean $\pm$ SD) of the control vial was $36 \pm 8.5$ for the sensitive strain	
<b>Table 8.1</b> .....	<b>91</b>
Antituberculosis activity of the compounds against the sensitive strain (H37Rv) of <i>M. tuberculosis</i> as determined by the radiometric method $\Delta$ GI value (mean $\pm$ SD) of the control vial was $20 \pm 1.4$ for the sensitive strain	

## List of Figures

<b>Figure 1.1</b> .....	<b>12</b>
<i>Mycobacterium tuberculosis</i>	
<b>Figure 2.1</b> .....	<b>28</b>
Plants of (a) <i>P. reniforme</i> (b) <i>P. sidoides</i>	
<b>Figure 2.2</b> .....	<b>29</b>
Distribution of <i>P. reniforme</i> and <i>P. sidoides</i> in South Africa	
<b>Figure 3.1</b> .....	<b>38</b>
Crude extracts of <i>P. reniforme</i> and <i>P. sidoides</i>	
<b>Figure 3.2</b> .....	<b>39</b>
Petri dishes with extracts and chocolate agar	
<b>Figure 3.3</b> .....	<b>41</b>
Antibacterial activity of acetone extract of <i>P. reniforme</i>	
<b>Figure 4.1</b> .....	<b>48</b>
Antifungal activity of:	
(a) <i>P. reniforme</i> acetone extract	
(b) <i>P. reniforme</i> ethanol extract	
(c) <i>P. sidoides</i> acetone extract	
(d) <i>P. sidoides</i> ethanol extract	
<b>Figure 5.1</b> .....	<b>53</b>
BACTEC TB- 460 instrument	
<b>Figure 5.2</b> .....	<b>55</b>
Ziehl-Neelsen staining (Kleeberg <i>et al.</i> 1980; WHO/ TB/97.258)	
<b>Figure 6.1</b> .....	<b>62</b>
Coumarins isolated from <i>P. sidoides</i>	
<b>Figure 6.2</b> .....	<b>63</b>
Tannins isolated from <i>P. reniforme</i>	
<b>Figure 6.3</b> .....	<b>65</b>
Bacterial streaking in laminar flow cabinet	

<b>Figure 7.1</b> .....	<b>74</b>
Schematic representation of the purification steps for the isolation of the compound from the roots of <i>P. sidoides</i>	
<b>Figure 7.2</b> .....	<b>75</b>
Sephadex column chromatography of butanol fraction obtained from the fresh roots of <i>P. sidoides</i>	
<b>Figure 7.3</b> .....	<b>76</b>
TLC plates of fractions obtained from chromatographic separation of butanol extract of <i>P. sidoides</i>	
<b>Figure 7.4</b> .....	<b>77</b>
Pure and semipure compounds obtained from <i>P. sidoides</i>	
<b>Figure 7.5</b> .....	<b>81</b>
Coumarins and flavonoids isolated from butanol extract of <i>P. sidoides</i>	
<b>Figure 7.6</b> .....	<b>84</b>
<sup>1</sup> H-NMR spectrum of coumarins and flavonoids isolated from butanol extract of <i>P. sidoides</i>	
<b>Figure 7.7</b> .....	<b>87</b>
<sup>13</sup> C-NMR spectrum of coumarins and flavonoids isolated from butanol extract of <i>P. sidoides</i>	