# List of contents

## Chapter one

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1-Flavonoids</td>
<td>1</td>
</tr>
<tr>
<td>1.2-Classification of flavonoids</td>
<td>2</td>
</tr>
<tr>
<td>1.3-Synthesis of flavonoids</td>
<td>7</td>
</tr>
<tr>
<td>1.4-Chalcones</td>
<td>11</td>
</tr>
<tr>
<td>1.5- <em>trans</em>- and <em>cis</em>- dihydroflavonols</td>
<td>12</td>
</tr>
<tr>
<td>1.6-Isolation technique of flavonoids</td>
<td>13</td>
</tr>
<tr>
<td>1.7- Identification technique of flavonoids</td>
<td>17</td>
</tr>
<tr>
<td>1.7.1 Chemical methods</td>
<td>17</td>
</tr>
<tr>
<td>1.7.2- Physical methods</td>
<td>18</td>
</tr>
<tr>
<td>1.7.2.1-Ultra violet and visible spectrometry</td>
<td>18</td>
</tr>
<tr>
<td>1.7.2.2-Proton magnetic resonance spectroscopy</td>
<td>19</td>
</tr>
<tr>
<td>1.7.2.3- Mass spectrometry</td>
<td>19</td>
</tr>
<tr>
<td>1.8- Isolation of flavonoids</td>
<td>20</td>
</tr>
<tr>
<td>1.9-Biological activity of flavonoids</td>
<td>22</td>
</tr>
<tr>
<td>1.10- Geigeiria alata (DC.)</td>
<td>34</td>
</tr>
<tr>
<td>1.10.1- Botanical description</td>
<td>34</td>
</tr>
</tbody>
</table>


1.10.2- Traditional medicine

1.11 –Aim of the study
Chapter two

Materials and methods

2.1 Materials 37
2.1.1 Apparatus 37
2.1.2 Instruments 37
2.1.3 Plant materials 37
2.2 Methods 37
2.2.1 Preparation of reagents for phytochemical screening 37
2.2.2 Preparation of UV shift reagents 39
2.2.3 Step wise procedure for the
use of shift reagents
2.2.4 Preparation of plant material
for phytochemical screening
2.2.4.1 Test for estrols and triterpenes 40
2.2.4.2 Test for alkaloids 41
2.2.4.3 Test for flavonoids 41
2.2.4.4 Test for tannins 41
2.2.4.5 Test for saponins 42
2.2.5 Extraction of flavonoids 42
2.2.6 Fractionation of the crude extract 42
Chapter three

Results and discussion

3.1-Identification of compound I  43
3.2-Identification of compound II  50
3.3-Identification of compound III  55
Recommendation  61
References  67
# List of figures

1. Fig 1 *Geigeria alata* (DC) Benth 35  
2. Fig 2 flowers and leaves of *geigeria alata* (DC) 35  
3. Fig 3 IR spectrum of compound 1 43  
4. Fig 4 UV spectrum of compound 1 44  
5. Fig 5 Sodium methoxide spectrum of compound1 45  
6. Fig 6 Sodium acetate spectrum of compound1 46  
7. Fig 7 Aluminium chloride spectrum of compound1 47  
8. Fig 8 boric acid spectrum of compound1 48  
9. Fig 9H1NMR spectrum of compound1 49  
10.Fig 10 mass spectrum of compound1 49  
11.Fig 11IR spectrum of compound II 50  
12.Fig 12 UV spectrum of compound II 51  
13.Fig 13sodium methoxide spectrum of compound II 51  
14.Fig 14 sodium acetate spectrum of compound II 52  
15.Fig 15Aluminium chloride spectrum of compound II 52  
16.Fig 16 boric acid spectrum of compound II 53  
17.Fig 17 Fig 15 the H1NMR spectrum of compound II 54  
18.Fig 18 mass spectrum of compound II 54  
19.Fig 19 IR spectrum of compound III 55  
20.Fig 20 UV spectrum of compound III 56  
21.Fig 21 sodium metoxide spectrum of compoundIII 56  
22.Fig 22 sodium acetate spectrum of compound III 57  
23.Fig 23 aluminium chloride of compound III 57  
24.Fig 24 aluminium chloride/HCL of compound III 58  
25.Fig 25 boric acid spectrum of compound III 58  
26.Fig 26 1HNMR spectrum of compound III 59  
27.Fig 27 mass spectrum of compound III 59
Abstract

The research aim to study the flavonoids of *Geigeria alata* (DC). From the ethanolic extract three fractions were prepared ethyl acetate, chloroform and n, butanol.

From the ethyl acetate fraction two flavonoids were isolated compound1 and compound11. From the n. butanol one compound was isolated compound111.

These compounds were purified by different chromatographic techniques and identified via spectroscopic tools: IR, UV, H1NMR and mass spectroscopy. The following tentative structures were suggested:

Compound I:

![Structure of Compound I](image)

Compound II:

![Structure of Compound II](image)
Compound III:
المستخلص:

درس المركبات الفلافونويدية لأوراق شجيرة الفلفل. من المستخلص الكحولي لأوراق شجيرة الفلفل تم تحضير ثلاث مستخلصات وهي مستخلص الكلورورفورم، مستخلص الأثيل استيت ومستخلص البوتانول. تم استخلاص ثلاث مركبات نقيهات من مستخلص الأثيل استيت ومركب واحد من مستخلص البوتانول وذلك عن طريق تقنيات الكروماتوغرافية. تم تسمية هذه المركبات بـ المركب I، المركب II والمركب III.

تعرف التراكيب لهذه المركبات بواسطة أطياف الأشعة تحت الحمراء، الأشعة فوق البنفسجية، الرنين المغناطيسي وطيف الكتلة وتم اقتراح البنية الترميزية التالية لهذه المركبات.

المركب I

المركب II

المركب III
Dedication

To the soul of my father, mother, husband, children, brother and sisters
Acknowledgement

I would like to thank Allah Almighty for giving me the strength to do this work.

First and foremost I would like to extend my deepest gratitude to all the parties involved in this research. First of all a spatial thanks to my supervisor Prof. Mohammed Abed Alkarim for his willingness in overseeing the progress of my research work from its initial phase till the completion of it.

I do believe that all of his advice and comments are for the benefit of producing the best research work.

Secondly I would like to extend my word of appreciation to all the staff members of the lab of the analytical and the pharmaceutical industries at the industrial research and consultancy center for their support and help.

My thanks extend to all my friends. The experiences and knowledge I gain throughout the process of completing my research work would prove invaluable to better equip me for the challenge which lie ahead. Last but definitely not least to my family members, mother and husband; I can never thank you enough for supporting me throughout my research work.