Phytochemical analysis of leaves extract of *Eucalyptus camaldulensis* Dehnh

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Abstract— Petroleum ether, Chloroform, Ethanol and water extracts of *Eucalyptus camaldulensis* leaves were carried out so as to quantify the phytochemical yields in such samples, the percentage yields obtained through the soxhlet (Petroleum ether, Chloroform, Ethanol) extraction for the *Eucalyptus camaldulensis* leaves were 1.54%, 3.82% and 9.34% respectively, while the percentage yields for the aqueous extract was 6.54%. The result of the phytochemical screening showed the presence of tannins, sterol, triterpenoids, saponins, flavonoids, and phenolic compounds. There were a complete absence of alkaloids, Anthraquinone glycoside and cyanogenic glycoside. The occurrence of these biologically active chemicals in *Eucalyptus camaldulensis* plants may justify their wide medicinal uses.

Keywords— Phytochemicals, *Eucalyptus camaldulensis*, extraction yields, bioactive compounds.

I. INTRODUCTION

Medicinal plants have been identified and used throughout human history. Chemical compounds in plants mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs, thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines, but also gives them the same potential to cause harmful side effects [11], [10].

In the written record, the study of herbs dates back over 5,000 years to the Sumerians who created clay tablets with lists of hundreds of medicinal plants (such as myrrh and opium) [2].

In 1500 B.C., the Ancient Egyptians wrote the Ebers Papyrus, which contains information on over 850 plant medicines, including garlic, juniper, cannabis, castor bean, aloe, and mandrake[2].

Sudan with all extremes of meteorological, climatic and topographical features resulting on very varied and luxuriant flora of all types could supply many countries of the world with medicinal plants.

Many of drugs of established therapeutic value used in the pharmacopoeias of different countries grow in many parts of Sudan. Bearing in mind all this, the main task of this study is to spot light on the antihyperglycemic effects of the very important medicinal tropical plant which is known as (*Eucalyptus camaldulensis* Dehnh).

The River Red Gum (*Eucalyptus camaldulensis*) is a tree of the genus Eucalyptus, it is one of around 800 in the genus and it is a plantation species in many parts of the world, but it is native to Australia, where it is widespread, especially beside inland water courses [12].

The tree produces welcome shade in the extreme temperatures of central Australia and plays an important role in stabilizing river banks.

The aim of this study was to investigate the phytochemical composition of the crude leaves extracts of *Eucalyptus camaldulensis* against some

II. MATERIAL AND METHODS

A. Collection and Authentication of Plant material

The leaves of *Eucalyptus camaldulensis* plant were collected during August 2013, from Forest Research Center; they were authenticated by Prof. Mohammed El-mokhtar and prof. Dawoud H. Dawoud, Agricultural Research Corporation (ARC), Federal Ministry of Agricultural and Irrigation, Khartoum, Sudan. The freshly collected leaves were cleared from any foreign materials and dried in a shade then powdered in a suitable powder form.

B. Preparation of Crude Extracts

60gm of *Eucalyptus camaldulensis* powdered leaves were taken and extracted with soxhlet apparatus using petroleum ether, chloroform and ethanol 70%. The solvents were removed under reduced pressure in a rotary evaporator until they become completely dry. The residues were stored at 4°C for further use. Each residue was weighed and the yield percentage was determined [4].

C. Preparation of aqueous extract

100 gm of *Eucalyptus camaldulensis* powdered leaves was infused in 500 ml hot water for 4 hours then filtered with Whatman filter paper. Extracts were kept in Deep freezer at - 4°C for 48 hours, then introduced in freeze dryer till completely dried. The residue was weighed and the yield percentage was determined [7].

D. Quantitative yield of extract

To determine the quantitative yield of extract, the dish was weighed while empty and its weight was recorded. The weight of the dish and its content after evaporation in the water bath was recorded. The yield of the extract was calculated using the formula given by[8].

Percentage yield = \( \frac{\text{Weight of the sample extract obtained (g)} \times 100}{\text{Weight of the powdered sampled used (g)}} \)
E. Phytochemical screening
Phytochemical screening for the active constituents was carried out using the methods described by [1], [13] and [3] with few modifications.

F. Preparation of Extract for Phytochemical screening
50gm of the plant powder was soaked in 500ml of ethanol for about twenty four hours at room temperature. The extract was filtered through filter paper and solvent was evaporated under reduced pressure using rotary evaporator apparatus. This extract was used for phytochemical screening.

1) Identification of Tannins: 0.2 g of the extract was washed three times with petroleum ether, dissolved in 10 ml hot saline solution and divided in two tests tubes. To one tube 2-3 drops of ferric chloride added and to the other one 2 – 3 drops of gelatin salts reagent added. The occurrence of a blackish blue color in the first test tube and turbidity in the second one denotes the presence of tannins.

2) Test of sterols and Triterpenes: The powder plant material (1g) will be macerated with petroleum ether (60-80°C) 20 ml for 6 hour, filtered and the ether will be evaporated to dryness. The residue was dissolved in acetic anhydride (2ml), transferred to a test tube and cautiously, concentrated sulphuric acid will be poured along the side of the tube. Possible presence of sterols and /or triterpenes is indicated by the immediate appearance of violet color in case of triterpenes which changes to green on standing in case of sterol.

3) Test for phenol: 2ml of extract was added to 2mls of ferric chloride solution (FeCl3), a deep bluish green solution is formed with presence of phenols.

4) Test for Alkaloids: 0.5 g of each fraction was heated with 5 ml of 2N Hcl in water bath and stirred for about 10 minutes, cooled filtered and divided into two test tubes. To one test tube few drops of Mayer’s reagent was added while to the other tube few drops of Valser’s reagent was added. A slight turbidity or heavy precipitate in either of the two test tubes was ranked as presumptive evidence for the presence of alkaloids.

5) Tests for Flavonoids: 0.5 g of the extract was washed three times with petroleum ether and dissolved in 30 ml of 80% ethanol.

The filtrate was used for following tests:
A/ to 3ml of the filtrate in a test tube 1ml of 1% aluminum chloride solution was in methanol was added. Formation of a yellow color indicated the presence of Flavonoids. Flavones or and chalcone. C/ to 2ml of the filtrate 0.5ml of magnesium turnings were added. Producing of defiant color to pink or red was taken as presumptive evidence that flavonenes were present in the plant sample.

6) Test for Saponins: 0.3 g of the extract was placed in a clean test tube. 10 ml of distilled water was added, the tube stoppered and vigorously shaken for about 30 seconds. The tube was then allowed to stand and observed for the formation of foam, which persisted for least an hour, was taken as evidence for presence of saponins.

7) Test for Cumarins: 0.2 g of each the extract dissolved in 10 ml distilled water in test tube and filter paper attached to the test tube to be saturated with the vapor after a spot of 0.5N KOH put on it. Then the filter paper was inspected under UV light, the presence of coumrins was indicated if the spot have found to be adsorbed the UV light.

8) Test for Anthraquinone Glycoside: 0.2 g of each fraction was boiled with 10 ml of 0.5N KOH containing 1ml of 3% hydrogen peroxide solution. The mixture was extracted by shaking with 10 ml of benzene. 5ml of the benzene solution was shacked with 3ml of 10% ammonium hydroxide solution and the two layers were allowed to separate. The presence of anthraquinones was indicated if the alkaline layer was found to have assumed pink or red color.

9) Test for Cyanogenic Glycoside: 0.2 g of each fraction was placed in erlenmeyer flask and sufficient amount of water was added to moisten the sample, followed by 1ml of chloroform (to enhance every activity).

III. RESULTS AND DISCUSSION

Table 1
The results of percent yield of the different extracts of Eucalyptus camaldulensis leaves

<table>
<thead>
<tr>
<th>No.</th>
<th>Solvent of Extract</th>
<th>Initial weight of plant powder (gm)</th>
<th>Final weight(g) of plant extract (gm)</th>
<th>Yield (%) W / W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Petroleum ether</td>
<td>60</td>
<td>0.872</td>
<td>1.45</td>
</tr>
<tr>
<td>2</td>
<td>Chlorfor m</td>
<td>60</td>
<td>2.293</td>
<td>3.82</td>
</tr>
<tr>
<td>3</td>
<td>Ethanol</td>
<td>60</td>
<td>5.604</td>
<td>9.34</td>
</tr>
<tr>
<td>4</td>
<td>Water</td>
<td>50</td>
<td>3.270</td>
<td>6.54</td>
</tr>
</tbody>
</table>

Table 2
Phytochemical components of the leaves extracts of E. camaldulensis

<table>
<thead>
<tr>
<th>No.</th>
<th>Phytochemical components</th>
<th>E. camaldulensis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tannins</td>
<td>++++</td>
</tr>
<tr>
<td>2</td>
<td>Sterols</td>
<td>+++</td>
</tr>
<tr>
<td>3</td>
<td>Triterpenes</td>
<td>+++</td>
</tr>
<tr>
<td>4</td>
<td>Phenol</td>
<td>++</td>
</tr>
<tr>
<td>5</td>
<td>Alkaloids</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Flavonoids</td>
<td>++++</td>
</tr>
<tr>
<td>7</td>
<td>Cumarins</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Saponins</td>
<td>++++</td>
</tr>
<tr>
<td>9</td>
<td>Anthraquinone glycoside</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>cyanogenic glycoside</td>
<td>-</td>
</tr>
</tbody>
</table>

key: + = Trace , ++ = Moderate , +++ = High , ++++ = Very High, - = Absent
The yield percentage was calculated for the four different extracts of *Eucalyptus camaldulensis*. The highest yield was (9.34%) for *Ethanolic extract* followed by *aqueous extract* (6.54%), while the chloroform and petroleum ether extracts were (3.82%) and (1.45%), respectively. These results are shown in table no1.

The phytochemical screening results from table 2 show that the *Eucalyptus camaldulensis* leaves contains tannins, sterol, triterpenoids, saponins, flavonoids, and phenolic compounds, while There were a complete absence of alkaloids, Anthraquinone glycoside and cyanogenic glycoside.

These findings are in accordance with other investigators [6] and [5] who have also reported these components in phytochemical analysis of extract of *Eucalyptus camaldulensis* leaves.

### IV. CONCLUSION

Bioactive compounds such as, sterol, triterpenoids, saponins, flavonoids, and phenolic compounds were detected to be present in the leaves of *Eucalyptus camaldulensis* plants. Since this plant had been used in the treatment of different ailment such as used for treating respiratory tract infections, whooping cough, asthma, pulmonary tuberculosis, osteoarthritis, joint pain, acne, wounds, , bacterial dysentery, liver and gallbladder problems, cancer etc, the medicinal roles of this plant could be related to such identified bioactive compounds. Efforts should be geared up at characterizing the entire bioactive agents present, in this plant for its full utilization.

### ACKNOELEDGEMENT

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### REFERENCES


