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# Qualitative and quantitative screening of the chemical components for selected medicinal plants from Libya

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**Abstract**
Most of the populations in emerging countries rely on traditional medicinal plants for their healthiness care requirements. As an effect, people have established their information of these traditional remedies through their capabilities and regular clarifications. In the Libyan communities, this evidence is extremely entrenched in their nation, conveyed from one age group to the next orally and alongside gender ranks. The qualitative and quantitative screening of the chemical constituents for selected medicinal plants from Libya were carried out for *Anethum graveolens*", (Dill) and "*Apium graveolens* L". Whereas, the Results of quantitative estimation of percentages crude chemical components in these plants (*Anethum graveolens*, *Apium graveolens* L, the percentage yields were 80 and 90% respectively. While, 60 and 40% were for flavonoids, though, 4 and 8% were for alkaloids, however, 40 and 32% for saponins. However, the qualitative estimation showed presence for practically of chemical constituents of envisioned plants by means of flavonoids, phenols, tannins, phlobatanins, saponins, steroids, alkaloids and carbohydrates in the both of extracts (aqueous and ethanolic). Even though the Anthraquinone does not exist at all and that both of glycosides and terpenoids scarce presence in water and alcoholic extracts.

**Keywords:** Traditional medicinal plants, *Anethum graveolens",* "*Apium graveolens* L", quantitative and qualitative screening

## Introduction
Aromatic and medicinal plants are prevalent throughout the Mediterranean area, whereas the ancient time had used by a local citizen for production of regional preparations, nourishment and beverages. Due to high demand for raw materials subsequently, cultivation of plants increased with help of biological technique [1]. *"Anethum graveolens"*, (Dill) is one of the most important condiment and vegetables are grown in Libya and one of the most important condiments and vegetables are grown in Libya. Likewise, this plant grows in many places such as Europe, United States and China, in addition, are used it as a medicine and cooking from since ancient times. Many reviews were attending on plants with healing possessions. *"Anethum graveolens",* correspondingly is used for some gastrointestinal illnesses such as indigestion flatulence, colic and stomachache. [3] Relatively triterpenes are known would decrease of gastric vascular permeability and antiulcer medications and their action are suggested to be the duo to the stimulation of cellular protection, relief of mucosal prostaglandins metabolism-cytoprotective action and [4]. While *"Apium graveolens* L*",* (Celery) grows at Khums region, Libya and outlying in almost of west and east of Libya also in North Africa and Mediterranean countries, "*Apium graveolens* L*"* was used for thousands of years ago as traditional medications [5-7]. "*Apium graveolens* L*"* moreover used as a food and at various times both the whole plant and the seeds were consumed as a medication. Celery seeds and celery seed extracts were offerings as flavouring agents in addition to in anti-rheumatic formulations as the seeds have significance as arthritic pain relief, for asthma, bronchitis, treating rheumatic and inflammatory conditions [8-12].

## Materials and Methods
### Collection of plant material
*Anethum graveolens",* (Dill) and *"Apium graveolens* L*" were* collected from different parts of the Al-khums city (Libya) in Marsh-April months of 2016. Identification of both these plants was confirmed by Plant taxonomist of the Department of Biology of Al- Mergheb University, Al-Khums, Libya. Leaves of each plant were collected, washed under running tap water and

dried under shade and ground into fine powder in the electronic grinder, the powder was stored in plastic bags at room temperature under low humidity condition.

**Preparation of Extract**

The plant material was air-dried at room temperature (26 °C) then subjected to the oven (40 °C) for 48 houses, after which it was ground to a uniform powder. Mean particle size $d$ = 0.388 mm was determined using sieve sets (Erweka, Germany). All extracts (Aqueous and Ethyl alcohol) were prepared by soaking 250 g dry powdered plant material in 1000 mL of appropriate solvent at room temperature for 72 houses. The extracts were filtered through a Whatman No. 42 (125 mm) filter paper, concentrated using a rotary evaporator and were dried at 50 °C to the constant mass [24].

**Qualitative and Quantitative Screening**

Chemical tests were performed for the aqueous and ethanolic leaves extracts of all plants using standard procedures to identify the presence of various phytochemicals as described by Sofowora, 1993 [25], Raman, 2006 [26] and etc [27-34].

**Qualitative Screening**

**Test for Flavonoids**

**Shinoda Test:** (Magnesium hydrochloride reduction test): To the test, solution add few fragments of magnesium ribbon and concentrated hydrochloric acid dropwise, pink scarlet; colour appears after few minutes indicating the presence of flavonoids.

**Ferric Chloride Test:** To the test solution, add few drops of ferric chloride solution, the intense green colour was formed to show the presence of flavonoids.

**Test for Tannins**

**Ferric Chloride Test:** Some amount of extract was dissolved in distilled water to this solution 2ml of 5% ferric chloride solution was added. Formation of blue-green indicates presence of tannins

**Lead Acetate Test:** Some amount of extract a few drops of lead acetate solution was added. Formation of precipitate indicates the presence of tannins.

**Test for Alkaloids**

A few drops of 2N hydrochloric acid was added to 2 ml of the methanolic extract and heated in a water bath (50 °C). The solution was filtered and Wagner's reagent added to the filtrate. The formation of a red colour precipitate indicates the presence of alkaloids.

**Test for Saponin**

**Foam test:** The extract was diluted with distilled water and shaken in a graduated cylinder for fifteen minutes. The formation of a layer of foam indicates the presence of saponins.

**Test for Glycoside**

**Keller-Killani Test:** To 2 ml of the test solution, 3 ml of glacial acetic acid and 1 drop of 5% ferric chloride was added to a test tube. Add carefully 0.5 ml of concentrated Sulphuric acid by the side of the test tube. Formation of blue colour in the acetic acid layer indicates the presence of Cardiac Glycosides [35].

**Borntrager's Test:** To3 ml of the test solution, dilute Sulphuric acid was added, boiled for 5 minutes and filtered. To the cold filtrate, an equal volume of benzene was added and shake it welled. The organic solvent layer was separated and ammonia was added to it. Formation of pink to red colour in ammoniacal layer indicates the presence of Anthraquinones glycoside.

**Test for Carbohydrate**

**Molisch's Test:** Treat the 2 ml of test solution with few drops alcoholic α-naphthol solution in a test tube and the1 ml of concentrated Sulphuric acid was added carefully along with a side of the test tube. Formation of vitrioled ring at the junction indicates the presence of carbohydrates [36].

**Fehling's Test:** Equal volume of Fehling solution A and Fehling solution B are mixed and few drops of sample is added and boiled, a brick red precipitate indicates the presence of reducing sugar [36].

**Test for Steroids**

2 ml of acetic anhydride was added to 0.5 g of an ethanolic extract of each sample with 2ml of $H_2SO_4$. The colour change from violet to blue or green indicated the presence of steroids [37].

**Test for Terpenoids**

5ml of each extract was added to 2ml of chloroform and 3ml of con.H2SO4 to form a monolayer of reddish-brown colouration of the interface was showed to form positive result for the terpenoids [38].

**Test for Anthraquinones**

About 0.5 g of each extract was boiled with 10% HCl for few minutes in water bath, filtered and allowed to cool. An equal volume of $CH_3Cl$ was added to the filtrates. Few drops of 10% ammonia were added to the mixtures and heated. Formation of rose-pink colour indicated the presence of Anthraquinones.

**Test for Phlobatanins**

The extracts (0.5 g) were dissolved in distilled water and filtered. The filtrate was boiled with 2% HCl solution. Red precipitate shows the presence of phlobatanins.

**Test for Phenols**

Two (2) ml extract was taken into water and warmed at 45-50 0C. Then 2 ml of 3% FeCl3 was added. Formation of green or blue colour will indicate the presence of phenols.

**Quantitative Screening**

Flavonoids, Saponins and Alkaloid were quantitatively determined by assuming the method described by Obadoni and Ochuko (2001), Kocipai-Abyazan (1994) and Harborne (1973) respectively. The percentage yields and quantitatively determined Flavonoids, Saponins and Alkaloid of were considered according to following:

$$\text{Yield \%} = \frac{\text{Final weight of extract}}{\text{Total weight of Ground plant}} \times 100$$

**Determination of Saponin**

The samples were pulverized and 10 g of each were invested in a conical flask and 50 Cm3 of 20% aqueous ethanol were added. The samples were heated over a hot water bath for 4 h with continuous stirring at about 55 °C. The mixture was filtered and the residue re-extracted with another 100 ml 20% ethanol. The combined extracts were reduced to 20 ml over a water bath at about 90 °C. The concentrate was transferred into a 150 ml separatory funnel and 10 ml of diethyl ether was added and shaken vigorously. The aqueous layer was recovered while the ether layer was discarded. The purification process was repeated and 30 ml of n-butanol was added. The combined n-butanol extracts were washed twice with 5 ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation the samples were dried in the oven to a constant weight; the Saponin content was calculated as a percentage [39].

**Determination of Flavonoids**

20 g of the plant sample was extracted repeatedly with 200 ml of 80% aqueous methanol at room temperature. The whole solution was filtered through Whatman filter paper No 42 (125 mm). The filtrate was later transferred into a crucible and evaporated into dryness over a water bath and weighed to a constant weight [40].

**Determination of Alkaloids**

10 g of the sample was weighed into a 500 ml beaker and 400 ml of 10% acetic acid in ethanol was added and covered and allowed to stand for 4 h. This was filtered and the extract was concentrated in a water bath to one-quarter of the original volume. Concentrated ammonium hydroxide was added dropwise to the extract until the precipitation was complete. The whole solution was allowed to settle and the precipitated was collected and washed with dilute ammonium hydroxide and then filtered. The residue is the alkaloid, which was dried and weighed [41].

**Result and Discussion**

**Table 1:** Quantitative (percent) phytochemical components of selected plants leaves:

| Plants Name | Percentage Yield % | Flavonoids % | Alkaloids % | Saponin % |
|---|---|---|---|---|
| *Anethum graveolens* | 80 | 60 | 4 | 40 |
| *Apium graveolens* L | 90 | 40 | 8 | 32 |

Quantitative evaluation of percentages crude chemical components in these plants (*Anethum graveolens*, *Apium graveolens* L, and as shown in table 1the percentage yield were 80 and 90% respectively. While, 60 and 40% were for flavonoids, though, 4 and 8% were for alkaloids, however, 40 and 32% for saponins.

**Table 2:** Qualitative phytochemical components of selected plants Leaves:

| Plants Name | *Anethum graveolens* | | *Apium graveolens* L | |
|---|---|---|---|---|
| Chemical Constituents | Aqus. Extr. | EtOH Extr. | Aqus. Extr. | EtOH Extr. |
| Flavonoids | + | + | + | + |
| Phenols | + | + | + | + |
| Tannins | + | + | + | + |
| Phlobatanins | - | - | - | - |
| Saponins | + | + | + | + |
| Steroids | + | + | + | + |
| Terpenoids | - | + | - | + |
| Anthraquinons | - | - | - | - |
| Glycosides | + | + | - | - |
| Alkaloids | + | + | + | + |
| Carbohydrate | + | + | + | + |

As shown in table 2 that presence for almost of chemical constituents of intended plants such as flavonoids, phenols, tannins, phlobatanins, saponins, steroids, alkaloids and carbohydrates in the both of extracts (aqueous and ethanolic). While the Anthraquinone do not exist at all and that both of glycosides and terpenoids scarce presence in water and alcoholic extracts, Moreover Saponin had conveyed as anti-oxidant, found in all studied plant and in decent quantity in and retain both advantageous (i.e. Cholesterol lowering) along with harmful properties and reveal structure dependent biological activity [42-43]. Flavonoids have biological efficacies contain protection in contradiction of inflammatory allergies, microbes, ulcers and free radical scavenging [44-45]. The studied plants contained steroidal combinations which remained of significance in pharmacy owing to their affiliation with composites as sex hormones [46]. Furthermore Presence of terpenoids in the crude ethanolic extract of studied plants is corresponding to the results in table 2 existed specified that Terpenoids were present in many herbal plants, and several terpenoids had shown to the obtainable for medicinal uses. Therefore several terpenoids were available in various plants for not only herbal but besides for nutritional use [47].

**Conclusion**

The results of qualitative and quantitative phytochemical screening of *"Anethum graveolens* and *Apium graveolens* revealed that Aqueous and Ethanolic extracts are potential sources of various active phytoconstituents present in them and which contribute medicinal as well as physiological properties of the plants. Therefore, these extracts from these plants could be seen as a good source for production of using drugs in future. Before putting into drug form the crude extract should be evaluated against various diseases.

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