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Phytochemical Evaluation of the Aerial Parts of some Selected Medicinal Plants Growing in Arid Environments

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Abstract As a consequence of people's collective interest in traditional sources, demand for traditional components generated from natural resources has expanded globally. The current study aims at several secondary chemicals found in the aerial parts of various medicinal plants living in natural environments in Egypt (*Farsetia aegyptia*, *Fagonia mollis*, *Lactuca serriola* and *Symphotrichum squamatum*). Steroids, alkaloids, flavonoids, saponins, tannins, phenols, and variation of glycosides, anthraquinones, and terpenes were discovered in various parts of four plants, according to the findings of the analysis. On the other hand, he highest total amount of phenols, alkaloids, flavonoids, saponins, and tannins was establish in *F. aegyptia* > *L. serriola* > F. mollis > *S. squamatum* was found (21.3, 10.26, 14.19, 21.33, and 33.21 mg/g); (20.45, 8.03, 5.10, 17.46, 29.59 mg/g); (19.10, 6.19, 4.61, 15.62, and 22.86 mg/g) and (14.87, 6.19, 4.61, 15.62, 22.86 mg/g), respectively. The findings of this study aid in the screening of herbal plants for future phytochemical and pharmacological research, resulting in the discovery of natural drugs and their development with global interest for the treatment of diverse maladies.

keywords: Wild plants; Desert; Phytochemical analysis; Medicinal plants.

1. Introduction

In the modern medicinal system, people have started looking at the ancient healing systems due to the adverse effects associated with synthetic drugs. Herbal medications serve an essential role in health-care initiatives, particularly in underdeveloped nations. The ancient Indian literature had a remarkably broad definition for medicinal plants, which regarded all plant parts to be possible sources of therapeutic components [1]. Traditional remedies produced from plants can be utilized to treat a number of ailments because they include a variety of secondary metabolites to which bacteria may not be resistant [2].

Natural products are a major source of new natural drugs and their use as an alternative medicine for treatment of various diseases has been increased in the last few decades [3]. In comparison to the formulated drugs, the herbs and spices have fewer side effects. They are also inexpensive, show better patient tolerance and are readily available for low socioeconomic population [4].

Plants have been described as the oldest friends of man due to their value as sources of food, shelter and medicines [5-7]. According to estimates, by the eighteenth century, 80% of all medicines came from plants [6]. Around 460-370 BC, Hippocrates, who practiced the art of healing via the use of plant-based pharmaceuticals, employed plants and their extracts in the treatment of diseases [8]. Furthermore, traditional medicinal knowledge is responsible for around 25% of all pharmaceutical drugs sold globally. There is a lot of interest in creating new types of therapeutic drugs that are more potent and have fewer adverse effects [9, 10].

The Egyptian desert is home to a variety of weeds. Egyptian scientists have experimented with introducing and cultivating several of our indigenous wild plants as fodder plants in Egypt [11]. Other than food, building materials, furniture, agriculture, paper, textiles, baskets, mats, and other plant products were also used. Various studies, including Zahran and El-

Amier [12], El-Amier and Ejgholi [13], Abd-ElGawad et al. [14], El-Amier et al. [15], and Zaki et al. [16], have lately researched the key active constituents of many species utilized as pasture. As a result, the purpose of this research was to examine the chemical analysis of a variety of wild plants from different habitats in Egypt in order to better utilize these natural resources.

2. Materials & Methods

2.1. Plant material and extraction process

In March 2021, four kinds of blooming plants were gathered from a habitat in Wadi Hagoul (Eastern Desert) and a canal bank in Egypt. The different selected plants are namely: *Farsetia aegyptia* Turra., *Fagonia mollis* Delile., *Lactuca serriola* L and *Symphotrichum squamatum* (Spreng.) Nesom. The plant species were identified according to Tackholm [17] and Boulos [18].

The aerial parts of selected plant were washed by hand, rinsed numerous times with distilled H_2O, and dried in an air-forced oven for 24 hours to remove moisture before grinding. Each dried plant component was steeped for 200 grams in 85 percent methanol and shook many times. After the extracts were filtered and evaporated, the dry residue was dissolved in dimethyl sulfoxide (DMSO) for further use.

2.2. Qualitative phytochemical screening.

Standard techniques such as those described by Trease and Evans [17], and Harborne [18] were used to identify the phytochemical components of selected four plants.

2.3. Quantitative determination of the chemical constituents.

Assays established by Stankovic [19] and Jasuja et al. [21] were used to evaluate total phenolics, flavonoids, and alkaloids. Van Buren and Robinson [23] defined tannins, whereas Obadoni and Ochuko [22] devised a technique for measuring saponins concentration.

3. Results and Discussion

3.1. Phytochemical constituents

The phytochemical analysis of the four plants that have been naturally grown in the different habitats was carried out to assess their economic potential and their use as raw natural resources for various purposes.

3.2. Qualitative analysis of Some Secondary metabolites

The findings of chemical contents of selected plant screening and qualitative analysis of the dust and methanol extract of entire plants (*Fagonia mollis, Farsetia aegyptia, Lactuca serriola, and Symphotrichum squamatum*) are shown in Table 1. The usage of different plants indicated diverse reactions to the occurrence of phyto-constituents in this study, and the outcome of scores are employed as -, +, ++, +++. As a consequence, the bioactive chemicals in wild plants (*F. mollis, F. aegyptia, L. serriola,* and *S. squamatum*) were quantified qualitatively. There was a lot of variation within the same sample and between each plant sample. Saponins alkaloids, phenols, flavonoids, and tannins were found in various amounts in the samples. Phytoconstituents were found in traces or in the absence of phytoconstituents in some samples \ Flavonoids were identified in trace quantities (+) in *Fagonia mollis*. Saponins were identified in trace quantities (+) in *Farsetia aegyptia*. Tannins were identified in trace quantities (+) in *Farsetia aegyptia* and *Lactuca serriola*; with high quantities (++) in *Fagonia mollis* and *Symphotrichum squamatum*. Glycosides and steroids were identified in trace quantities (+) in *Fagonia mollis* and *Farsetia aegyptia*; with low quantities (++) in *Lactuca serriola* and absent in *Symphotrichum squamatum*. Anthraquinones are absent (-) from the all-plants; whereas terpenoids are absent in all plants, and are present in trace quantities (+) in *Lactuca serriola* samples as shown in Table 1.

A variety of variables impact the estimate of bioactive constituents from ordinary wild flora, counting removal technique, raw resources, removal solvent, taxa species and age, and topsoil nature [25].

3.3. Quantitative analysis of Some Secondary metabolites

The overall assessment of the analytical results for different wild plants (*Fagonia mollis, Farsetia aegyptia, Lactuca serriola,* and *Symphotrichum squamatum*) revealed distinctive specificity of each investigated plant and a highest diverse spectrum of secondary

bio-metabolites that differed from one sample to other plant sample; and revealed that the plants were highest source of saponins, tannins, phenols, flavonoids, and alkaloids The highest total content of phenols, alkaloids, flavonoids, saponins, and tannins was originate in *Farsetia aegyptia* > *Lactuca serriola* > *Fagonia mollis* > *Symphotrichum squamatum* plant sample was found (21.3 mg/g, 10.26 mg/g, 14.19 mg/g, 21.33 mg/g, and 33.21 mg/g); (20.45 mg/g, 8.03 mg/g, 5.10 mg/g, 17.46 mg/g, 29.59 mg/g); (19.10 mg/g, 6.19 mg/g, 4.61 mg/g, 15.62 mg/g, and 22.86 mg/g) and (14.87 mg/g, 6.19 mg/g, 4.61 mg/g, 15.62 mg/g, 22.86 mg/g), respectively as showed in Table 2.

Table 1. Qualitative phytochemical analysis of five selected plant species collected from the different habitats.

Screening test	Plant samples			
	Fagonia mollis	***Farsetia aegyptia***	***Lactuca serriola***	***Symphotrichumsquamatum***
Anthraquinones	-	-	-	-
Glycosides	+	+	++	++
Flavonoids	+	++	+++	++
Saponins	+++	+	++	++
Alkaloids	++	++	+++	++
Tannins	++	+	+	++
Steroids	+	+	++	-
Phenols	++	++	+++	++
Terpenes	-	-	+	-

Table 2: Bioactive constituents (mg/g D.Wt.) in different parts of selected taxa together from different habitats.

Plant species	Active organic compounds				
	Phenolics	**Alkaloids**	**Flavonoids**	**Saponins**	**Tannins**
Fagonia mollis	19.10±1.19	6.19±0.34	4.61±0.26	15.62±0.98	22.86±1.43
Farsetia aegyptia	21.31±1.33	10.26±0.26	14.19±0.96	21.33 ±1.32	33.21±2.08
Lactuca serriola	20.45±1.28	8.03±0.57	5.10±0.32	17.46±1.09	29.59±1.85
Symphotrichum squamatum	14.87±0.93	4.61±0.45	6.82±0.43	9.06±0.57	15.53±0.97

Values are mean of triplicates ± standard error.

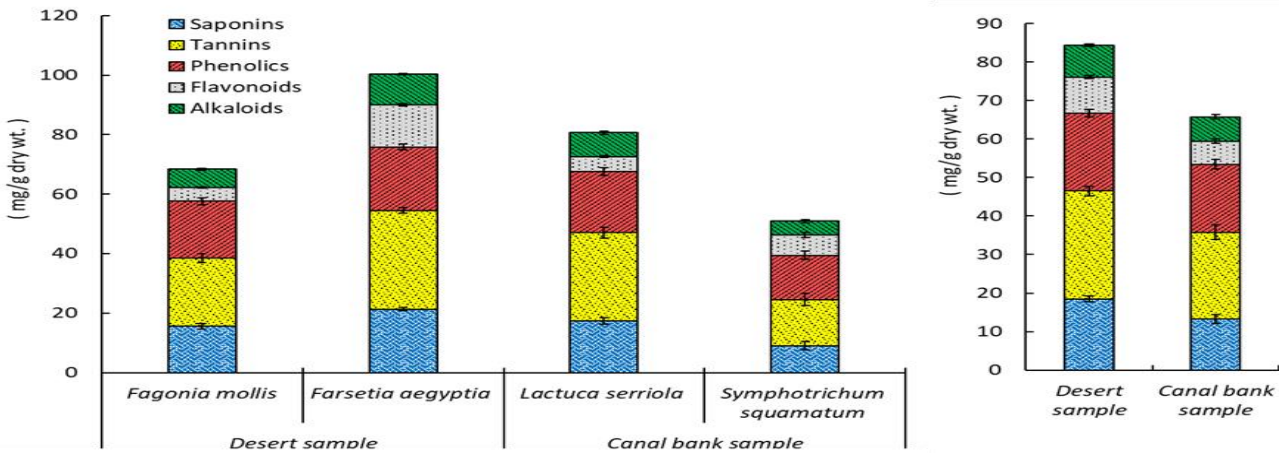

Figure 1. Bioactive constituents (mg/g D.Wt.) of selected taxa together from the different habitats.

4. Conclusion

Finally, the wild plants picked are important flora that have been used to treat a range of diseases in traditional medicine. In this investigation, four plants were shown to provide a long-term supply of agro-industrial and medicinal commodities. Phytochemicals from certain plant species can also be utilized as a raw material for developing less priced pharmaceuticals and a number of other viable public-use products. The largest amounts of

natural chemicals were found in the leaves and flowers of plants. We recommend that biotechnical technologies (e.g. tissue culture, micropropagation, synthetic seed technology, and molecular marker-based approaches) should be employed to increase yield and modify the potency of medicinal plants.

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