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Extraction and Identification of Some Organic Compounds of Some Spice Types Available at Libyan Markets

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Abstract:

This study was carried to investigate some organic compounds on some spice samples which available at some Libyan markets, the samples including (*Nigella sativa,* Chamomile *Piper nigrum* and *Dianthus caryophyllus* L). The phytochemical screening of the natural product compounds which may be presence in the aqueous and alcoholic extracts of the selected plants was carried out by color detection. The Flavonoids Alkaloids Carbohydrates Cardiac glycosides Steroid Terpenoids, Saponins and Tannin compounds were studied. The results indicated that, different organic compounds which classified as natural product compounds were recorded in some samples. The results also showed that Alkaloids, Carbohydrates and Cardiac glycosides were found in all the studied extracts. While the other organic compounds were found in some spice samples comparing with other samples. The phytochemical screening showed that there is variation of the contents of the studied samples between the aqueous and alcoholic extracts.

Keywords: *Extraction and identification and Spice samples.*

Introduction:

Spices and the medicinal plants are used as substances that increase the taste and variation of food. [1 and 2]. According to world health organization (WHO), more than 80% of the world's population relies on traditional medicines for their primary health care needs [2]. The medicinal value of spices, which include leaves (coriander, mint), buds (clove), bulbs (garlic, onion), fruits (red chili, black pepper), stem (cinnamon), rhizomes (ginger) and other plant parts, have been defined as plant substances from indigenous or exotic origin, aromatic or with strong taste, used to enhance the taste of foods.

Phytochemicals are bio- active chemicals of plant origin, they are regarded as secondary metabolites because the plant that manufactures them may have little need for them. They are naturally synthesized in all parts of the plant body; bark, leaves stem, root, flower, fruits, seeds, etc. i.e. any part of the plant body may contain active components [3].

Nigella sativa is an annual flowering plant, the seeds on account of their aromatic nature, are used as a spice in cooking. *N. sativa* has been used for medicinal purposes for centuries, both as herb and pressed into oil, in Asia, Middle East, and Africa. It has been traditionally used for a variety of conditions and treatments related to respiratory health, stomach and intestinal health, kidney and liver function, circulatory and immune system support, as analgesic, anti-inflammatory, anti-allergic, anti-oxidants, anti-cancer, anti-viral and for general well-being so the investigation of its chemical constituent is very important [3 and 4].

Chamomile (*Matricaria chamomilla*) which belonging to family Asteraceae, is one of the most ancient medicinal herbs known to mankind [5]. Chamomile flowers are tea taken as herbal, the flowers contains 1-2%, volatile oils including alpha-bisabolol, alphabisabolol oxides and matricin, and also rich in flavonoids [4]. Chamomile has also numerous applications in traditional medicine. It is used as anti-cold [6], for gastrointestinal and digestive disorders [7], against Eczema [8], anti-estrogenic effect [9], anti-diabetic [10], for wound healing [11] and as an anticancer [12].

Piper nigrum is the flowering vine in the family Piperaceae. They have several uses such as they help in pain relief, rheumatism, chills, flu, colds, muscular aches and fever. Externally it is used for its rubefacient and as a local application for relaxed sore, throat and some skin disorder. It has anti-microbial [13], anti-mutagenic [14], antioxidant and radical scavenging property [13] and inhalation of black pepper oil increase the reflexive swallowing movement [15].

Dianthus caryophyllus L. (carnation) is an important cut flower in trade. This plant traditionally used in China, Japan and Korea in the treatment of wounds and gastro-intestinal disorder and various other ailments. In recent pharmacological studies plant tested for anticancer, antiviral, antibacterial, antifungal and anti-insecticide activities. Kaempferide tri glycoside a phenolic compound from plant exhibit anticancer properties against colon cancer cell lines and also show antifungal properties against· The seeds extract of *D. caryophyllus* exhibit potent antiviral activity against HIV, herpes simplex virus-1 (HSV-1) and hepatitis A virus-27 (HAV-27). Essential oil extracted from flowers of carnation shows arthropods repellent and larvicidal [16].

Materials and Methods

A- Collection of samples

The four spices (*Nigella sativa*, Chamomile , *Piper nigrum* and *Dianthus caryophyllus*) were collected from Spices Research Centre from El-bida. The spices were cleaned, washed in sterile distilled water and air dried at room temperature. The dried spices were powdered using blender.

B- Preparation of the extracts

Extraction was carried out according to the method described by [117], Briefly, 25 gram of powdered spices were weighed and mixed with 100 ml of two different solvents (methanol, and distillated water) in conical flasks and kept in rotatory shaker at 150 rpm for 4 hours. Then, extracts were evaporated under reduced pressure using rotary evaporator apparatus and allowed to dry in the incubator till complete dryness.

C- Phytochemical Screening of Spices

Phytochemical screening was carried out on methanol and distilled water extracts of spices for its chemical composition [18]. The following tests were performed to detect various phytochemical constituents present in them.

Screening for Alkaloids (Mayer's Test)

2 ml of the extract was boiled with dilute hydrochloric acid and the mixture was filtered and to the filtrate a few drops of Mayer's reagent was added. A cream or white color precipitate produced immediately indicates the presence of alkaloids.

Screening for Carbohydrate test

1 ml of extract, 1ml of Benedict's reagent was added. The mixture is heated on a boiling water bath for 2 minutes solution appeared green showing the presence of reducing sugar.

Screening Forglycosides (Keller Kilianin Test)

5 ml of each extract was added with 2 ml of glacial acetic acid which was followed by the addition of few drops of ferric chloride solution and 1ml of concentrated Sulphuric acid. Formation of brown ring at interface confirms the presence of glycosides.

Screening for Terpanoids (Salkowski Test)

5 ml of extract was taken in a test tube and 2ml of chloroform was added to it followed by the addition of 3ml of concentrated sulphuric acid. Formation of reddish brown layer at the junction of two solutions confirms the presence of terpanoids.

Screening for Flavonoids (Alkaline Reagent Test)

2 ml of extracts was treated with few drops of 20% sodium hydroxide solution formation of intense yellow color, which becomes colorless on addition of dilute hydrochloric acid, indicates the presence of flavonoids.

Screening for Saponins (Foam Test)

2ml of extract was taken in a test tube and 6ml of distilled water was added to it. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of saponins.

Screening for Steroids

1ml of extract was dissolved in 10 ml of chloroform and equal volume of concentrated sulphuric acid was added by the sides of the test tube. The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence. This indicates the presence of steroids.

Screening for Tannins

2 ml of extract was added to few drops of 1% lead acetate. A yellowish precipitate indicated the presence of tannins.

Results and Discussion

In the present study the phytochemical screening of four spices (*nigella, camomilla, piper and dianthus caryphylus*) samples were carried out. The phytochemical analysis data of four spices was shown in Table (1) .The results revealed that the some of the organic compounds were present in the extracts of all spices.

Eight compounds were screened in the aqueous and alcohol extracts, only the alkaloid, carbohydrates and cardiac glycoside were presented commonly in all the studies spices. Saponin and tannins were present in the nigella and camomilla extracts. In methanol extracts of all spices the steroid and terpinoids were also present. Flavonoids were present in piper, while camomilla and niglla extracts, only carnation were no present .

Table (1): The result of phytochemical screening of the studied samples.

Plant species	**Type of extract**	**Metabolite**							
		1	2	3	4	5	6	7	8
Nigella Sativa	DW	-	++	++	++	-	-	+	+
	Methanol	+	++	++	++	++	++	+	+
Matricaria chamomilla	DW	+	++	++	++	-	-	++	+
	Methanol	+	++	++	++	++	++	++	+
Piper nigrum	DW	+	+	+	+	-	-	+	-
	Methanol	+	+	+	+	+	++	+	-
Dianthus caryophyllus	DW	-	+	+	+	-	-	-	-
	Methanol	-	+	+	+	+	++	-	-

Key: 1= Flavonoids 2= Alkaloids , 3= Charbohydrats , 4= Cardiac glycosides , 5= Steroid , 6= Terpenoids , 7= Saponins , 8= Tanins

It was reported that the spices added to foods since ancient times as flavoring agent, also as food preservatives and folk medicines. Basically when spices are used for medicinal purpose, their value is depend on the

phytochemicals they possess [19], The spices, herbs, plant extract and their phyto constituents have been reported for anti-inflammatory, anti-diarrheal, antimicrobial, antioxidant and insecticidal activities [20], In the present study, the extract of pepper and niglla and camomilla showed the presence of alkaloids.

Alkaloid has important biological property like cytotoxicity In the present investigation glycosides are present in all the four spices. The glycosides are useful in lowering blood pressure. It is also used in the treatment of congestive heart failure and cardiac arrhythmia [21]. Terpanoids are also present in all methanol extracts of spices. Terpanoids are used in the treatment of cough, asthma and hay fever. Saponins are present in nigella and camomilla extracts. Traditionally saponins have been extensively used as detergents and pesticides, in addition to their industrial applications as foaming and surface active agents and also beneficial health effects [22]. Saponins protect against hyper cholesterolemia and antibiotics properties [23 and 24]. Tannins are present in camomilla and nigella extracts. The growth of many fungi, yeast, bacteria and viruses was inhibited by tannins [6].

Conclusion

In conclusion the selected four spices in this study consist of many useful phytochemical compounds having important biological properties. The result of this study would lead to find out some compounds which are very useful for the manufacturing of new drugs. The previous phyto chemical analysis and present studies show nearly the similar results due to the presence of phytochemical constituents.

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