Phytochemical Investigation of Quranic Fruits and Plants

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Abstract

Background: Plants and fruits are an essential component of the universe. Human beings have used those as medicine from the very beginning of time. According to holy Quran, the fruits like grape, date, fig, olive and pomegranate are gifts and heavenly fruits of God. Eighteen fruits and plants name have been mentioned in the holy book of Moslem. A phytochemical screening of these fruits and plants belonging to 15 families was carried out.

Objective: This study was conducted to phytochemical investigation on fruits and plants that has been mentioned in Holy Quran.

Methods: The plant species are: *Olea europaea* L., *Vitis vinifera* L., *Punica granatum* L., *Phoenix dactylifera* L., *Alhagi mannifera* Desf., *Ficus carica* L., *Cedrus deodara* (Lawb.)G. Don., *Tamarix aphylla* L., *Salvadora persica* L., *Zingiber officinale* Rosc., *Musa sapientum* L., *Brassica nigra* (L.) koch., *Lens culinaris* medicus., *Allium sativum* L., *Allium cepa* L., *Cucumis sativus* L., *Cucurbita maxima* Duchartre., *and Ocimum basilicum* L. Fruits, seeds and other material of the plants screened in this investigation were collected and/or purchased from different grocery and fruit shop during the seasonable period, dried in shadow, and then powdered, some fruits used as fresh sample. A qualitative phytochemical analysis was performed for the presence of flavonoids, alkaloids, tannins and saponins.

Results: The results obtained of the investigated plants showed that the all 18 samples were found to be flavonoids bearing, 9 showed the presence of alkaloids, 10 tannins and 10 saponins.

Conclusion: The methanolic extract of *Phoenix dactylifera* L., *Olea europaea* L., *Ficus carica* L., *Cedrus deodara* (Lawb.) G.Don., *Tamarix aphylla* L., *Salvadora persica* L., *Zingiber officinale* Rosc., *Brassica nigra* (L.) Koch. *Allium sativum* L. and *Allium cepa* L. mentioned in holy Quran are rich sources of flavonoids that appear to have protective effects for human health. The Quranic fruits and plants which are medicinal species used for various ailments.

Keywords: Quranic fruits, Qualitative analysis, Flavonoid, Alkaloid, Tannin, Saponin

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Introduction

An information of the chemical constituents of plants and fruits are desirable, not only for the discovery of therapeutic agents, but also because such information may be of value in disclosing new sources of such economic materials as flavonoids, alkaloids, tannins, oils, gums, precursors for the synthesis of complex chemical substances, etc. In addition, the knowledge of the chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies [1].

Fruits are one of the oldest forms of food known to man. There are many references to fruits in ancient salt literature. According to holy Quran, the fruits like grape, date, fig, olive and pomegranate are gifts and heavenly fruits of God. The people in ancient times regarded fruits to be endowed with magic or divine properties. They gave them due reverence and dedicated them to their gods and goddesses. They also used their designs in decorating temples, vestments or ceremonial garments and sacred vessels. Fresh and dry fruits are the natural staple food of man. They contain substantial quantities of essential nutrients in a rational proportion. They are excellent sources of minerals, vitamins and enzymes. They are easily digested and exercise a cleansing effect on the blood and the digestive tract. Persons subsisting on this natural diet will always enjoy good health. Moreover, the ailments caused by the intake of unnatural foods can be successfully treated by fruits. Fresh and dry fruits are thus not only a good food but also a good medicine [2]. Fruits, eaten raw or consumed as fresh juice, are excellent ways to retain and balance the moisture level in the body. The low level of sodium in fruits plays an important role for people who would like to avail of a salt free diet. Dry fruits like apricots, raisins and dates are storehouses of calcium and iron, essential for the strengthening of bones and maintaining good blood, respectively. Custard apple too is an excellent calcium source. If you are unwell, consume fruits in the form of fresh juice only. One or two fruits a day clean the digestive tract and aids easy bowel action [3].

Plants are an essential component of the universe. Human beings have used plants as medicine from the very beginning of time. After various observations and experimentations medicinal plants were identified as a source of important medicine, therefore, treatment through these medicinal plants, began in the early stages of human civilization. In Islam diseases are cured in two ways, first the cure of soul through prayers and second the cure of ailments through medicines [4]. Several phytochemical surveys have been published, including the random sampling approach which involved some plant accessions collected from all parts of the world. The major chemical substances of interest in these surveys have been the flavonoids and tannins, however, other diverse groups of naturally occurring phytochemicals such as alkaloids and saponins have also been reported. The natural active compounds classes or secondary metabolites as alkaloids, flavonoids, saponins, tannins and others have attracted researchers to investigate their chemical, toxicological and pharmacological features. The alkaloids represent a group of natural products that has had a major impact throughout history on the economic, medical, political and social affairs of humans. They are a diverse group of low molecular weight nitrogen-containing compounds derived mostly from amino acids [5]. These secondary metabolites are found in about 20 % of plant species and they classified as true alkaloids,

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which have nitrogen atoms in heterocyclic rings, protoalkaloids, which do not have the nitrogen atom(s) in heterocyclic rings and pseudoalkaloids, which don't derive from amino acids but may have nitrogen atoms in heterocyclic rings. A wide range of biological activities of alkaloids have been reported: emetic, anti-cholinergic, antitumor, diuretic, sympathomimetic, antiviral, antihypertensive, hypnoanalgesic, antidepressant, miorelaxant, antitussigen, antimicrobial and anti-inflammatory. However, the alkaloids and other natural compounds have complex activities and it is necessary to analyze pharmacological activities in the general tissues, linking the structure with the activity presented. It is common to find pharmacological results where a single experimental model generalizes a biological answer, but these can't be accepted because all the pathologies in question are also complex and it is necessary to investigate specific experimental models [6].

Flavonoids in plants can function as color definitions and attractants to pollinators and seed dispersers, as antioxidants to protect plants against UV-radiation, as insect feeding attractants in host-species recognition, as signal molecules to facilitate nitrogen fixation, in inducible defense against bacteria and fungal attack; and as bitter or astringent taste attributes to repel birds and other animals [7, 8]. For humans, several health beneficial properties of dietary flavonoids are recognized for their antioxidant and antiproliferative effects which may protect the body from various diseases, such as cancers, cardiovascular disease and inflammatory[9, 10].Tannins and saponins have therapeutic uses due to their anti-inflammatory, anti-fungal, antioxidant, cytotoxicitic activity and healing properties. Some groups of tannins act on arachidonic acid metabolism in leucocytes with important roles in reversing inflammations and they are used in treatments fostering wound healing [11].

Our approach involved the collection, identification, extraction and phytochemical evaluation of extracts derived primarily from fruits and plants mentioned holy Quran. Each fruit or plant sample was then air-dried and milled to a coarse powder or chopped to some suitable steaks. This article will present the procedures used in preparing the test extracts and the results obtained from the 18 fruits and plants successions [12].

Experimental

Plant materials: Fruits, seeds and other material of the plants screened in this investigation were collected and/or purchased from different grocery and fruit shop in Ardabil, northwestern Iran (Table 1), during the seasonable period, dried in shadow, and then powdered, some fruits used as fresh sample. Herbarium specimens are deposited in the Herbarium of the center of agricultural researches of Ardabil, Iran.

Extraction: 100 g of the plant materials were milled and chopped to some suitable steaks and extracted with methanol in a soxhelet extractor for 24 h. The methanol was removed under reduced pressure and the extract kept in the refrigerator until used. Phytochemical screenings were performed as described in previous works. The following methods were applied to identification of flavonoids, alkaloids, tannins and saponins.

Flavonoids: The alcoholic extract (0.5 g) was treated with a few drops of concentrated HCl and magnesium turnings (100 mg).The presence of flavonoids was indicative if pink or magenta-red color developed within 3 min. A pink or red color developed which could be extracted with amyl alcohol. The presence of flavonoids was (+1) – (+4) numeric

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Table 1- Phytochemical constituents of species of holy Quranic fruits and plants

Species	Quranic Name	Persian Name	English Name	Fla.[a]	Alk.[b]	Tan.[c]	Sap.[d]	Used part
Alhagi mannifera Desf	Mann	Khare- Shotor	Manna	+1	+2			leaf
Allium cepa L.	Basal	Pyaz	Onion	+4			+4	gland
Allium sativum L.	Foume	Seer	Garlic	+4			+4	gland
Brassica nigra L. Koch.	Khardal	Espandan	Mustard	+4	+1	+2		seed
Cedrus deodara (Lawb.)G.Don	Cedre	Cedre	Cedar	+4	+2	+3	+3	leaf
Cucumis sativus L.	Ghassa	Khyar	Cucumber	+2				leaf
Cucurbita maxima Duchartre.	Yaghtine	Kadoo	Gourd	+2			+2	fruit
Ficus carica L.	Tin	Angir	Fig	+4	+1	+2	+1	fruit
Lens culinaris Medicus	Adas	Adas	Lentil	+1				seed
Musa sapientum L.	Talh	Moz	Banana	+3				fruit
Ocimum basilicum L.	Reihan	Reihan	Basil	+3	+1	+2	+1	leaf
Olea europaea L.	Zeitoon	Zeitoon	Olive	+4			+1	fruit
Phoenix dactylifera L.	Nakhl	Khorma	Date	+4		+2	+1	fruit
Punica granatum L.	Romman	Anar	Pomegranate	+1	+4	+4		fruit
Salvadora persica L.	Khamt	Drakhte meswak	Salvadora	+4	+2	+2	+1	wood
Tamarix aphylla L.	Gaz	Assel	Tamarisk	+4	+1	+3		leaf
Vitis vinifera L.	Enab	Angoor	Grape	+3		+4		fruit
Zingiber officinale Rosc.	Zangabil	Zangabil	Ginger	+4	+2	+3	+1	gland

[a] Fla. = Flavonoid, [b] Alk. = Alkaloid, [c] Tan. = Tannin, [d] Sap. = Saponin.

representation, according to color intensity [13].

Alkaloids: 1 g of the alcoholic extract was dissolved in 5ml of HCl (2N) and heated on a boiling water bath. After cooling, the mixture was filtered and the filtrate was divided into two equal portions. One portion was treated with a few drops of Mayer's reagent and the other with equal amounts of Wagner's reagent [14]. The samples were then observed for the presence of turbidity or precipitation. A (+) score was recorded if the reagent produced only a slight opaqueness; a (2+) score was recorded if a definite turbidity, but no flocculation was observed; a (3+) score was recorded if a definite heavy precipitate or flocculation was produced and a (4+) score was recorded if a definite very heavy precipitate was produced [15].

Tannins: 1g of the alcoholic extract was extracted by 10 ml of hot 1 % NaCl solution, filtered and divided into 3 equal portions. A sodium chloride solution was added to one portion of the test extract, 1% gelatin solution to a second portion and the gelatin-salt reagent to a third portion. Precipitation with the latter reagent or with both the second and third reagent is indicative of the presence of tannins. Positive tests are confirmed by the addition of $FeCl_3$ solution to the extract and should result in a characteristic blue, blue-black, green or blue-green color and precipitate (phenolic compounds)The results were recorded from +1 to +4 on color intensity [16, 17].

Saponins: About 0.5 g of extract was dissolved in 5 ml of distilled water in test tube and shaken vigorously to froth and was then allowed to stand for 15-20 min and classified

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for saponin content as follows: no froth = negative; froth less than 1 cm = + 1; froth 1.2 cm high = +2, froth 1.5cm high = +3 and froth greater than 2 cm high = +4 [18, 19].

Results

Present findings were confined to 18 fruits and plant species belonging to 17 genera of 15 families enlisted in holy Quran. The plant species are: *Olea europaea* L., *Vitis vinifera* L., *Punica granatum* L., *Phoenix dactylifera* L., *Alhagi mannifera* Desf., *Ficus carica* L., *Cedrus deodara* (Lawb.) G. Don., *Tamarix aphylla* L., *Salvadora persica* L., *Zingiber officinale* Rosc., *Musa sapientum* L., *Brassica nigra* (L.) koch., *Lens culinaris* medicus., *Allium sativum* L., *Allium cepa* L., *Cucumis sativus* L., *Cucurbita maxima* Duchartre., and *Ocimum basilicum* L. which are used throughout the world for various aspects such as food, vegetable, medicinal and industrial products. Table 1 reports the results obtained of the investigated plants, the all 18 samples were found to be flavonoids bearing, 9 showed the presence of alkaloids, 10 tannins and 10 saponins.

The following species were found to contain alkaloids and some of them have not been previously reported in the literature for their alkaloids: *Punica granatum* L., *Alhagi mannifera* Desf., *Cedrus deodara* (Lawb.) G. Don., Salvadora *persica* L., and *Zingiber officinale* Rosc. The following species were found to contain tannins (10 species): *Vitis vinifera* L., *Punica granatum* L., *Phoenix dactylifera* L., *Ficus carica* L., *Cedrus deodara* (Lawb.) G. Don., *Tamarix aphylla* L., *Salvadora persica* L., *Zingiber officinale* Rosc. *Brassica nigra* (L.) Koch. and *Ocimum basilicum* L. The following species were found to contain saponins (10 species): *Olea europaea* L. *Phoenix dactylifera* L., *Ficus carica* L., *Salvadora persica* L., *Zingiber officinale* Rosc., *Allium sativum* L., *Allium cepa* L., *Cedrus deodara* (Lawb.) G. Don., *Cucurbita maxima* Duchartre. and *Ocimum basilicum* L. (Table 1).

Discussion

This study revealed that *Phoenix dactylifera* L., *Olea europaea* L., *Ficus carica* L., *Cedrus deodara* (Lawb.) G. Don., *Tamarix aphylla* L., *Salvadora persica* L., *Zingiber officinale* Rosc., *Brassica nigra* (L.) Koch. *Allium sativum* L. and *Allium cepa* L. mentioned in holy Quran are rich sources of flavonoids that appear to have protective effects for human health. The Quranic fruits and plants which are medicinal species used for various ailments have been reported. The studies have shown that water and methanolic extracts of some of these plants which have never been reported. However, the activity was dose dependent, the results are promising. Further work needs to be carried out to ascertain their biological activities of several extracts. The studies thus provide further evidence on the traditional usage of these species in treating diseases. Our knowledge about chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies.

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