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Research Article

Ficus carica Linn (Moraceae) Fruit's: Qualitative, Quantitative Phytochemical Screening and Antibacterial Activities

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Abstract

Fig fruit, *Ficus carica* Linn (*F. carica*) has natural active chemical constituents that own medicinal properties which enclose a vast scope of biological effects. The extracts of fresh matured of *F. carica* were used to screen for some active chemical constituents (qualitatively and quantitatively). The screening estimates the phytochemicals among the qualitative tests done for the presence of secondary metabolites; where the results contained in the crude aqueous and alcoholic extracts of *F. carica* fruits which are Triterpenoids, Steroids, Tannins, Protein, Glycosides, Reducing Sugars, Alkaloids, Flavonoids, Carbohydrates, Sugars, Fats, Fixed Oils, Saponins and vitamin C, where it was found that all the detected components were between medium and rich in presence in both extracts. While the result of weight loss of the fresh *F. carica* at room temperature was 41g with a percentage yields of 73%. And the results of ash content of fresh fruits were the weight of residual ash after burning 7.637g and the percentage of ash content 76.37%. And the results of the extraction yield percentage of the aqueous extract revealed 87% with a Creamish to Dark Brown and the ethanolic extract was 93% with Greenish Oily in colour. The results of the detected quantitative secondary metabolites of the phytochemicals were revealed that 58, 73, 65, and 53% for Saponins, Terpenoids, Alkaloids and Flavonoids, respectively. The greater percentage amount in fruits was obtained 73% for alkaloids and the lowest 53% was for Flavonoids. In addition, the results of the bioactivity of the aqueous extract against pathogenic bacteria were as follows 12, 13, 15 and 12 mm against each of *P. aeruginosa, E. coli, B. subtilis* and *S. aureus*, consequently. Whereas the ethanolic extract was as follows 18, 16, 20 and 17 mm against each of *P. aeruginosa, E. coli, B. subtilis* and *S. aureus*, consequently.

Keywords: *Ficus carica* Linn; Chemical Constituents (Qualitatively and Quantitatively); Antibacterial Activity

Introduction

Humans have benefited from plants in diverse areas of their vitality, such as food, treatment, and other facets that are no less important. Various research studies on different plants include resulted in significant advantages to the plant oneself, as well as to humans, animals and the environment. This is because most plants contain effective chemical components such as secondary plant metabolites (phytochemicals), *which play along with prevention and treatment for humans,* for example. The secondary metabolites constituents are products of primary metabolites. As well, secondary metabolites are organic molecules that do not participate in the development and growth of an organism. While primary metabolites are responsible for the survival of living organisms, one of their tasks is photosynthesis. That is, the absence of secondary metabolites leads to long-term weakness of the

organism, meaning that it does not lead to its immediate death, and also one of its responsibilities, for instance, is to defend it. These natural metabolites (secondary metabolites) are synthesized by the living organism and are often classified on their biosynthetic bases, such as alkaloids, phenols, and terpenes and they are significant as pharmacological compounds because they have a vital biological activity [1]. In the meantime, one of those important plants is fig, while the taxonomy of this species of Fig, *Ficus carica* Linn (*F. carica*) is Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Urticales; Family: Moraceae; Genus: Ficus and Species is *carica. Fig*, *Ficus carica* Linn (Moraceae) are recognized fruit from ancient times, and humans maintain benefited from them through the ages because of their very great benefit to humans, animals and the surrounding environment. It is a type of small flowering tree, originally native to the Mediterranean basin and Asia. Figs are grown almost over the world, containing over 800 tropical and subtropical plant species [2,3]. There are many types grown in Libya, and sometimes these types are called locally based on the colour of their fruits, such as white, black and red. Like the figs included in this study, they are called locally in Libya as black fig "karmus Aswad" due to their black colour, wherein fact, this type exists in a light purple on the upper to dark black on the rest of the surface fruit's skin. This study aimed to carry out qualitative and quantitative detection on the crude extracts obtained from the Figs, *Ficus carica* (*F. carica*) fruit, which was to recognize active compounds of primary and secondary metabolites products. Additionally for estimating the bioactivity of these crude extracts against some pathogenic bacterial strains.

Materials and Methods

In this research study, just before preserve the secondary metabolites constituents in the plant samples, a proper methods must be followed, from the previous preparation of the purpose samples before extraction such as gathering sorting and drying the samples, and then selecting the appropriate solvents, temperature and the optimal extraction method to get samples including the constituents required to be detected later, plant materials used in this research were *F. carica* fresh fruits was obtained from wild places around Alkhums city 120 km east to Tripoli capital city of Libya, the fruits were collected through June/July summer season, fresh ripe healthy fruits without defects and suitable for the study were selected and picked up during its ripened stage then they were washed well with tap water and then distilled water to get rid of everything unwanted. Where the sample of fruits were cut into small pieces to facilitate drying more, then was dried with a cloth and then was spread on dried paper and placed in a dark place to protect them from sunlight for three days then completed the drying process in an electric oven at a temperature of 40 ^{0}C for 72 hours separately, after this the dried sample was ground by using an electric blender to reduce the particle size of it and sieved to obtain a fine powder of 400µ (04 mm), formerly finely powdered sample was kept in opaque airtight glass containers were stored in a dry and dark place until further use.

Organoleptic evaluation

The organoleptic evaluation is considered initial significance is before any further experimentation can be accomplished. The desired fruits of *F. carica* were collected washed several times with distilled water dried under shade for 6 weeks. Then were ground and utilized for organoleptic evaluation to refer to it by features texture, order, colour, and taste.

Flavor profile

Light purple to black skin with deep earthy flavor such a Cabernet.

Chemical behavioral analysis

The Behavioral characteristics of dried powder of F. *carica* treated with different chemical reagents under visible light. Consequently, few amounts the crude materials mixed with suitable reagents such as Concentrated Acids (Sulphuric Acid H_2SO_4, Hydrochloric Acid HCl and Nitric Acid HNO_3), Sodium Hydroxide Solution NaOH, Iodine Solution, Ferric Chloride Solution $FeCl_3$, and Ethyl Acetate, Separately.

Extraction

20g of a finely powdered sample was used which is placed in a "thimble" in the chamber of the Soxhlet Apparatus, 400 ml of the appropriate extraction solvent (Distilled water, Ethanol, separately) were located in the boiler flask and was heated for 4 hours. Therefore, a crude extract with brown colour from water and a greenish oily colour was obtained for ethanol. After this, the solvent was separated using a vacuum rotary evaporator at a temperature of 43 °C, where the closures and percentage yields components extracted from the fruits were calculated and the result is shown in table 3.

Measurement of weight loss percentage of fresh *F. carica* at room temperature

The weighed 56 g of fresh *F. carica*, from washed well with distilled water and was dried with a piece of cloth, were placed in a well-ventilated place of the room, away from light sources and dust, at room temperature 26 ± 2, and then were left for 20 days with stirring from time to time, and after this has been weighed, and the result is as shown in table 4.

Measurement of Ash Content of fresh fruits for the *F. carica*

50 grams of fresh *F. carica* were placed in suitable crucible and transferred to muffled furnace at temperature of 505°C, and weighed after every hour of burning until a stable weight was obtained. The result was calculated based on the following equation, which is as shown in table 5.

Ash Content = Weight after burning/Weight before burning X 100

Phytochemical (Qualitative and Quantitative) detection's

The initial qualitative and quantitative phytochemical investigations were conducted using the recognized standard methods [5-17].

Phytochemical qualitative analysis

The preliminary phytochemical screenings were lead to reveal the existence of both primary and secondary metabolites constituents in the crude extracts. Various qualitative investigations substantive were used to determine the presence such as Triterpenoids, Steroids, Tannins, Proteins, Glycosides, Reducing Sugar, Alkaloids, Flavonoids, Carbohydrates and Sugars, Fats, Fixed Oils, Saponins and Vitamin C. Results of the phytochemical screening showed in table 6.

Detection of triterpenoids and steroids

- **Salkowski's test:** 5 ml of chloroform was added to 10 ml of the crude solution of the extract, then shaken well, after that filtered. Concentrated sulfuric acid 2-3 drops were added to filtrate, again shaken well, and allowed to stand. And leave it aside for a while. The golden- yellow color of the formed precipitate is evidence of the presence of triple terpenes.
- **Libermann Burchard's Test:** About 1g of dry alcoholic crude extract was mixed with 10 ml of chloroform, and heated for 10 minutes, and then filtered. 2 ml of anhydrous acetic acid was added to it, and then followed by added concentrated sulfuric acid on the wall of the test tube. Evolution of violet to blue-colored ring at the junction of the two liquids indicated the presence of steroids.

Detection tannins

Gelatin's test: 5 ml of the crude extract solution were mixed with a solution of 1% gelatin containing sodium chloride with shake very well. Formation of white precipitate indicates the presence of tannins.

Detection of proteins

- **Xanthoproteic Test:** 5 ml of the crude extract solution were mixed with 3-4 drops of nitric acid in test tube with shake very well. The appearance of yellow-color indicates presence of protein.
- **Ninhydrin Test:** 5 ml of the crude extract solution was mixed with 0.25% of Ninhydrin reagent and shake. Then mixture was then boiled for 3-4 minutes, appearance of blue color, indicating presence of protein.
- **Biuret Test:** 5 ml of crude extract solution was mixed with 4% sodium hydroxide solution. Then, was followed by the addition of 1% copper sulfite solution, the appearance of violet color indicate the presence of peptide linkage.

Detection of glycosides

- **Keller–Killiani Test:** 5 ml of the crude extract solution were mixed with 1 ml of lead acetate solution, shaken, and filtered. Thereafter, the mixture were extracted again with 6-7 ml of chloroform, evaporated, and dissolved the extracted residue in glacial acetic acid. Then 3-4 drops of ferric chloride solution were added, after while 2 ml of sulfuric acid was added also. Appearance of reddish brown layer that turns bluish green indicates the existence of digitoxose.
- **Legals Test:** 5 ml of the crude extract were mixed with 5 ml of sodium nitro-prusside solution and followed by 3- drops of sodium hydroxide solution and shook well, appearance of pink-to-red precipitate indicates for the presence of cardiac glycosides.
- **Bontrager's Test:** 0.5g of the dry crude extract dissolved in 3 ml of dilute hydrochloric acid. Then 1 ml of ferric chloride

solution 5% were added and shook well for a while and placed over water bath for boiling 10 minutes, then cooled, and filtered. Afterward, 5 ml of benzene were added for extracted again. After that, 5 ml of ammonia solution were added to the separated benzene layer. Appearance of pink color indicates the presence of anthraquinones glycosides.

Detection of reducing sugars

Fehling's test

5 ml of crude extract solution were mixed with 2 ml of a mixture of Fehling's solutions (equal volumes of Fehling's solutions A and B), then were boiled for 5 minutes. Appears of a brick red precipitate color indicated the reducing sugar is presence.

Detection of alkaloids

- **Mayer's Test:** 5 ml of the crude extract solution were mixed with 5 ml of potassium mercuric iodide solution and shook very well, appearance of cream or whitish precipitate indicates the presence of alkaloids.
- **Wagner's Test:** 5 ml of the crude extract solution were mixed with 5 ml of potassium iodide and shook very well, appearance of reddish brown precipitate an evidence for the existence of alkaloids.
- **Hager's Test:** 5 ml of the crude extract solution were mixed with 5 ml of saturated ferric solution then shook well. Appearance of yellow-colored precipitate indicates the presence of alkaloids.
- **Dragendorff's Test:** 5 ml of the crude extract solution were mixed with 5 ml of potassium bismuth iodide solution and shook well. An orange red precipitate formed evidences for the presence of alkaloids.

Detection of flavonoids

- **Alkaline Reagent Test:** 5 ml of the crude extract solution were mixed with 4-5 drops of sodium hydroxide solution and shaken. Appearances of intense yellow color which that turns to colorless after adding dilute acid indicates the presence of flavonoids.
- **Lead Acetate Test:** 5 ml of the crude extract solution were mixed with 3-4 drops of lead acetate solution shaken well Appearance of yellow precipitate evidence the presence of flavonoids.

Detection of phenols

- **Gelatin Test:** 10 ml of the crude extract solution were mixed with about 3 ml of 1% gelatin solution and shook well, appearance of white precipitate an evidence of the existence of phenols.
- **Mayer's Reagent Test:** 10 ml of the crude extract solution mixed with 2 ml of Mayer's reagent in an acidic solution. Appearance of the white precipitate indicates the existence of phenolic compounds.
- **Ferric Chloride Test:** 5 ml of the crude extract solution were mixed with 1 ml of 1% gelatin solution containing sodium chloride and shaken. Appearance of bluish-black color indicates the presence of phenols.
- **Lead Acetate Test:** 10 ml of crud extract solution were mixed with 2 ml of alcoholic solution, followed by addition of 2ml of diluted 20% sulfuric acid. after that solution of sodium hydroxide was added, appearance of red-to-blue color evidence for existence of phenols.

Detection of carbohydrates and sugars

- **Benedict's Test:** 10 ml of Benedict's reagent was added to 1ml of crude extract solution and boiled for 3 minutes then cooled. The appearance of red precipitate showed the existence of sugars
- **Molisch's Test:** 10 ml of the crude extract solution was mixed with 5 ml of a-naphthol the solution, then 3-4 drops of a concentrated Sulphuric acid was added through the side of the test tube. The appearance of purple or reddish-violet colour at the junction of the two liquids indicate the presence of Carbohydrates.
- **Fehling's Test:** 10 ml of the crude extract solution, was mixed with 10 ml of Fehling's solution (A + B), during a heating appearance of a brick-red precipitate indicates the existence of sugars.

Detection of fats and fixed oils

- **Saponification Test:** 10 ml of the crude extract solution was added 5-6 drops of alcoholic Potassium hydroxide (0.5 N) along with 3 drops of phenolphthalein. Then the mixture was heated in a water-bath for about 2 hours. The formation of soap or partial neutralization of alkali reveals the existence of fats and fixed oils.

- **Spot Test:** Oil stains on paper revealed the presence of fixed oils were appeared after pressing a small portion of crude extracts between the filter paper.

Detection of saponins

10 ml of the crude extract in a test tube mixed 5 ml of distilled water and then shook vigorously until the frothing will appear (2 minutes, approximately) then a few drops of virgin olives oil was added and also mixed vigorously. The foam formation revealed the presence of saponins.

Detection of vitamin C

- **DNPH Test:** 10 ml of crude extract solution was mixed with DNPH reagent (Dinitrophenyl hydrazine added in concentrated Sulphuric acid). The formation of yellow colour reveals the presence of vitamin C [18].

Determination of Phytochemical (quantitative analysis)

Determination of total flavonoids content

5g of the finely powdered sample were extracted with 50 ml of aqueous methanol 80% at room temperature, filtered and transferred to a crucible, dried and further weighed to constant weight, then calculated as the following equation, where results as shown in table 7 [19].

Total Flavonoids Content = weight of the powdered sample/ weight of the Extracted Flavonoids X 100

Determination of terpenoids content

20g of the finely powdered sample were soaked in water and methanol solution (in ratio of 1:4) at 37°C for 24 h, filtered after that were concentrated at 40°C and farther acidified with sulfuric acid (2M). The mixture was further extracted with chloroform and non-aqueous layer was separated and dried by evaporation [20].

Total Terpenoids Content = weight of the powdered sample/ weight of the Extracted Terpenoids X 100

Determination of total saponins content

10g of the finely powdered sample and 50 ml of aqueous ethanol solution (20%) then were mixed well in conical flask, after that heated at 55°C for 4 h in a hot water bath with continuous mixing then filtered. The residue was further re-extracted with (100 ml) of 20% aqueous ethanol again. The extracts were combined and concentrated to 20 ml. And then concentrate was put in a separating funnel and 10 ml of Diethyl Ether was added and vigorously shaken. Aqueous layer was further purified and ether layer was discarded. Concentrate was fractionated with 30 ml of n-Butanol with repeatedly three times. The butane fractions were combined and washed with 5 ml of an aqueous sodium chloride 50% two times. Purified butanol fractions were dried to a constant weight and saponins content was computation as percentage [21].

Total Saponins Content = weight of the powdered sample/ weight of the extracted saponins X 100

Determination of total alkaloids content

2 g of the finely powdered sample was mixed with 80 ml of acetic acid (10%) in ethanol and let to settle for 4 h. This was filtered and the extract was concentrated on a water bath to one-quarter of the original volume. Concentrated ammonium hydroxide was added drop wise to the extract till the precipitation was complete. The whole solution was allowed to settle and the precipitate was collected and washed with dilute ammonium hydroxide and then filtered. The dried residue is the alkaloid, which was weighed and calculated [22].

Total Alkaloids Content = weight of the powdered sample/ weight of the extracted alkaloids X 100

Antimicrobial activity determination by disc diffusion method

The antimicrobial activity of the fruits crude extracts were carried out by the Disc Diffusion Method described by Bauer-Kirby [25,26]. The bacteria used in the study include Gram-negative *bacteria: Pseudomonas aeruginosa (P. aeruginosa), Escherichia coli (E. coli),* while Gram-positive bacteria *Bacillus subtilis (B. subtilis)* and *Staphylococcus aureus (S. aureus).* The isolates bacterial were first subcultured in a nutrient broth and incubated at 37°C for 24 hrs. The appropriate solvents (40 µg/disc of Ethyl Alcohol 75%, Distilled water, separately) was employed as a standard solvents for comparison of the effects (as a negative control), likewise, a ampicillin (30 µg/disc) and a Tetracycline (30µg/disc) were employed as a standard antibiotic for comparison of the effects (as a positive control). A sterile swab was used to spread the inoculums of microorganisms over nutrient agar plates. 200 milligrams of the crude extract of the test sample was dissolved in 2 ml of methanol to obtain the concentration of 200 µg/µl in and a sepsis condition (from each crude extract separately). Discs

in size 6 mm in diameter of sterilized filter paper type Whatman No. 1, were soaked with crude extracts concentrations (50 µg/µl) of the test crude sample. Then the soaked discs were set on the agar plate and dried. The plates were inoculated at 37 °C for 24 h. The diameter of the zone of inhibition was measured in mm. The experiment was repeated in triplicates and the average values were calculated. Results as showed in table 8.

Results and Discussion

Organoleptic Parameters

Plant's Name	Features texture	Odor	Colour	Taste
F. carica Fruit	Smooth	Fruity (Fig's odor)	Blackish brown	Mild and Fruity (Fig's taste)

Table 1: The results of organoleptic evaluation of *F. carica* dried powdered.

As shown in table 1 organoleptic evaluation of powdered *F. carica* fruits were has a smoothly featured texture with fruity (Fig's characteristic) odor, blackish-brown in colour and within mild and Fruity (Fig's taste) taste.

Chemical behavioral

	Crude Powder + Reagent	Visual viewing
F. carica	Powder as such	Creamish to dark brown
	Conc. H_2SO_4	Darkbrown
	Conc. HNO_3	Darkbrown
	Conc. HCl	Darkbrown
	NaOH (10%)	Light Brown
	Iodine Solution	Light Brown
	$FeCl_3$ (5%)	blackish green
	KI Solution	Light Brown
	Ethyl acetate	Light Brown

Table 2: Behavioral characteristics of powder of *F. carica* with different chemical reagents under visible light:

Table 2 showed the results behavioral characteristics of Crude Powder of *F. carica* after being treated with different chemical reagents under visible light. Where the visual viewing revealed that the Creamish to Dark Brown colour were for the crude powdered sample before treating with the used reagents. While, a Dark brown colour was resulted from treated with concentrated Sulphuric acid, dark brown colored resulted from treating with each nitric acid, sodium hydroxide solution, potassium iodide solution and ethyl acetate. Whereas, the blackish-green colour, resulted from being treated with ferric chloride solution.

Extraction percentage yield

F. carica		
Solvents	**Extraction Percentage Yield (%)**	**Color of extract**
Aqueous	87	Creamish to dark brown
EtOH	93	Greenish Oily

Table 3: The extraction percentage yield and color of crude extracts of *F. carica*.

Table 3 revealed results of the extractive values of Aqueous extract were 87% with a Creamish to dark brown in colour and ethanolic extract were 93% with greenish Oily in colour.

Weight loss percentage of fresh *F. carica* at room temperature

Description	Weight (g)	Percent's loss (%)
Weight of *F. carica* in wet, fresh condition	56g	/
Weight of *F. carica* after drying at room temperature	15g	73
Loss in weight on drying	56 - 15 = 41 g	/

Table 4: Results of the percentage loss of *F. carica* after drying.

Table 4 showed the result of weight loss percentage of fresh *F. carica* at room temperature, were 41g with percentage yield 73%.

Ash Content of fresh fruits for the F. carica

As showed in table 5 the results of ash content of fresh fruits of the *F. carica* were the weight of residual ash after burning 7.637g and the 7.637% were for the percentage of ash content 76.37.

Plant's Name	Weigh of fresh *F. carica* (g)	Weight After burning in the crucible (ash) (g)	Percentage of ash content (%)
F. carica	50	7.637	76.37

Table 5: Results of ash content of fresh fruits of the *F. carica.*

Phytochemical (qualitative analysis)

Plants synthesize many chemical compounds that are of great importance to the plant itself and most of these compounds have important and effective vital functions, for example to survive or to defend oneself against animals or microbes and others. Likewise, these compounds found in plants had an effective influences that man has known since he Launch into eating plants as lunch and then as a treatment when he fell ill, as the benefit obtained was ancient and modern, especially with the absence of side effects when using them.

Phytochemicals	Extracts	
	Aqueous	EtOH
Triterpenoids and Steroids	+++	+++
Tannin's	+++	+++
Protein	++	++
Glycosides	+++	+++
Reducing Sugar	+++	+++
Alkaloids	+++	+++
Flavonoids	+++	+++
Carbohydrates and Sugars	+++	+++
Fats and Fixed Oils	++	++
Saponins	+++	+++
vitamin C	++	++

Table 6: Results of phytochemical constituents of *F. carica* extracts.

++ = Moderate, +++ = Abundant

Table 6 shows the results of the phytochemical screening of the metabolites contained in the crude aqueous and alcoholic extracts of *F. carica* which are Triterpenoids, Steroids, Tannins, Protein, Glycosides, Reducing Sugars, Alkaloids, Flavonoids, Carbohydrates, Sugars, Fats, Fixed Oils, Saponins and vitamin C, where it was found that all the detected components were between medium and rich in presence in both extracts. As the presence of vital and active constituents in the plant's fruits, especially secondary metabolites, makes it play a very big role in the prevention, resistance and elimination of many pathogenic microbes that are harmful to human health. Terpenoids are natural products that have existed in numeral medicinal plants especially those used in folk treatments, and because they involve several biologically energetic compounds. Some of the terpenoids compounds are played an important role in plant growth and development as hormones for growth. While the tannins, are one of the polyphenolics compounds and include an expansive area of influences altering from the declining capability of nutrients and proteins. Tannins also have anti-inflammatory, anti-mutagenic and anti-oxidant properties. However, the presence of some compounds of alkaloids in the plant makes it more resistant to drought, saving food resources and providing a substrate for coexisting insects or even as a defense against animals, as they are considered toxic compounds to livestock. Even so, flavonoids have various biological activities such as antioxidants, inflammation, carcinomas, and therefore many microbes as well viruses, bacteria and others. While, carbohydrates and sugars are compounds that give fruits the desired sweetness, meaning that the presence of such as sugar (for example sucrose, glucose, and fructose) and carbohydrates affects such an important characteristic of it. Accordingly, it is known that when this fruit is dried for a period of time required to be used as dried fruit, there is a layer of white scales formed on its peel resulting from the abundance of sugars in this fruit. Furthermore, Fixed oils are considered to be one of the lipids compounds that are naturally created molecules in plants, Also lipids are regarded as primary plant metabolites. Lipids perform diverse biological activities as the main structural components of all biological membranes [23]. Moreover, saponins are one of the secondary metabolic compounds found in plants, and it is triterpenes glycosides or steroid. Also, some saponins compounds have properties such as analgesic expectorant and anti-tumor [24]. In addition, vitamin C or ascorbic acid is a water-soluble vitamin that works to restore and change the free radicals of vitamin E to the original vitamin E. It also gives the ability to intracellular and extracellular aqueous-phase antioxidant capacity primarily by scavenging lipid hydro-peroxides. From what was

mentioned above, we can say that the presence of secondary and primary metabolites ingredients is of utmost importance to the fruit of *F. carica*, consequently as to advantage from it as health preventing and medicine for the treatment of various diseases.

Phytochemical (quantitative analysis)

Phytochemicals	*F. carica* Constituents Percentage (%)
Saponins	58
Terpenoids	73
Alkaloids	65
Flavonoids	53

Table 7: Results of phytochemical quantitative analysis of *F. carica* extracts.

As shown in table 7 the results of the detected quantitative secondary metabolites of the phytochemicals were revealed that 58, 73, 65, and 53% for Saponins, Terpenoids, Alkaloids and Flavonoids, respectively. Depending on the availability of these secondary compounds in the plant, the bioactivities and biological positive effect on microorganisms such as bacteria and viruses, and some of them may have an effective effect in preventing diseases even before their occurrence. Regarding this capability, the contemporary interest extended the use of natural products in pharmaceutical, food, cosmetics products, and because they possess the importance of activity for restoring the imbalance in human body activity.

Antimicrobial activity

Bacterial Sorts	Crude Extracts		Antibiotics (mm)	
	Aqueous (mm)	EtOH (mm)	Tetracycline	Ampicillin
P. aeruginosa	12	18	22	21
E. coli	13	16	20	17
B. subtilis	15	20	21	13
S. aureus	12	17	23	18

Table 8: Results of antibacterial activities of the *F. carica.*

As shown in table 8 the results of the bioactivity of the aqueous extract against pathogenic bacteria were as follows 12, 13, 15 and 12 mm against each of *P. aeruginosa, E. coli, B. subtilis* and *S. aureus*, consequently. Whereas the ethanolic extract was as follows 18, 16, 20 and 17 mm against each of *P. aeruginosa, E. coli, B. subtilis* and *S. aureus*, consequently. In comparison with the results of the antibiotics used, it was noted that the results of the extracts were magnificent, as some of the readings recorded for the bioactive resistance of plant extracts are almost equal to the resistance to antibiotics. This is evidence that this plant can be used against some of these types of bacteria as an antibiotic because of its superior ability to eliminate bacteria. Consequently as the presence of vital components in plants will support their biological effectiveness and will be considered as a medicinal plant that can be used for therapeutic purposes against many diseases. Proteins, sugars and chlorophyll are all considered primary compounds, or what is known as primary metabolites products. While both sterols, flavonoids, tannins, saponins, terpenoids and others are considered secondary compounds or compounds of secondary metabolic products. The leaves of *F. carica* have some active combinations like saponins, flavonoids, alkaloids and tannins, which include biological activities such as antiviral, antibacterial anti-inflammation, anticancer and antioxidant [7,8]. Furthermore, tannins are considered a toxic component for bacteria that can restrain their cell also stop their growth and protease action. And according to the presence of flavonoids compounds that acts as antibacterial because have multiple cellular effects, it functions to create a complex with proteins through non-specific forces, like hydrophobic effects, including covalent bond formation and hydrogen bond. The activities manner of flavonoids may be related to the ability to inhibit strongly oxygen consumption in bacteria, inactivate the microbial cell envelope transport proteins; adhesion enzymes also disrupt microbial membranes [27-31].

Conclusion

In conclusion, the results exposed the studied fig fruits, *Ficus carica* Linn (*F. carica*) that can be used in medicine for the treatment of diseases, because it contains active ingredients such as antimicrobial activity. Moreover, the preliminary phytochemical analyses revealed the presence of several compounds that possess the potential efficiency of *F. carica*. Hence, perhaps it can be encouraged to be this fruit as an alternative to current medicines, especially if many studies have been conducted on it, and that is after further carried out advanced analyzes to detect and define the effective compounds to determine the extent of their biological vitality to resist different of pathogenic microbes. Additionally,

research on secondary metabolites will be useful to the chemical industry to produce and extracts the natural chemicals constituents from plants and minimize the use of the different synthetic chemicals drugs.

Conflict of Interest Statement

The author declares that has no conflict of interest.

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Bibliography

1. Roze LV., *et al*. "Compartmentalization and molecular traffic in secondary metabolism: a new understanding of established cellular processes". *Fungal Genetics and Biology* 48 (2011): 35-48.
2. The Fig: it's History, Culture, and Curing, Gustavus A. Eisen, Washington, Govt. print. Off., (1901).
3. "RHS A-Z encyclopedia of garden plants". United Kingdom: Dorling Kindersley (2008): 1136.
4. Anonymous. The Indian Pharamacopoeia 2nd Enden. Government of India publication, New Delhi (1966).
5. Ingle KP., *et al*. "Phytochemicals: Extraction methods, identification, and detection of bioactive compounds from plant extracts". *Journal of Pharmacognosy and Phytochemistry* 6 (2017): 32-36.
6. Pandey A and Tripathi S. "Concept of standardization, extraction, and pre-phytochemical screening strategies for herbal drug". *Journal of Pharmacognosy and Phytochemistry* 2 (2014): 115-119.
7. Tiwari P., *et al*. "Phytochemical screening and extraction: A review". *International Journal of Pharmaceutics* 1 (2011): 98-106.
8. Eloff JN. "Which extractant should be used for the screening and isolation of antimicrobial components from plants". *Journal of Ethnopharmacology* 60 (1998): 1-8.
9. Beena P., *et al*. "Preliminary phytochemical screening of Cicer arietinum in folklore medicine for hepatoprotection". *Journal of Innovations in Pharmaceutical and Biological Sciences* 3 (2016): 153-159.
10. Trease GE and Evans WC. "Textbook of pharmacognosy". 13th ed. London, UK; Toronto, Canada; Tokyo, Japan: Bailiere Tindall (1989): 200-201.
11. Wallis TE. "Text book of pharmacognosy". Delhi, India: CBS Publishers and Distributors (1989): 356-549. Google Scholar.
12. Dhawan D and Gupta J. "Comparison of different solvents for phytochemical extraction potential from Datura metel plant leaves". *International Journal of Biological Chemistry* 11 (2017): 17-22.
13. Kenwat R., *et al*. "Preliminary phytochemical screening and in vitro antioxidant efficacy of fruit oil of Martynia annua". *UK Journal of Pharmaceutical and Biosciences* 2.1 (2014): 16-22.
14. Gupta AK., *et al*. "Phytochemical Screening and Antimicrobial Assessment of Leaves of Adhatoda vasica, Azadirachta indica and Datura stramonium". *UK Journal of Pharmaceutical and Biosciences* 1.1 (2011): 42-47.
15. Purohit P., *et al*. "Assessment of antibacterial activity and phytochemical screening of Hemidesmus indicus root extracts". *UK Journal of Pharmaceutical and Biosciences* 2.6 (2014): 67-72.
16. El-Feky AM., *et al*. "Phytochemical and Biochemical Studies of Sage (Salvia officinalis L.)". *UK Journal of Pharmaceutical and Biosciences* 4.5 (2016): 56-62.
17. Ravi K., *et al*. "Phytochemical Screening and Antibacterial Activity of Ethanol Extract of Leaves and Twigs of Azadirachta indica A. Juss". *UK Journal of Pharmaceutical and Biosciences* 3.6 (2015): 56-59.
18. Sharma A., *et al*. "Potential biological efficacy of Pinus plant species against oxidative, inflammatory and microbial disorders". *BMC Complementary and Alternative Medicine* 16.1 (2015): 35.
19. Boham BA and Kocipal-Abyazan R. "Flavonoids and condensed tannins from leaves of Hawaiian Vaccinium vaticulatum and V. calycinum". *Pacific Science* 48 (1974): 458-463.
20. Harborne JB. "Phytochemical methods". 2nd ed. New York 3 (1984): 100-117.
21. Obadoni BO and Ochuko PO. "Phytochemical studies and comparative efficacy of crude extracts of some homeostatic plants in Edo and Delta States of Nigeria". *Global Journal of Pure and Applied Sciences* 8 (2001): 203-208.
22. Harborne JB. "Phytochemical methods". London. Chapman and Hall, Ltd. (1973): 49-188.

23. Subramaniam S., *et al*. "Bioinformatics and systems biology of the lipidome". *Chemical Reviews* 111.10 (2011): 6452-6490.

24. Güçlü-Üstündağ Ö and Mazza G. "Saponins: Properties, applications and processing". *Critical Reviews in Food Science and Nutrition* 47 (2007): 231-258.

25. Koster R., *et al*. "Acetic acid for analgesic screening". *Federation Proceedings* 18 (1959): 412-418.

26. Drew WL., *et al*. "Reliability of the Kirby-Bauer disc diffusion method for detecting methicillin-resistant strains of Staphylococcus aureus". *Applied Microbiology* 24.2 (1972): 240-247.

27. Tchombe LN and Louajri A. "Therapeutic effects of Ficus carica leaves: A brief review". *ARPN Journal of Science and Technology* 5 (2015): 37-34.

28. Badgujar SB., *et al*. "Traditional uses, phytochemistry and pharmacology of Ficus carica: A review". *Pharmaceutical Biology* 52 (2014): 1487-1503.

29. Mishra AK., *et al*. "Inhibitory activity of Indian spice plant Cinnamomum zeylanicum extracts against Alternaria solani and Curvularia lunata, the pathogenic dematiaceous moulds". *Annals of Clinical Microbiology and Antimicrobials* 8 (2009): 1-7.

30. Anitha J and Jayraaj IA. "In-vitro antibacterial activity and evaluation of flavonoid and phenol in earthworm powder (eudrilus eugeniae)". *World Journal Pharmacy and Pharmaceutical Science* 2 (2013): 4917-4928.

31. Działo M., *et al*. "The potential of plant phenolics in prevention and therapy of skin disorders". *International Journal of Molecular Sciences* 17 (2016): 1-41.