



Phytochemical characteristics of Date Palm (*Phoenix dactylifera* L.) leaves extracts

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Abstract:

Evaluation of the phytochemicals date palm leaves , which have been shown the presence of many medical compound that are significant to the human health like tannins , alkaloids , trepenoids , carbohydrate , phenols, amino acids and flavonoids . So, the recent research activities are focused to assess natural sources date palm leaves antioxidants compounds .This is what explains the use of herbal drugs have gained importance in recent years which its efficacy and cost effectiveness few . Therefore, there is more growing trend in searching for antioxidants of natural origin.

Key words: extraction of date palm leaves, phytochemicals.

خصائص التركيب النباتي لمستخلص سعف النخيل

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الخلاصة:

تقدير المركبات النباتية في مستخلص سعف النخيل ، وقد وجدت الدراسة وجود بعض المكونات الطبية الفعالة التي تدخل في تركيب أكثر الادوية استخداما للشفاء من الأمراض ومنها ، العفص ، الفلافونويد ، الأحماض الامينية ، القلويدات ، تربينودس والمركبات الفينولية . وهذا ما يفسر لنا استخدامها في الطب الشعبي من قبل بعض العشابين وذلك لتوفرها ورخص ثمنها وفعاليتها الشديدة للتقليل من شدة الأمراض أو للشفاء منه.

Introduction:

The date palm tree "*Phoenix dactylifera* L" is one of the oldest fruit trees in the Arab region and it is extensively cultivated for its edible sweet fruit (1). The date palm tree is so old in Iraq that many of the names of its parts and the tools used for the maintenance are Babylonian in origin, or even older... but still in use today. In the central region of Iraq, the date palms are

used in orchards to provide cover for the more delicate citrus fruit trees such as oranges and lemons. They provide shade from the sun in summer and shelter from the cold winds in winter. Iraq may be considered the date palm country. Apart from the northern part. Of the country, date palm trees grow everywhere. The date palm tree has been mentioned as the "tree

of life" (2). Each part of the palm tree can be used to produce items of value for the community. There are many pharmaceutical companies show interest in plant-derived drugs mainly due to the current widespread believe that 'Green Medicine' is safe and more dependable than the costly synthetic drugs which may have adverse side effects. As per the World Health Organization (WHO) report, 80% of the world population presently uses herbal medicine for some aspect of primary health care (3). About 42% of 25 top selling drugs marketed worldwide are either directly obtained from natural sources or entities derived from plant products (4). Nearly, all cultures and civilizations from ancient times to the present day have depended fully or partially on herbal medicine because of their effectiveness, affordability, availability, low toxicity and acceptability (5). From this standpoint, we found it is necessary to discover the benefits of this blessed tree. Several studies have been shown the beneficial effects on several disease.

Nevertheless, there is insufficient information regarding the phytochemical study of palm leaves such as phytochemical screening in order to detect all secondary metabolites in the parts plant; selective extraction of tannins and attempts to separate the major constituent of tannins which may be the active compound against stomach diseases, antidiabetic, antilipaemic etc.

Material and Methods:

Collection of plant material:

Cultivar of "Phoenix dactylifera L" (fresh leaves) were collected from Najaf prov. during April to May 2012. Collected material was washed thoroughly in running tap water, rinsed in distilled water and shade dried for one week in open air, crushed using mortar and pestle, reduced to powder using waring laboratory blender

(MX-7011G) for 5 min at high speed and then stored in airtight as a powder.

Extraction of polyphenolic compounds from palm leaves:

Extraction of polyphenolic compounds from palm leaves was performed according to (6) in two steps as following:

1. Two hundred (200) gm. of palm leaves were crushed with 400ml of mixture methanol 95% and distilled water (9:1), mixed for 18h in magnetic stirrer at room temperature, and then filtered under vacuum using Whitman No. 1.
2. The filtrate residues from step one was mixed again with 200ml of mixture methanol 95% and distilled water (1:1) for 18h in magnetic stirrer at room temperature and the filtered was collected as described in step one. Then the filtrate collected in step 1 and 2 was evaporated in incubator (42°C) to reach one –third of original volumes.

The concentration extract was separated from low organic materials by addition of chloroform 20:100 (extract: chloroform) in separatory funnel, then the mixture was left for one hour to separate in two layers: lower layer contain chloroform and upper layer contain (total polyphenol). The upper layer was separated with chloroform 10:100 (extract: chloroform), from the upper layer, total polyphenol was collected and dried at (40°C) incubator and then collected as powder.

Phytochemicals detection of the active components of palm leaves:

Chemical tests were carried out on the palm leaves extract by using standard procedures to identify the constituents as follows:

Detection of tannins:

500mg of extract was stirred with about 10 ml of distilled water and then filtered. four drops (0.3 ml) of 1% ferric chloride solution were added to 2 ml of the filtrate. The occurrence of a blue-black, green, or blue- green precipitate indicated the presence of tannins (7).

Detection of Steroids:

To 0.2 gm. of extract, 2ml of acetic acid was added, the solution was cooled in ice, and then concentrated H_2SO_4 was carefully added. Color development from violet to blue or bluish-green indicated the presence of steroidal ring, i.e., a glycone portion of cardiac glycoside (8).

Detection of terpenoids:

100 mg of extraction was dissolved in ethanol. Then, 1ml of acetic anhydride was added, followed by the addition of concentrated hydrogen sulphate. A change in color from pink to violet showed the presence of terpenoids (8).

Detection of saponins:

1gm of extract was boiled with 5ml of distilled water and filtered. Then, 3ml of distilled water was added to the filtrate, and the mixture was shaken vigorously for about 5 minutes. Then 5 ml of silver nitrate was added to 5ml of extract solution in a test tube, then it was put in boiling water bath for 5 minutes, the appearance of silver mirror on sides of test tube indicated saponins existence. 1-3 ml of mercuric chloride was added to 5 ml of extract, appearance of white precipitate represented a good indicator to saponins existence (9).

Detection of flavonide:

NaOH Tests: To 2-3 ml of extract, few drops of sodium hydroxide solution were added in a test tube. Formation of intense yellow color that became colorless on addition of few drops of dilute HCl indicated the presence of flavonoids (10).

Detection of alkaloids :

10 gm of extract were boiled in 50 ml water acidified with 4% HCl, then filtered and 0.5 ml of the supernatant was mixed with Mayer reagent in watch glass, a white precipitate indicated the presence of alkaloids (11).

Detection of Phenol:

When 0.5 ml of $FeCl_3$ (w/v) solution was added to 2 ml of test solution, formation of an intense color indicated the presence of phenols (10).

Phytosterols

Salkowski Test: To 2 ml of extract, add 2ml chloroform and 2 ml concentrated H_2SO_4 and was shaken well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence indicated the presence of sterols (10).

Liberman-Burchard's Test: Mix 2ml extract with chloroform. Add 1-2 ml acetic anhydride and 2 drops concentrated H_2SO_4 from the side of the test tube. First red, then blue and finally green color indicated the presence of sterols (10).

Carbohydrates Molish's Test: To 1 ml of extract, 2 drops of Molisch's reagent was added in a test tube and 2 ml of concentrated H_2SO_4 was added carefully keeping the test tube slightly curved. Formation of violet ring at the junction indicated the presence of glycosides (10).

Amino acids Ninhydrin Test: To 5 ml of extract, 2 drops of freshly prepared 0.2 % ninhydrin reagent was added and heated. The appearance of blue color indicates the presence of amino acids (10).

Anthraquinones:

0.5 g of the extract was boiled with 10 ml of sulphuric acid (H_2SO_4) and filtered while hot. The filtrate was shaken with 5 ml of chloroform. The chloroform layer was pipette into another test tube and 1 ml of dilute ammonia was added. The resulting solution was observed for color changes (10).

RESULTS

In the present investigation, preliminary phytochemical screening has been shown the results of palm leaves extract in table (1).

Table 1: Phytochemical analysis of the date palm leaves extracts

Chemical group	Results
Tannins	+
Flavonoids	+
Saponnins	+
Alkaloids	+
Steroids	-
Phenols	+
Terpenoids	+
Carbohydrates	+
Amino acids	+
Anthraquinones	-

Positive sign (+) indicates presence, negative sign (-) indicates absence.

The methanol extract showed the presence of alkaloids, flavanoids, phenols, carbohydrates, saponnine, amino acids, trepenoids and tannins.

The systemic research for useful bioactives from the plants is now considered to be a rational approach in nutraceuticals and drug research. The results of phytochemical analysis comprehensively validate the presence of therapeutically important and valuable secondary metabolites (Alkaloids, Flavonoids, Phenols, Tannins and terpenoids) in palm leaves extract.

Discussion:

Medicinal plants are a source of great economic value all over the world. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grow in different parts of the country. Plant phenolics present in fruits and vegetables have received considerable attention because of their potential antioxidant activities (12). Herbal extracts contain different phytochemicals with biological activity that can be of valuable therapeutic index. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases (13). The crude extracts of the palm leaves *was* chemically and bioactive assayed for the presence of phytochemical compounds

which could be responsible for their medicinal use in traditional medicine, as anti-diabetic, hyperlipidemia, and treatment of Broncho-pneumonia (14). This study showed the methanol extract of polyphynol tested positive for the presence of tannins, saponine and trepenoids, flavonoide, alkaloide, amino acid.

Tannins is a group of phenolic compounds found to form irreversible complexes with proline rich protein (15, 16). Resulting in the inhibition of cell protein synthesis (17). Reported that tannins are known to react with proteins to provide the typical tanning effect which is important for the treatment of inflamed or ulcerated tissues. Herbs that have tannins as their main components are astringent in nature and are used for treating intestinal disorders such as diarrhea and dysentery (18). Alkaloids exhibit marked physiological effects when administered to animals and hence their wide use in medicine for development of drugs (11, 19). They produce analgesic, antispasmodic and bactericidal effects (20). Also, this study showed presence of flavonides have been phenolic compounds and plant phenolics are a major group of compounds that act as primary antioxidants or free radical scavengers used for medicinal purposes e.g. catechol, hydroquinine and resorcinol are phenolic salicylates used as analgesics, antipyretics

and as internal antiseptics in medicine and surgery (21). Triterpenoids and saponins showed the analgesic properties and central nervous system activities (22, 23, and 24).

Conclusion:

The phytochemical screening of palm leaves extract demonstrated the presence of alkaloids, flavonoids, phenols, phytosterols, tannins, amino acids, terpenoids, and carbohydrates. The phytochemicals present in palm leaves extract have well known curative activity against several human pathogens and therefore could suggest the use traditionally for the treatment of various.

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