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QUANTITATIVE PHYTOCHEMICAL ANALYSIS ON FRUIT EXTRACT OF *PHOENIX LOUREIROI* KUNTH- AN IMPORTANT MEDICINAL PLANT

S. Deborah[1*] and S. P. Anand[2]

[1]PG & Research Department of Biotechnology, National College (Autonomous & CPE), Tiruchirappalli, Tamil Nadu, India.
[2]PG & Research Department of Botany, National College (Autonomous & CPE), Tiruchirappalli, Tamil Nadu, India.

ABSTRACT

Phoenix loureiroi fruit is an edible fruit and it is also called as mountain dates. The present study is to estimate the phytochemical constituent by using three different solvent such as aqueous, chloroform and ethanol. Secondary metabolites such as alkaloids, flavonoids, phenols, tannins and saponins are estimated. The highest concentrations of phytochemicals like alkaloids, flavonoids, phenols and tannin were seen in ethanolic extracts, the moderate concentrations seen in chloroform extracts and the low concentrations of phytochemical analysis are seen in the aqueous fruit extract of *Phoenix loureiroi*. Saponin was high in aqueous extract. The quantification of the secondary metabolites such as Alkaloids, Flavonoids, Phenols, Tannins and Saponins were quantified from the plant source to pioneer the novel therapeutic drugs for various infectious diseases.

Keywords: Edible, Mountain dates, secondary metabolites, Novel therapeutic drugs, Infectious diseases.

INTRODUCTION

In recent years, many novel drugs are derived from the phytochemical constituent of medicinal plants [1]. Medicinal plants provide many bioactive compounds which give ways to indigenous health care systems such as Ayurveda, Unani, Siddha and also for modern medicines. About 25,000 effective plant based formulations are available in Indian medicines [2]. More than 1.5 million people use the medicinal plants in protective, preventive and curative agent. 7800 therapeutic drugs manufacturing 2000 tons of herbs annually and 119 drugs developed and marketed today units in India, 74% of novel drug designed from the pool of traditional herbal medicines. Ethano-medicinal provides therapeutic drugs, nutritive value and also to produce very low cost cosmetics [3]. Pharmacological properties of medicinal plants and their isolated constituents to possess antioxidant, antidiabetic, antibacterial, antiviral, and antiulcer activity [4]. Recently, there is very much demand on fruits and seeds which have well-known storehouse of polyphenols and nutrients which possess antioxidant activities, antimicrobial activities and anticancer activities [5]. Phytochemical screening of various plants has been reported by many workers. These studies revealed the presence of secondary metabolites such as alkaloids, flavonoids, steroids, phenols, tannins and saponins. The crude extracts of fruits are rich in phenols and flavonoids because they retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food [6].

Tribal residents in the study area which find for the wild edible fruits has a traditional medicine at a very cheaper cost when compared to synthetic medicines. *Phoenix loureiroi* contains solitary and clustering plants with trunks from 1–4 m high and 25 cm in width, usually covered with old leaf bases. The leaves vary to some degree, but usually reach 2 m in length with leaflets wide at the base and sharply pointed apices. The leaflets emerge from the rachis at varying angles creating a stiff, plumose leaf. The fruit is a single-seeded drupe, bluish-black when ripe, produced on erect, yellow inflorescences, usually hidden within the leaf crown. The species is noted for its variability in different habitats [7]. Till date, there is no reported submitted for quantitative Phytoscreening analysis of *Phoenix loureiroi* fruit on. Hence the present study deals on the phytochemical screening of *Phoenix loureiroi* fruit extract.

MATERIALS AND METHODS

Plant collection and identification

Phoenix loureiroi, Wild edible matures fruits were collected in the month of February to April at Kolli hills. The collected fruits specimen was authenticated by

Corresponding Author: **S. Deborah** **Email:-** raniseedar@gmail.com

Botanical survey of India (BSI), Coimbatore, Tamil Nadu, India. The specimen number is BSI/SRC/ 5/23/ 2017/Tech/1081/1.

Preparation of Extract

The fresh fruits were dried in shade for about 3 weeks and ground using a mixer to a coarse powder. 100 gm of powdered material was soxhlet extracted with different solvents, like, ethanol, chloroform and aqueous (12 hour each). All the extracts were evaporated in vacuum under reduced pressure. All extracts were stored in sterile glass bottles at room temperature until screened.

Quantitative determination of the Phytochemical Screening constituency

The amount of each phytochemical: secondary metabolites from the crude powdered sample were evaluated using standard laboratory procedures based on the methods of Total phenol contents using spectrophotometric methods [8], Flavonoids by the method of Boham and Kocipai-Abyazan, Tannin by the method of Van-Burden and Robinson, Alkaloids by method of Harborne, and Saponin by the method of Obadoni and Ochuko.

Determination of Total Phenolic contents using Spectrophotometric method

The concentration of phenolics in fruit extracts was determined using spectrophotometric methods [8]. An ethanol extract of fruit in the concentration of 1 mg/ml was used in the analysis. The reaction mixture was prepared by mixing 0.5 ml of ethanol extract, 2.5 ml of 10% Folin-Ciocalteu's reagent dissolved in water and 2.5 ml 7.5% $NaHCO_3$. Blank was concomitantly prepared, containing 0.5 ml ethanol, 2.5 ml 10% Folin-Ciocalteu's reagent dissolved in water and 2.5 ml of 7.5% of $NaHCO_3$. The samples were thereafter incubated in a thermostat at 45^{o}C for 45 min. The absorbance was determined using spectrophotometer at 765nm. The samples were prepared in triplicate for each analysis and the mean value of absorbance was obtained.

Determination of flavonoids by the method of Boham and Kocipai-Abyazan (1974)

10 g of the sample was extracted repeatedly with 100 ml of 80% aqueous ethanol at room temperature. The whole solution was filtered through Whatman filter paper No 42 (125mm).The filtrate was later transferred into a crucible and evaporated into dryness over a water bath and weighed to a constant weight.

Determination of Tannin by Van – Burden and Robinson (1981) method

500 mg of the sample was weighed into a 50 ml plastic bottle. 50 ml of distilled water was added and shaken for 1 hour in a mechanical shaker. This was filtered into a 50 ml volumetric flask and made up to the mark. Then 5 ml of the filtrate was pipette out into a test tube and fruits has bioactive compound which acts as a multiple drugs for a variety virulent disease [13]. The results of the mixed with 2 ml of 0.1M $FeCl_3$ in 0.1N HCl and 0.008M potassium ferrocyanide. The absorbance was measured at 120 nm within 10 minutes.

Determination of alkaloids using Harborne (1973) method

5 g of the sample was weighed into a 250 ml beaker and 200 ml of 10% acetic acid in ethanol added. The beaker was covered and allowed to stand for 4 hours. It was then filtered and the extract concentrated on a water-bath to one-quarter of the original volume. Concentrated ammonium hydroxide was added dropwise to the extract until the precipitation was complete. The whole solution was allowed to settle and the precipitate was collected and washed with dilute ammonium hydroxide (2M) and then filtered. The residue if available, is the alkaloid which is then dried and weighed.

Determination of saponin by Obadoni and Ochuko (2001) method

The samples were ground and 20g of each put into a conical flask followed by the addition of 100ml of 20% aqueous ethanol. They were then heated over a hot water bath for 4 hours with continuous stirring at about 550ºC. The mixture was filtered and the residue re – extracted with another 200 ml of 20% ethanol. The combined extracts were reduced to 40 ml over a water bath at about 900ºC. The concentrate was transferred into a 250 ml separatory funnel and 20 ml of diethyl ether added and shaken vigorously. The aqueous layer was recovered while the ether layer was discarded. The purification process was repeated. 60 ml of n – butanol was added. The combined n – butanol extracts were washed twice with 10 ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation the samples were dried in the oven to a constant weight. Saponin content was calculated as percentage.

RESULTS AND DISCUSSION

Traditional medicinal knowledge gives evidence of the valuable novel drugs discovery [9]. There is growing awareness in correlating the phytochemical compounds with their biological activities [10]. Phytochemicals are not essential nutrients and also not required for human body by sustaining life, but have very important properties to fight against pathogen which cause severe diseases. Phytocompounds are naturally synthesized in all parts of the plant like bark, leaves, stem, root, lower, fruits, seeds, etc. Availability of phytochemicals present in plant parts may differ from one part to another [11]. The quantitative estimation of the phytochemicals may pave a way for therapeutics agent [12].

Phytochemical screening of the ethanol, chloroform and aqueous extracts of *Phoenix loureiroi* fruits showed the presence of various classes of secondary metabolites such as Phenol, Flavanoids, Tannin, Alkaloids and Saponins. The presence of secondary metabolites in

quantitative phytochemical evaluation were given in Table-1 and Fig-1. From the tested three extract, the result shows

the high amount of secondary metabolites are present in the ethanol extract of the *Phoenix loureiroi* fruit. The moderate concentration was shown in chloroform extract. Low concentrations were seen in aqueous extract of the fruits except saponins. In *Phoenix loureiroi* fruit, Phenolic compounds are one largest ubiquitous group of secondary metabolites [14]. The presence of Phenols is about 37.44 mg/g of fruit extract in Gallic acid equivalent in ethanol extract. Phenolic compounds have been used as effective disinfections and bacteriosides [15]. They possess biological properties such as anti-apoptosis, anti-aging, anti-carcinogen, anti-inflammation, cardiovascular protection and improvement of endothelial function [16]. The phenolic compounds may contribute directly to anti-oxidative action. It implies that polyphenolic compounds have inhibitory effects on mutagenesis and carcinogenesis in humans when up to 1.0 g is daily ingested from the diet rich in fruits and vegetables [17]. The Flavonoids content was high in ethanolic extract, above 15.28 mg of fruit extract in quercetin equivalent per gram. Whereas, in chloroform and aqueous the concentration of flavonoids is very low. Flavonoids are the water insoluble belongs to the polyphenols family and are found in fruits. It has their biological properties of antioxidants, anti-carcinogenic, anti-microbial and anti-tumor [18]. The Tannin content was about 6.54 mg/g were present in ethanol. Whereas, in chloroform and aqueous the quantity is very low. Tannin is an anti-nutrient, belongs to polyphenols group. Tannins are well known for their anti-oxidant and antimicrobial properties, as well as for soothing relief, skin regeneration, anti-inflammatory and diuretics [19]. Alkaloids content was about 2.38mg/g in the ethanol. Alkaloids compounds act as an antibacterial, anti-diabetic properties and also for the blocking of pathogenic microbes. Alkaloids are the most powerful, effective when compared to other secondary metabolites. The possession of alkaloids groups also effect on autonomic nervous system, blood vessels, promotion of diuresis, respiratory system, gastrointestinal tract, uterus, malignant disease, infections and malaria [20]. Hence alkaloids help to cure various infectious diseases. The saponin content was high in aqueous extract for about 1.49 mg/g. In chloroform it is not detectable. In ethanol, about 1.42 mg/g were present. Saponins are glycoside characterized by their ability to foam in aqueous solutions and are used as detergents [21]. The saponins are used in hypercholestrolaemia, hyperglycemia, antioxidant, anticancer, anti inflammatory activity and weight loss [22].

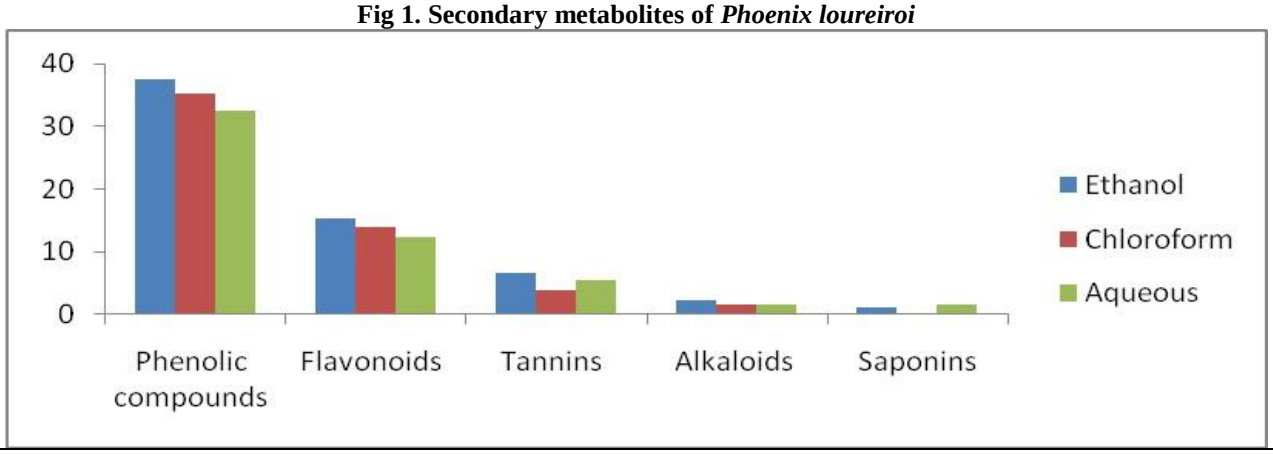
The present investigation shows that significant variation in the contents like phenol, flavonoids, tannins, alkaloids, and saponins content. These variations are due to number of environmental factors such as climate changes, altitude, rainfall, etc. [23]. The phytochemical constituents are a source of useful drugs and also to improve the nutritive value of food. The phytochemical analysis of the edible fruits has profitable interest in both research institutes and pharmaceutical companies to develop new modern drugs for the treatment of various diseases.

Table 1. Quantitative phytochemical analysis of Phoenix loureiroi

S.No.	Secondary metabolites	Ethanol	Chloroform	Aqueous
1.	Phenolic compounds (mg/g plant extract in Gallic acid equivalents)	37.44±0.02	35.3±0.2	32.39±0.15
2.	Flavonoids (mg/g plant extract in Quercetin equivalents)	15.28±0.22	13.9±1.2	12.45±0.19
3.	Tannins (mg/g)	6.54±0.1	3.98±0.5	5.43±0.01
4.	Alkaloids (mg/g)	2.38±0.060	1.65±0.23	1.55±0.09
5.	Saponins (mg/g)	1.12±0.07	-	1. 49±0.149

Samples were analyzed in triplicate and result expressed as mean (n=3)± Standard deviation (SD).

Fig 1. Secondary metabolites of *Phoenix loureiroi*



CONCLUSION

The traditional systems of medicine have become a major topic of global health care needs. The present study concluded that the traditional use of edible fruits of *Phoenix loureiroi* has a rich source of naturally occurring bioactive compound which could be extracted efficiently

with ethanol, aqueous and chloroform solvent. The ethanol extracts showed a higher potency of secondary metabolites such as phenols, flavonoids, tannins, alkaloids and saponins. The data clearly indicated that the high quantity of secondary metabolites in the ethanol extracts traditionally cure various diseases. In future, the active compound may separated and serve for the production of synthetic drugs for various therapies.

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CONFLICT OF INTEREST

No interest

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