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The Efficacy of Fig Extract on Some *Candida* spp.

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Abstract

The study was conducted in Al-Amin Laboratory by preparing the alcoholic extract of fig leaves, which were collected from the garden of a house in Najaf Governorate/Al-Shuara'a during December 2023 to test its inhibitory effectiveness against two isolates of the fungus Candida albicans and Candida dubliniensis taken from Al-Amin Scientific Research Laboratory, where serial concentrations of the extract were prepared 12, 9, 6, and 3 mg/ml., Several categories of Candida habit a non-typical genetic code in the translation of their nuclear genes into the amino acid arrangements of polypeptides. The alteration in the genetic code among species retaining this other code is that the codon CUG (generally encoding the amino acid leucine) is interpreted via the yeast as a dissimilar amino acid, serine, also Candida is nearly universal in squat numbers on vigorous adult skin, and C. albicans is part of the normal flora of the mucous films of the respiratory, gastrointestinal and female genital tracts. The drought of skin associated with other tissues forestalls the growing of the fungus, but spoiled skin or skin in intertriginous regions is more agreeable to rapid growth., This fungus can be developed in a lab. Candida looks like large, round, white or cream circles that smell identical bread. The consequences indicated an inhibitory influence of the concentrations used of the fig leaf extract on the fungus C. albicans. The diameters of inhibition ranged from the lowest to the highest 0–21 mm at concentrations of 3–12 mg/ml, respectively. As for C. dubliniensis, the diameters of inhibition ranged between (0–17) mm at concentrations of 3–12 mg/ml, respectively.

Keywords: Fig plant, yeast, inhibition, extract, *Candida* spp.

INTRODUCTION

The fig tree is one of the blessed trees mentioned in the Holy Qur'an, and God Almighty has sworn it in His Holy Book, which does not speak out of desire. God almighty does not swear except by a great one, and the oath of God Almighty is true proof of the importance of this tree and an important indication that it has great benefits and benefits. The fig tree grows and bears fruit in places where no other fruitful tree species can live [1–3]. We found it in rocky and fossilized lands, on walls, in caves, and on the edges of roads. Its ability to adapt and live in different soil conditions is limited, and the preferred soil for its cultivation is medium, warm, and fertile sandy clay soil [4]. This is preferred at high temperatures [14]. The fig tree is prolific, and its fruits are characterized by great nutritional value. It has a delicious taste and flavor. God Almighty has provided us with all the necessary materials that our bodies need in this fruit, which is considered to have a complete nutritional level for human health [9], as fresh fig fruits contain the following compounds: 75–78% water, 12–20% sugars, and 1.4% substances. Oil content, 1.4% cellulose, 0.2% acidity, 0.6% minerals, 0.3% fat. The fruits also contained a large percentage of vitamins C and A. As for dried fruits, they contain the following percentages: about 18% water, 58% sugars, 3% starch, 5% pectin substances, 7% cellular substances, 6% proteins, and about 1% fat. Fig leaves also contain a number of vitamins, such as vitamin A, vitamin B, vitamin

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B12, and minerals, such as calcium, iron, phosphorus, manganese, potassium, and chlorine [5–7], in addition to being rich in fiber [13].

Fig fruits are used in many food industries, such as jams and sweets, and they are also eaten dried, especially in the holy month of Ramadan. Figs contain two types of fiber: They are biodegradable and non- water-soluble fibers, and non-degradable and water-soluble fibers [8–10]. Studies have shown over the past fifty years that fiber found in plant foods plays an effective role in stimulating the function of the digestive system, plays an important role in performing its natural function, and contributes to reducing the risk of some types of cancer. Since figs are considered rich in fiber, nutritionists have described them as an ideal way to increase the percentage of fiber the human body needs [9]. In view of the benefits mentioned and transmitted from parts of the fig plant and the increasing emergence of cases of resistance to antifungals resulting from incorrect and excessive use, we chose this study, which aims to test the effectiveness [11] of figs against some types of fungi *C. albicans* and *C. dubliniensis* [1].

MATERIALS AND METHODS

Collecting and Preparing Fig Leaves

Plant samples were collected from fig leaves from the garden of a house in Shuaraa/Najaf governorate during December 2023. They were cleaned and washed several times with plain water, and then with distilled water to remove impurities and dust. They were left to dry for 24 h at 40°C in an oven and the collected leaves were ground. After drying completely using a grinder and grinding it well [12], it was used to prepare the extract [1] (Figure 1).

Preparation of Fig Extract

The method of Ahmed *et al*. (1998) was used to prepare the alcoholic extract of fig leaves using the solvent extractor extraction device, where 4 g of fig leaf extract powder was added to 80 ml glass cups of the extraction device and fixed in the ethyl alcohol base of the extraction device, which was immersed in ethyl alcohol. The device was operated according to the following settings:

- *Immersion stage:* 4 hours
- *Washing stage:* 60 minutes
- *Recovery stage:* 20 minutes

The boiling point of ethyl alcohol. 78.5°C. Depending on the instructions of the extraction device, the base of the cup was heated to 210°C until it reached a boiling point of 78.5°C. Because we did not want it to reach the boiling point, we heated it to 100°C. After the final stage of extraction, the extract was poured into a glass container and left at 40°C in an electric oven for ≥24 h until it dried completely [13]. After the material was completely dried, the extract was scraped off using a sharp blade (Figure 2).

Figure 1. Collecting and preparing fig leaves.

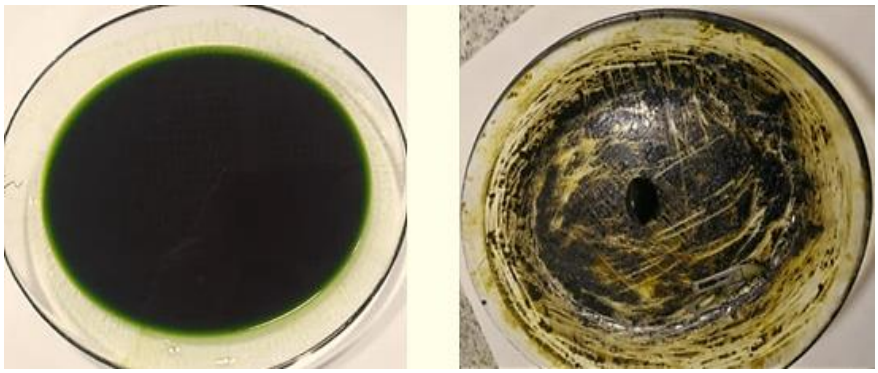


Figure 2. Preparation of fig extract.

Evaluation of the Biological Effectiveness of Fig Leaf Extract

The method involved preparing serial concentrations of fig extract and testing its biological effectiveness against the fungal isolates included in the study. 12, 9, 6, and 3 mg of fig extract was dissolved in 1 ml of distilled water in Eppendorf tubes to obtain concentrations of 12, 9, 6, and 3 mg/ml, and all the formed aggregates were dissolved in the fig extract solution using a vortex device.

Diffusion in pits was used to examine the antifungal activity of fig extract concentrations. The fungal inoculum was prepared from the two isolates used in the study, *C. albicans* and *C. dubliniensis*, by diluting colonies taken from a petri dish containing solid cypro dextros agar medium in which the *C. albicans* isolates were grown. and *C. dubliniensis* for 24 h at 37°C. Distilled water was used for dilution and mixed well to obtain a homogeneous fungal suspension using a vortex vibrating device. The turbidity rate was regulated using a turbidity measuring device to reach (1.6×10^9) cells/ml [13]. The fungal inoculum 0.2 mL was spread on the entire surface of the Solid Spruce Dextrose medium using a sterile ear swab, and five holes were made on the medium using a cork drill with a diameter of 7 mm. The holes were then filled with 75 microliters of concentrations 12, 9, 6, and 3 mg/ml at a rate of three repetitions after an incubation period of 24 h at a temperature of 37°C, then examined the dishes to measure the diameter of growth inhibition [12]. Control dishes were prepared in the same manner [13]; however, distilled water was added instead of fig extract (Figure 3).

RESULT AND DISCUSSION

The results showed that there was an inhibitory effect for the different concentrations of fig extract used in the study, and the concentration of 12 mg/ml was the most influential in producing the highest inhibition value for each of the two isolates used, and the lowest diameter of inhibition for the two isolates used was at the concentration of 3 mg/ml, as the diameters of inhibition for the fungus *C. albicans* reached 21, 15, 7, and 0 ml at concentrations 12, 9, 6, and 3 mg/ml, respectively, and for *C. dubliniensis*, it reached 17, 15, 11, 0 ml at concentrations 12, 9, 6, and 3 mg/ml, respectively. The results showed that there was no inhibitory effect [14] on the distilled water solution, which was used as the control solution in this study (Figure 4 and Table 1).

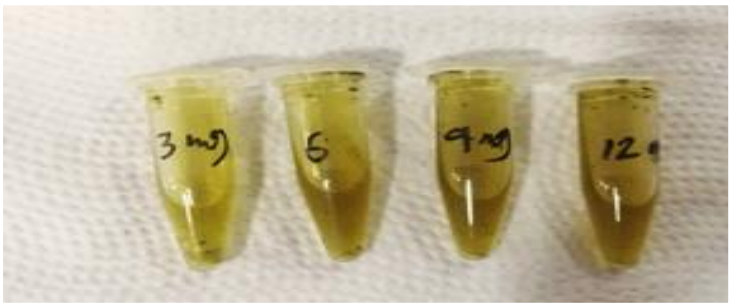
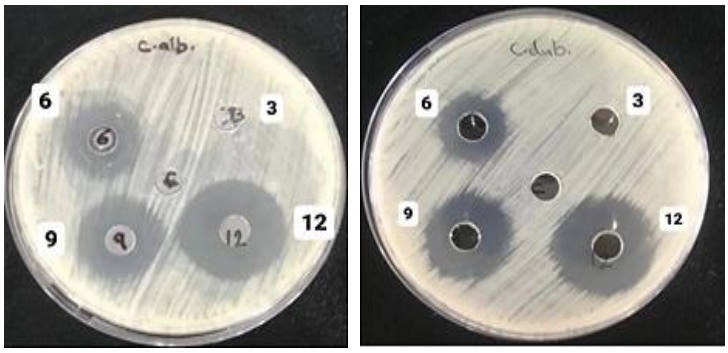


Figure 3. Prepared fig extract concentrations 3, 6, 9, and 12 mg/ml.



C. albicans *C. dubliniensis*

Figure 4. Diameters of the inhibition zones for *C. albicans* and *C. dubliniensis* because of different concentrations of fig extract.

Table 1. The diameters of inhibition zones of *C. albicans* and *C. dubliniensis* are isolated because of different concentrations of fig extract.

Isolate	Diameters of inhibition zones (mm)			
	3	***6***	***9***	***12***
C. albicans	0	7	15	21
C. dubliniensis	0	11	15	17

Also, It was found from current results there is a clear inhibitory effect of fig leaf extract on the fungal isolates used in the study, and this effect can be attributed to the leaves containing many antioxidants and organic compounds such as coumarins and proteins such as rutin, which have an inhibitory effect on the growth of a number of microorganisms [4], a revision exhibited that figs can performance as a natural antibacterial mediator, as the leaf extract exposed resilient activity beside oral bacteria than fungi, as the joint belongings of the methanol cutting with ampicillin or gentamicin were synergistic alongside oral microbes [11], and a study showed For fig leaf extract and its effect on fungi, when examining the chlorophyll extract and ethyl acetate, ethyl acetate showed a very strong inhibition (100%) and the methanol portion had total inhibition against *Candida albicans* (100%) at a concentration of 500 mg/ml [14].

CONCLUSIONS

The results presented a strong inhibitory influence of fig leaf extract on the fungal isolates used in the study, and this effect can be attributed to the leaves containing many antioxidants and organic compounds such as coumarins and proteins such as rutin, which have an inhibitory effect on the growth of a number of microorganisms. A study showed that figs can act as a natural antibacterial cause, as the leaf-cutting disclosed robust activity alongside oral bacteria and fungi, as the shared belongings of the methanol excerpt with ampicillin or gentamicin were synergistic alongside oral microbes.

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