ARTICLE / INVESTIGACIÓN

Biological activities of Ethanolic Extract Produced by *Cucurbita pepo* plant

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Abstract: Antibacterial and antioxidant effects of alcoholic extract for the *Cucurbita pepo* plant were studied. Properties optical (UV-visible spectrophotometer) and morphological surface(scanning electron microscopy) detection of the alcoholic extract was done, and the antibacterial activity was investigated against pathogenic microbes (*E.coli*, *Staphylococcus aureus*). Results showed the highest effect for crud extract in the growth of *E.coli* by the zone of inhibition diameter reached (16.33±0.58), followed by Staph. Aureus by the diameter of the inhibition zone reached (12.33±2.30mm). The results indicate that the plant C. pepo can be considered a valuable source of effective antioxidant agents at a 0.8 µg/ml concentration.

Key words: Cucurbita pepo plant, alcoholic extract, antioxidant, antibacterial activity.

Introduction

Herbal medicine has long been utilized in India and China as a less expensive means of treating various health problems[1], and it is still the principal therapy for treating infections in several underdeveloped nations[2]. When compared to synthetic drugs, herbal remedies are frequently less toxic and have fewer adverse effects. The World Health Organization has also advised that research be launched to identify and describe novel herbal remedies derived from historically recognized plants and create new effective therapeutic agents, particularly in places where modern, safe pharmaceuticals are lacking. For the treatment of long-term illnesses[3].

Aromatic herbs are commonly used as nutritional supplements[4], and they are treasured as a source of natural antioxidants[5]. Because of the rising safety issues linked with the intake of synthetic antioxidants, it's more crucial than ever to seek cheaper and safer antioxidants from natural sources, mainly plants[6]. *C. pepo*, a native squash plant, is one of the 15 species of Cucurbita genus in the Cucurbitaceae family[7]. Gourds are utilized for various aesthetic and traditional purposes, while pepo vines and fruit are used as cattle feed[8,9]. *C. pepo* is a superb protein, carbohydrate, mineral, and fat supplement[10]. The cucurbits family, often known as cucurbits, is a vast collection of plants that may be cultivated in warmer climates worldwide and yield popular food crop plants. Some of these kinds are squash, gourd, watermelon, and gourd are some of these varieties. One of the first known cultivated species is the peppo squash. Fruits that are not fully ripe are eaten as vegetables. Sweet, ripe fruit is utilized in sweets and roasted or boiled beverages[11]. This study aims to determine some biological activities of the *C. pepo* plant.

Materials and methods

Extract Preparation

The extraction was done by Soxhlet through 75% ethanol; then the solvent was removed using a rotary evaporator, then transferred to the oven to dry and stored at 4 ℃ until used[12].

Phytochemical Screening of C. pepo extract

The crude extract screening for the determination of phytoconstituents[13].

Characterization *C. pepo* extract.

UV-Visible and SEM

UV-Vis absorption spectra were employed for the optical test of C. pepo extract at various preparation conditions within range (365-540 nm); the solution was measured by UV-Vis double beam astrophotometers SP-3000 plus (CE OPTMA TOKYO). All spectra were measured at room temperature. The size and shape of *C. pepo* extract were passed out by (SEM), and were applied in the University of technology-Iraq.

Antioxidant activity

Antioxidant activity of C. pepo was studied by DPPH assay with modified according to (13), ten µl of the sample was mixed up with 490 µl of DPPH and finally added 500 ethanol. The equation formula examined the optical density (O.D.) was examined by 517 nm by the equation formula[13,16].

$$\text{Antioxidant activity \%} = \frac{^{OD}\text{control} - ^{OD}\text{sample}}{^{OD}\text{control}} \times 100$$

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OD= Optical density

Preparation of bacterial isolates

Microbial isolates were taken from the Biotechnology department at the University of technology. The microbes were grown overnight at 37 ℃ on nutrient broth to prepare the suspensions cell to 0.5 McFarland standards (1 × 105 CFU/mL)[16].

Antimicrobial activity

Isolates were obtained from the Biotechnology Branch/ Applied Science Department at the University of Technology. The diffusion agar method was used to detect antimicrobial activity. The inhibition zone was measured around each well, compared with the control, and conducted in triplicate[12,13,16].

Results

The UV-visible spectroscopy was used to check the formation alcohol extract of C. pepo. The surface of the alcohol extract band at 390 nm (Fig. 1).

SEM assay

SEM technique was employed to visualize the shape and size of the ethanolic extract by *C. pepo* plant shown in figure 2.

Phytochemical Screening of extract

The result of the Phytochemical Screening of plant extract ware dark green color suggests the presence of phenolics and tannin, respectively. Yellow to colorless (flavonoids), volatile oil by yellow precipitate, reddish-brown alkaloids, flavonoids by yellow precipitate is indicated by the formation of a precipitate, such as yellow precipitate, the presence of saponins is indicated by the persistence of frothing. While Glucosides, Steroids, and Terpenoids were absent in Ethanolic extract (Table 1).

Antioxidant activity of C. pepo plant

The DPPH was found to be proportional to the increase in concentration. The free radicals were given 56.50%, 62.42%.,66.12%,74.33% by the concentration of 20,40,60 and 80 µg/ml respectively in figure.3.

Antibacterial activity

C. pepo extract effect was studied against two types of pathogenic microbes. The effects of the ethanolic extract varied on pathogenic microbes' growth. The highest effect observed on the growth of *E. coli* by a zone of inhibition reached (16±0.13mm), followed by *S. aureus* (15±0.58 mm) (Figure 4, and Table 2).

Discussion

C. pepo extract exhibited antibacterial action related to Gram-negative and Gram-positive bacteria[13]. The activity of *C. pepo* extract against bacteria was credited to phytochemical materials like Flavonoids, phenolics, alkaloids, and tannins which affect the cell wall bacteria[14]. Antibacterial activity differed depending on the cell wall structure of G +ve and G-ve bacteria[15,18], which leads to the destruction of bacteria[16,18]. In-creased phenolic elements, such as flavonoids, phenolic diterpenes, and phenolic acids, increased DPPH radical scavenging activity. Phenols, Flavonoids, and Alkaloids isolated from leaves of plants decreased the oxidant action[17].

Conclusions

C. pepo plants have wide phytochemical compounded and clinical investigations. Scientific studies have shown most of the claims of traditional medicines through has antibacterial activity against G+ve and G-ve bacteria, the ability of the extract to inhibitor 75%, and antioxidants.

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Informed Consent Statement

Written informed consent has been obtained from the biotechnology department and biomedical engineering at the University of technology.

Data Availability Statement

The results might be achieved using an evaluation software or assessment table, available at www.diagnostics.sk/idmicro.

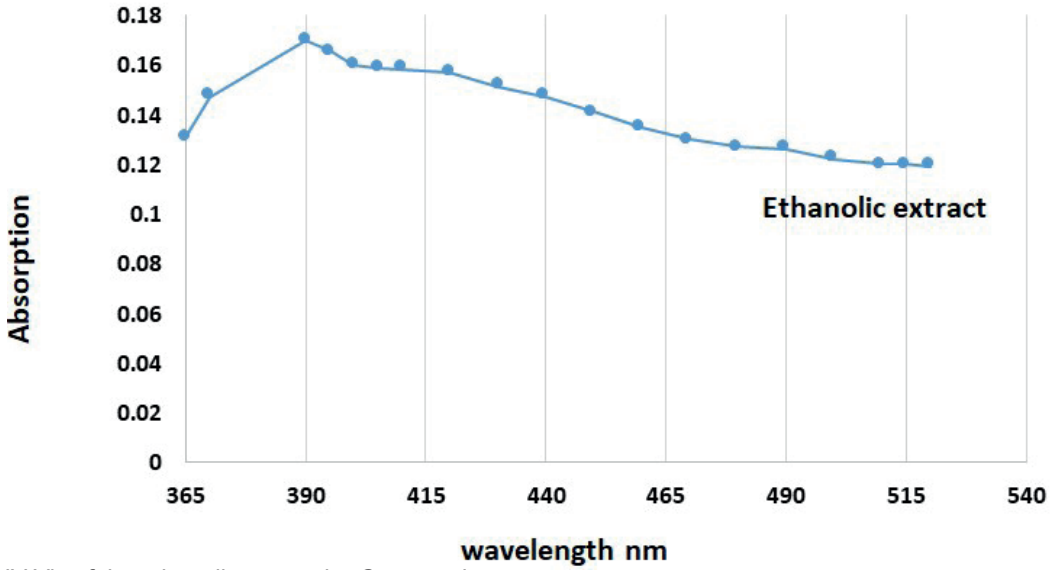

Figure 1. UV-Vis of the ethanolic extract by *C. pepo* plant.

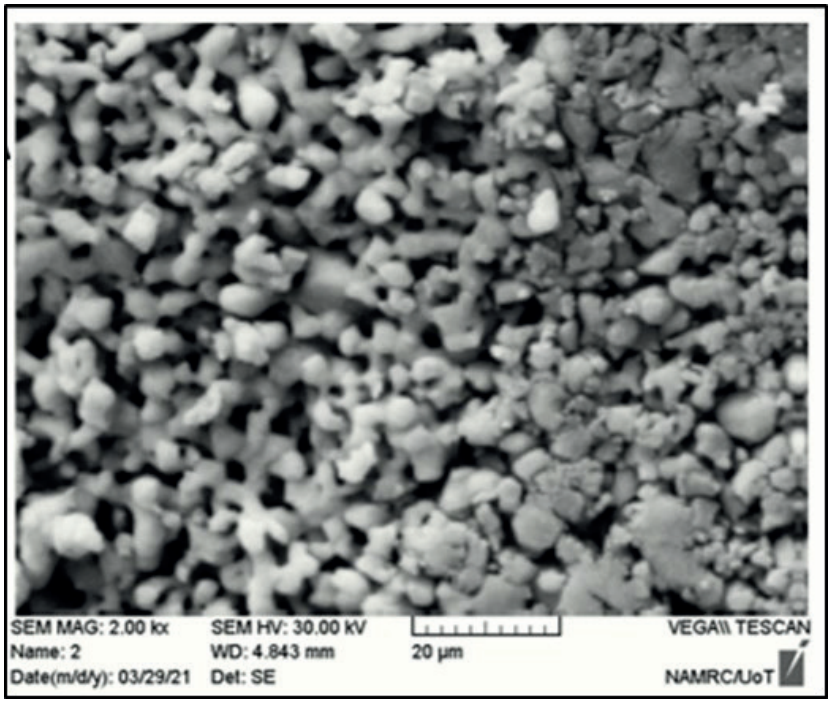

Figure 2. SEM of the ethanolic extract by *C. pepo* plant.

Constituent	Test
Tannins	**Presence**
Saponins	Presence
Phenol	Presence
Alkaloids Wagner's test	Presence
Flavonoids Ferric chloride test	Presence
Volatile oil	Presence
Glucosides	Absent
Steroids	Absent
Terpenoids	Absent
Comarines	Presence

Table 1. Phytochemical Screening of *C. pepo* plant.

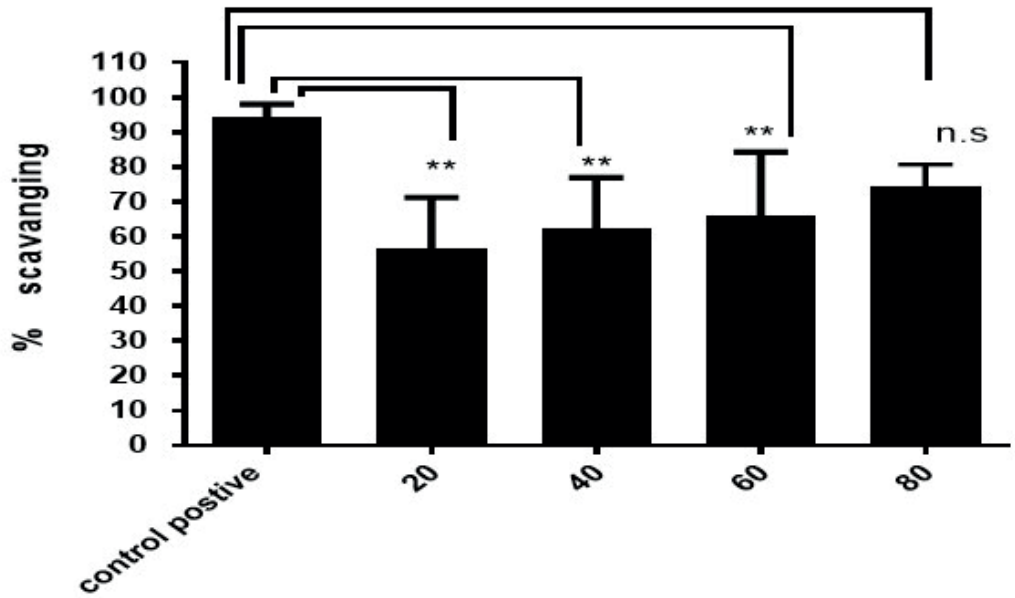

Figure 3. DPPH radical scavenging of *C. pepo* plant.

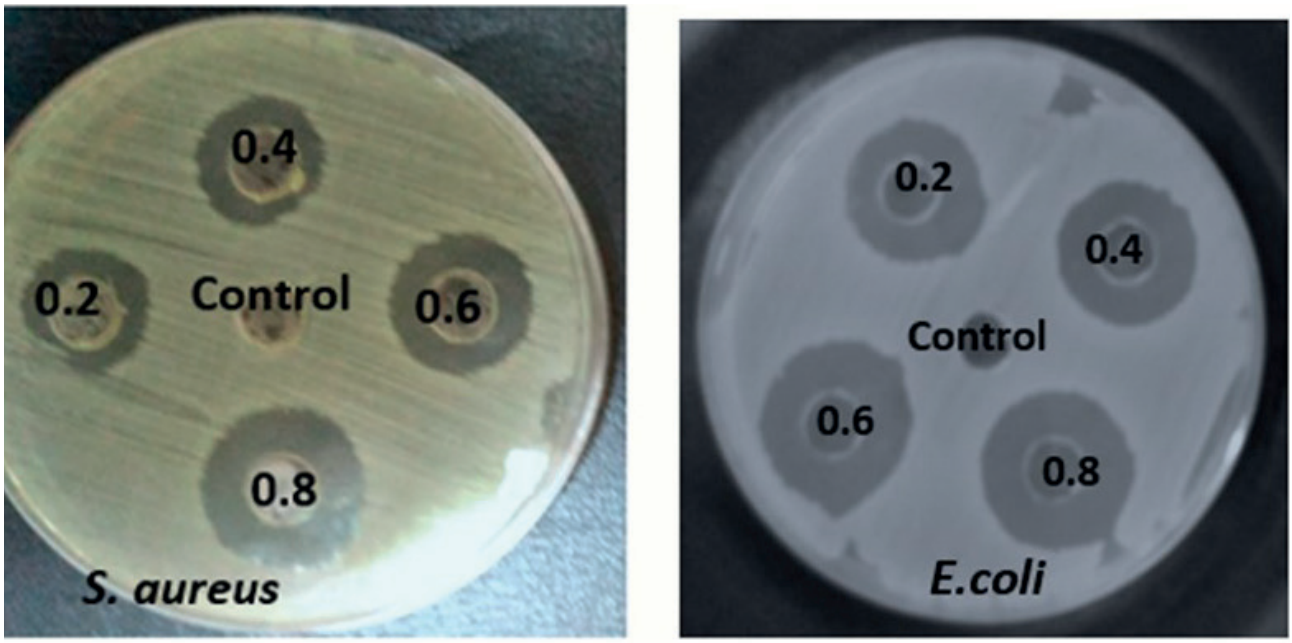

Figure 4. Antibacterial activity of ethanolic extract toward. *E.coli*, *S. aureus*.

Microorganism pathogenic	Concentrations µg/ml				
	0.2	0.4	0.6	0.8	Control
S. aureus	7±0.58	9±2.30	12±1.15	15±0.58	-
E.coli	10±0.58	12±0.02	14±0.23	16±0.13	-

Table 2. The effect of ethanolic extract against some pathogenic.

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Conflicts of Interest

None.

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