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The microbial effect of extracts of the plant (Dodder) and the concentrations of some minerals on the growth of bacteria (Pseudomonas) isolated from some hospital rooms in Derna and Al-Bayda

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Abstract:

This study aimed to isolate and identify 112 samples from different departments in Derna and Al Bayda hospitals to determine the most common bacteria. Standard microbiological methods were used to identify the isolated bacteria from the study areas, such as spectrophotometry, minimum inhibitory concentration (MIC), and agar diffusion. Alcoholic and aqueous extracts of the wormwood plant were also used, in addition to the concentrations of some elements (copper, nickel, and iron) as inhibitors of the bacteria. Statistical analysis was performed using Tukey's analysis software, MlNlTAB version 2021. Some chemical analyses included phytochemical examination, antioxidant content, phenolic compounds, and metals. Some of the elements showed that the most common was *Pseudomonas aeruginosa*, accounting for 22.2% of the total. The effects of the wormwood plant extracts were studied and their effectiveness compared with the concentrations of the elements used in the study. The results showed that Dodder plant extracts had no effect on Gram-positive bacteria, and that the most effective and influential elements were nickel at a concentration of 100%, followed by copper, and the least effective was iron.

Keywords: Bacterial isolation; Pseudomonas aeruginosa; Dodder plant extracts; Minimum Inhibitory Concentration (MIC), Antimicrobial resistance, Hospital-acquired infections, Phytochemical analysis.

1. INTRODUCTION

Before being admitted to the hospital, patients in low who do not currently have healthcare resources get health-associated infections (HAIs). Reducing and eliminating nosocomial infections can help address hospital-acquired illnesses, which are serious problems that need to be carefully addressed globally (Demirdağ et al., 2021).

These infections do not affect one suffered in particular. These might happen to everyone, patient or hospital staff, and raise the hospital's mortality rate (Demirdağ et al., 2021). Studies show urinary tract infections are among the most common causes of that Hals (UTIs), infections of the circulatory system, respiratory tract infections (RTIs), and surgical site infections range from 18 to 101 (Demirdağ et al., 2021; Vidaković et al., 2020). As per a World Health Organization (WHO) assessment, 55 hos- HAIs were more common in 14 nations, accounting for 8.7% of hospitalized patients. This has led to an increase in both mortality and morbidity rates (Vidakovic et al., 2020).

Strong The largest concentration of P. aeruginosa 11% of all nosocomial infections, which have a high risk of morbidity and death. Non-fermenter Gram-negative organisms are the source of diseases, particularly in those with weakened immune systems. The kidney, urinary system, and upper respiratory tract are colonization sites. It is the source of UTIs, bacteremia, pneumonia, cystic fibrosis, and wound and surgical infections. Adhesions, hemolysins, exotoxins, proteases, and siderophores are a few significant virulence factors. A variety of processes opposing drugs are causing P. aeruginosa to become more resistant (Lin et al., 2015a).

According to Kuijt (1969), dodders (Cuscuta spp.) are the most common group of parasitic weeds that are important to agriculture and the economy. Dodder cannot finish its life since it is an obligatory parasite, cycle. Lists numerous popular names for the annual plant called dodder, including angel's hair, golden thread, and strangle weed. Without leaves or roots, seedlings are made entirely of stem tissue. Typically, golden to orange in hue, stems are thin threads. Some species of dodder may have minimal amounts of chlorophyll, despite the fact that they depend on their host for nutrition to survive (Yuncker, 1965).

Research has demonstrated that the components of C. campestris, or dodder, have the following effects: They are effective against atopic dermatitis (Choopani et al., 2016). They are also effective against some plant-pathogen fungi (Sin et al., 2011). They have an anticancer effect (Behbahani, 2014; Noreen et al., 2019). They have analgesic, hypothermic, anti-inflammatory, and anti-proliferative effects (Agha et al., 1996; Ghule et al., 2011; Lee et al., 2011).

Family: Cuscutaceae.

Scientific Name: CuscutaplanifloraTen.

Vernacular Name: Vern. Hariri Essayer.

The body of knowledge about how important metal ions are to biological systems is constantly expanding. Thus far, research has demonstrated that the majority of organisms need the manganese, iron, nickel, copper, and zinc first-row transition metals certain absorption processes are used by bacteria to obtain the necessary (Palmer & Skaar, 2016a)

Nickelis thought to be connected in some manner to the structure or operation of proteins. It is found in nucleic acids, specifically RNA and DNA. has focused mostly on the synthesis of nickel complexes with ligands due to their biological properties (Wilfred et al., 2012).

The development of the latest nickel-based pharmaceuticals has been greatly aided by nickel's ability to increase the inhibitory power of chemotherapeutic medications. Coordination has been found to improve the efficacy of a range of medical therapies (Wilfred et al., 2012).

In the past few years, research has been conducted to create the metal copper, which has been shown to have self-sanitizing properties that prevent human infections from surviving exposure to copper or copper alloy surfaces for any appreciable amount of time. There is a significant reason for concern in the current pandemic context because this feature is not observed with other common surface materials such as plastic, stainless steel, or aluminum (Olivares and Uauy, 1996; Carson et al., 2007; Brewer, 2003).

In the form of a metal complex, iron is the most prevalent transition element in the human body and a potentially effective antibacterial agent. Iron can affect bacterial cells by inducing oxidative stress, blocking respiration and ATP synthesis, increasing cell hydrophobicity, and facilitating penetration over the cell wall. Consequently, combination treatments provide a number of benefits, including a decreased risk of developing (Saranya et al., 2020; Claudel et al., 2020).

2. Materials and methods

Study locations

This study was conducted at Al-Bayda Medical Center in Al-Bayda and Al-Wehda Hospital in Derna, (Libya), between (October 2022-December 2023), Al-bayda and Derna are cities located in the northern eastern region in Libya as shown in figure (1).

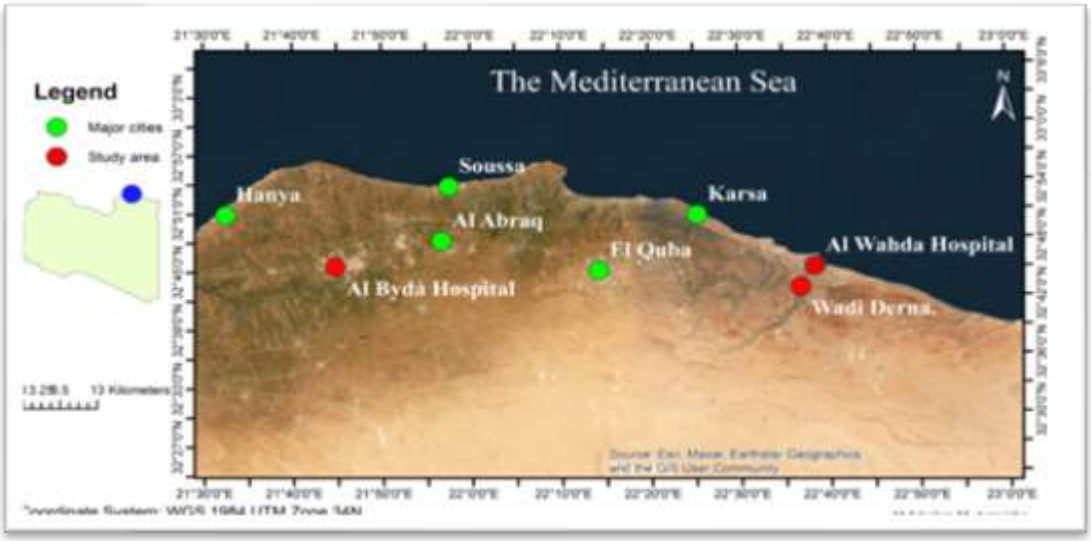

Figure: (1). Map of Libya with relative location of Derna and Al-Bayda hospitals with local samples.

2.1.1. Isolation and identification

Sampling:

The samples were collected from two different hospitals (Al-Bayda Medical Center and Al.wahda Derna) from some departments, Benches and rooms. The samples were selected randomly, where 112 samples were taken from pediatric Department, incubators, some rooms, sterilization devices, monitoring devices, cauterization devices, emergency rooms, surgical department rooms, doors, handles and ventilators.

For Al-Bayda Hospital, the samples were collected from women's Department only, which consisted of cauterization devices, monitoring devices, emergency carts, sterilization devices and seats.

2.1.2. Isolation

The samples were isolated from the selected collection sites. A conventional Nutrient Broth bacterial medium was prepared according to the manufacturer's instructions on the package. Then the medium was sterilized in sterile tubes under sterile conditions. Swabs were taken from the locations, placed in test tubes under sterile conditions, and transferred to the laboratory to conduct the known microbiological tests (Benson, 1990).

2.1.3. Identification

Bacteria were identified using conventional diagnostic microbiological laboratory techniques as well as morphological appearance. They were cultured on selective media to determine the growth type of each bacterial isolate. Blood agar, MacConkey agar, mannitol agar, NB and NA nutrient agar were used. They were incubated for 24 h at 37°C. Gram stain was then performed to determine whether they were Gram-positive or Gram-negative. Biochemical tests, including catalase and oxidase tests, were performed (Benson, 1990).

2.2. Antimicrobial investigation

2.2.1. Spectrophotometric method

The spectrophotometric method which carried out in this study was carried by measured the mixture of isolated bacteria with the suggested metal ion solutions .

A suspension of 1.5×108 CFULml (Farland method, 1907) was prepared for bacterial species of (Klebsiella, pseudomonas and S.aureus). where 1 ml of the bacterial suspension and 1 ml of the element or plant extract used in this study were taken, which are (Different concentrations of iron, copper and nickel Solutions) and extracts of the dodder plant and 1 ml of sterile nutrient broth and incubated at a temperature of 37 C° for 24 hours. Then, a spectrophotometer was used to estimate the turbidity values, where the, the optical density (OD) of the designated broth media was measured using a spectrophotometer set at a wavelength of 600 nm to improve accuracy, then slightly diluted before taking the readings. These measurements were then repeated throughout the experiment at selected time points (Lin et al., 1989). Different concentrations of (5, 10 ,25,75,50 and 100 ppm) for metal ions in addition to the extract plant Dodder and minerals at all tested species of organisms (Wadhwani et al., 2019).

2.2.2 Agar wellpropagation techniques

Antibacterial activity was confirmed using the agar diffusion method and using three bacterial colonies, namely Klebsiella pseudomonas and S.aureus, using nutrient agar (NA) and sterile cotton swabs. A bacterial suspension was prepared using the MC Farland method. The suspension was distributed on the plates, then using a sterile drill to create a bacterial well with a diameter of 4 mm in each plate; concentrations of mineral elements and different extracts Dodder plant were added at a rate of about 100 microliters. After 24 hours in the Incubation, the results were read using a ruler by measuring the diameter of the Inhibition zone (Mahmoudi et al., 2011).

2.2.3. Minimum inhibitory concentration (MIC) test

Different concentrations of metal elements (Iron, Copper and Nickel) and extracts of the plant Dodder according to the method of the National Committee for Clinical Laboratory Standards (NCCLS,2000), In this study each one of the concentrations 25, 50, 75 and 100 ppm to the Nutrient Agar (NA) medium at 50°C. The suspension was distributed on plates and then left for few minutes to dry. The plant were 24 hours at 37°C. A bacterial suspension was prepared without any antimicrobial agents. It is used to

determine the actual growth of bacteria (Ericsson et al., 1960). The results were recorded as the presence or absence of growth

2.3. Preparation of extracts

2.3.1. Solvent extraction

The powdered materials of the plant Cuscuta dodder were extracted with different solvents (water and ethanol), where 10 grams of plant powder were combined with 100 milliliters of both aqueous and non-aqueous solvents (ethanol). At 60°C, crude extract was evaporated, and with the rotary evaporator, the extracts were collected and stored at 4ºC until further use (Al-Shammary *et al*., 2014; Adegboye *et al*., 2008; Akinpelu *et al*., 2008).

2.3.2. Phytochemical screening

All the phytochemical screening tests were carried out according to standard methods. The methods are described as following:

2.4. Test for sterols and/or triterpene

Libermann-Burchad's test

A small amount of concentrated sulfuric acid was put down the side of the dry test tube after 0.3 ml of acetic anhydride and 1 ml of the chloroform extract of each sample had been added. Chloroform solutions turn green when sterols and/or triterpenes are present, whereas reddish-violet coloration is formed at the intersection of the two layers. (El-Hifnawy *et al*., 1992).

2.4.1. Test for flavonoids

The extracts (alcohol and aqueous) of the tested herbal plants were further extracted with 1% hydrochloric acid; each extract was subjected to the following test: 10 ml of each extract is rendered alkaline, where a faint yellow color is produced in the presence of flavonoids (Balbaa *et al*., 1981).

2.4.2. Test for alkaloids:

The extracts of the tested herbal plants were further extracted with 20 ml of dilute hydrochloric acid, cooled and rendered alkaline with a dilute ammonium hydroxide solution, and then extracted with chloroform. (Phillipson and Neil, 1989).

2.5. Dragendorff the preparation of the reagent

Solution (a): 10 milliliters of acetic acid and 40 milliliters of distilling water were combined to dissolve approximately 0.85 grams of basic bismuth nitrate. Solution (b): 20 milliliters of water were used to dissolve around 8 grams of potassium iodide. Standard response: Solutions (a) and (b) are combined in equal volumes. On filter paper, a few drops of chloroform extract were placed, let dry, and then sprayed with the reagent. When alkaloids are present, an orange hue is seen. (Stahl, 1964).

2.6. Statistical Analysis:

Analyzed the normality distribution according to Shapiro, wilk Ryan Joiner and klomogorovsmirnov at a significance level of 0.01 A factorial experimental with a Completely Randomized Design (CRD) It was the first experience three factors for the study factor one the isolates (Klebsiella pseudomonas and S.aureus) factor two the elements (Fe.Cu .Ni) and Dodder plant and factor three the concentrations at the levels (25, 50, 75, and 100) The optical density (OD) was measured by the turbidity measurement method. As for the second experiment, using agar well diffusion techniques, the first factor was the isolates (Klebsiella pseudomonas and S.aurous), the second factor was the elements (Fe , Ni and Cu) Dodder plant, and the third factor was the concentrations (5, 10 ,25 , 50 , 75, and 100 %)The comparison

between the means was analyzed using Turkey's test statistical analysis was done using the MlNlTAB program by version 2021

3. Results

3.1. Isolation and identification bacteria species:

Colonies appeared on transitional media and were confirmed by biochemical tests and Gram stain, where under the microscope A rod-shaped colony appeared, motile, gray in color, with a distinctive odor, requiring an oxidase test. A drop of the colony appeared on a filter paper and a drop of oxidase solution was placed on it. It appeared purple, *Pseudomonas*, distinguished by its green color on NA medium, anaerobic.

The results of isolation bacteria for the 112 samples which were used in this study showed that the species of bacteria including 22% pseudomonas is the most common. Table (1).

Table (1): Distribution values of bacterial isolates at sampling sites.

Isolation bacteria	Average
pseudomonas	**22.261a±16.49**
Tukey's	**0.2652 *****

3.2. Spectrophotometer method

3.2.1. Effect of metal concentrations and Dodder plant extract on isolated bacteria inhibition by spectrophotometric method

The high spectrometer was set to measure the transmittance 600nm which refer to the optical density at a wavelength of 600 nm transmittance measurement was taken without adding coefficients at 100% and when adding substances at zero high turbidity little or no light transmittance occurs indicating high bacterial growth because the growth intercepts the light and it is absorbed instead of going into The other way and transmittance tells us how light passes through the sample that contains a large number of cells and the transmittance reading will be lower than the sample which contains a lower number of cells gives a higher reading and this is what we indicated in concentration 100 where the reading was higher and the number of microbial cells was lower.

Showed the effect of different concentrations of metal ions (50, 75 and 100%) and dodder extract showed that the low concentrations of metal ion solutions (5, 10, 25%) were the readings respectively iron (5, 10, and 25%) (0.2, 4.5, and 2.4) copper (0.9, 4.6, and 2.2) nickel (1.2, 2.3, and 1.7) dodder (0.1, 0.5 and 0.9) did not show any bacterial activity on the other side the metal concentrations of 50, 75, and 100% recorded different antibacterial activities (6.7, 4.9, 2.1, and 35.96 nm) respectively the metal concentration of 100% gave high antibacterial permeability of (35.96 nm) the results were illustrated in Tables.(2)

For the Nickel concentrations (50, 75 and 100 %) effect, the results recorded that, the high concentration of 100 % gave antibacterial activities of (87.133, 16.2 and 96.76 nm) on pseudomonas, respectively. While the Nickel concentrations of (75 %) recorded inhibition, Bacteria values of (4, 20.66 and 14.07 nm) on pseudomonas respectively. On the other side the Nickel concentrations of (50 %) recorded lower antibacterial values of (8.06, 1.1 and 10.20 nm), on pseudomonas respectively, the same manner was recorded for the effect of Iron solution concentrations on the selected bacteria species. Also, the concentrations of copper solutions of (50, 75 and 100 %) recorded antibacterial activities on the studied

specie's (pseudomonas), where the inhibition values (nm) were as following : (49 , 27 and 44 nm) , (15 , 7 and 11 nm) and (7 , 2, and 9 nm) on the above concentrations and bacteria species , respectively
On the other side the net effect of concentrations (50, 75 and 100 %) of Dodder plant extract showed antibacterial activity values of (17.80, 5.93 and 6.41 nm), (12.36, 6.36 and 6.40 nm) and (10.26, 4.33 and 15.1 nm) on *Pseudomonas*, the results were illustrated in Table (3).

Table: (2). Effect of metals concentrations and plant extracts antibacterial activity.

Concentrations	Average (nm)
100%	**35.961a±29.64**
75%	**9.217b±5.702**
50%	**6.747c±4.080**
Tukey's	**0.4593 *****

The results of the first experiment containing three treatments, the first factor isolates used in the study, the second factor is elements, minerals and the extraction of the dodder plant, the third factor is concentrations at a significant level of 0.001, the coefficient of estimation of the difference was 99.65%, evidence of the accuracy of the experiment according to the statistical analysis of the normal distribution using Completely Randomized Design (CRD) and using the Turkey ś test using the MlNlTAB program by version 2021, Among the metal concentrations and the extract of the dodder plant, the one with the highest permeability was nickel at a concentration of 100% and copper at a concentration of 100%, then iron and the extract of the dodder plant were the least permeable according to the Tukey's test, which showed a significant difference between the averages, which were (a), (b), and then (c), as shown in Table (3).

Table: (3). The antibacterial activity of different concentrations at (OD. nm).

Isolation	Pseudomonas		
concentrations	**100%**	**75%**	**50 %**
Dodder	6.4l	6.4	15. 1
Ni	95.767 a	14.076	10. 2
Fe	45.733 c	2.9	5.3
Cu	44.767 c	11.067	9.4 33
Tukey's	0.9185***		

3.3. Agar diffusion method

3.3.1. Effect of metal concentrations and Dodder plant extract on isolated bacteria inhibition by Agar diffusion method.

The effect of the plant extract concentrations of 50, 75 and 100% were not gave antibacterial activity on the isolated bacteria Table (4) and Figures (2&3). On the other side, the solutions of metals (Fe, Ni and Cu) for concentrations of (50, 75 and 100 %) showed small values of antibacterial activities compared with the values of those values obtained by spectrophotometric methods. In addition, the

concentrations of (Fe) did not show any antibacterial activities. The concentrations (100 %) of Nickel solutions showed values of (11, 9 and 11 mm), while the isolated bacteria Pseudomonas, whereas the concentrations at (75 %) gave inhibition values. In addition, for the concentrations of (10, 8 and 10 mm) and for the Copper concentrations of (50 %) gave inhibition values of (8, 7 and 8 mm). and the concentration of copper solution of (50 %) showed (9, 6 and 1.33 mm) against Pseudomonas.

Table: (4). Effect antibacterial activity different metals concentrations and isolation by (Agar diffusion method) mm.

Isolation	**Pseudomonas**		
Conc.	**100**	**75**	**50**
Dodder	of	of	of
Ni	11 a	10 ab	8 bc
Cu	8 bc	6 d	1.33 e
Tukey's	0.458		

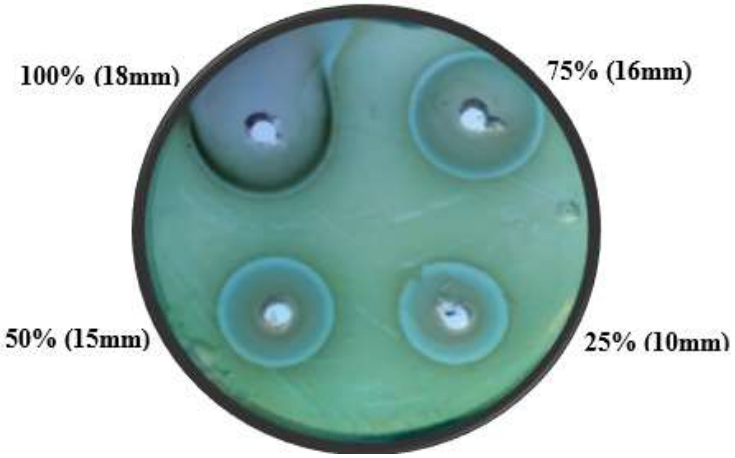

Figure: (2). Antibacterial activity of nickel against p. aeruginosa

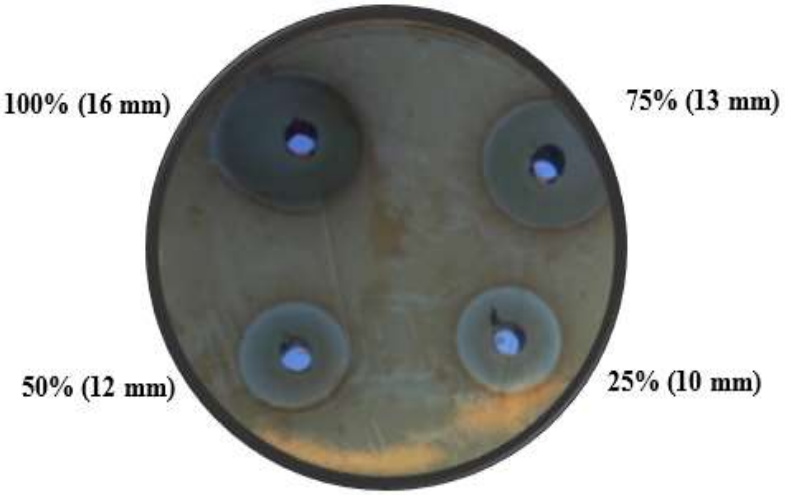

Figure: (3). Antibacterial activity of copper against p. aeruginosa

3.3.2. Effect of different concentrations of metals on the growth of bacterial

The effect of different concentrations (100%, 75%,and 50%) of metals solutions (Ni, Cu, and Fe) and plant extracts Dodder on isolated bacteria were illustrated in Table (5).The results showed that the antibacterial activity, no growth of bacteria at high concentration of (100%) , whereas there are presence for bacteria growth at concentratio (75 & 50). In addition, the Dodder plant extract showed bacteria growth for the *Pseudomonas*

Table: (5). Effect metals and Dodder extracts of concentrations on bacteria.

P.areginosa	100%	75%	50%
Ni	**-**	+	+
Cu	**-**	+	+
Fe	**-**	+	+
Dodder	+	+	+

*Positive (+), and negative (-)

3.4. General phytochemical screening of all parts of the Dodder

Tables (6 and 7) showed the general phytochemical screening of the Dodder extract. The results recorded presence of cardiac glycosides, tannins, flavonoids, sterols and/or triterpenes, alkaloids, and carbohydrates and/or glycosides, and absence of anthraquinone and saponins in both leaves and stems in alcohol extract. On the other side for the water extract, the results of phytochemical screening showed presence of all constituents, and absence of Flavonoids in both leaves and stems of *Dodder* plane extract.

Table: (6). Phytochemical screening of water extracts.

Phytochemical screening test	Leaves	Stems
Sterols and/or triterpenes	+++	+++
Flavonoids	**-**	**-**
Anthraquinone	+++	+++
Tannins	+++	+++
Alkaloids	+++	+++
Saponins	+++	+++

+: low amount, **++:** moderate amount, **+++:** high amount, and**-:** absent

Table: (7). Phytochemical Screening of ethanol extracts.

Phytochemical screening test	leaves	Stems
Sterols and/or triterpenes	++	++
Flavonoids	++	+
Anthraquinone	**-**	**-**
Tannins	++	++
Alkaloids	++	++
Saponins	**-**	**-**

+: low amount, **++:** moderate amount, **+++:** high amount, and**-:** absent

Dodder has compounds similar to antioxidants that may help inhibit the growth of cancer cells Tables 6 and 7. Furthermore, phenolic substances have been employed as purgatives, including anthraquinones (Sodipo et al., 2000).

3.5. Contents of Minerals and metal of the Dodder extract

The results of the minerals and metal contents of the studied plant (Leaves of Dodder) were given in Figures (4 and 5). High content (82 ppm) of minerals was obtained for sodium (Na), whereas the potassium (K) and calcium contents were 16 and 14 ppm, respectively. Also, the contents of (Iron (Fe), Copper (Cu) and Nickel (Ni)) were (0.6, 0.42 and 0.38 ppm), respectively.

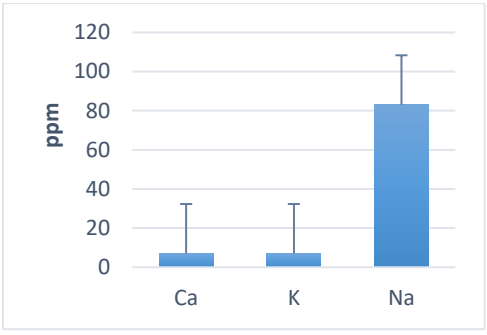

Figure: (4). Minerals (Ca, K, and Na) and content (ppm) in extracts Dodder plant studied.

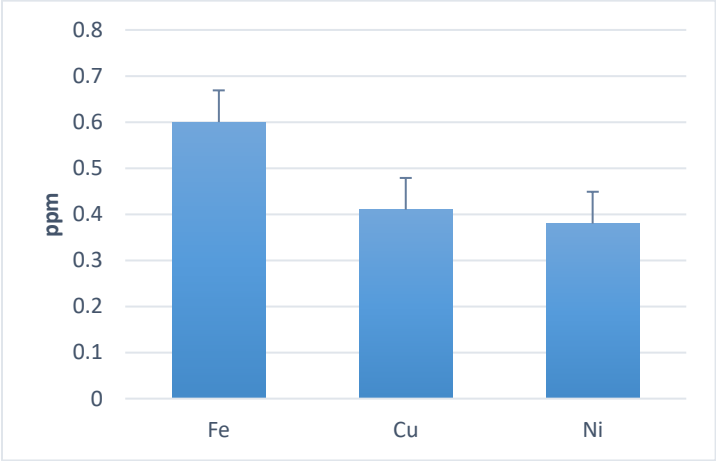

Figure: (5). Minerals (Fe, Cu, and Ni) and content (ppm) in extracts Dodder plant studied.

3.6. Total phenol and antioxidant contents:

Figures 6 shows the concentrations of total carbohydrate and Total protein content (ppm) in the studied plant. There is a significant content of anti-oxidant and total phenol compounds of values (1.22 and 0.90 ppm), respectively. The recorded concentrations of carbohydrate and protein contents were (1.32 and 0.18 ppm),
respectively.

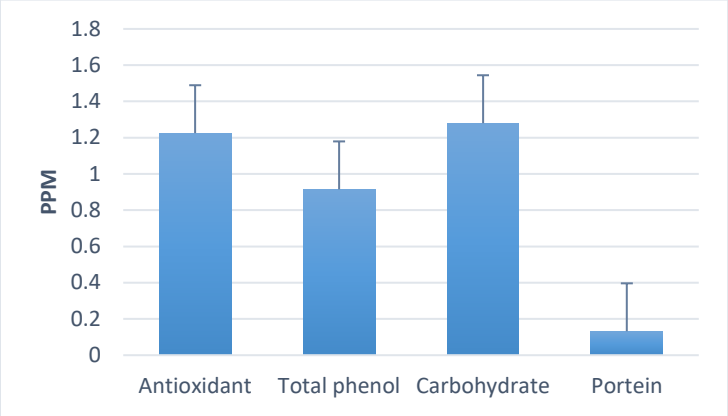

Figure: (6). Total carbohydrate and Total protein content (ppm) in the studied samples.

4. Discussion:

Using specific protocols, the 112 samples which collected in this study were obtained for this investigation from a variety of sources at locations where contamination is more likely. Where containing Pseudomonas is the most common, it also aligns with the findings of (Rishi et al. 2013).

In Libya, a study which carried out at Tripoli Central Hospital, recorded presence of Various bacterial isolates from general surgery departments and medical laboratories, where about 35%, Klebsiella Staphylococcus (8.9%) and Pseudomonas (29%). Were recorded in this investigation on Tripoli Central Hospital (Giacometti et al., 2000).

As per the results of this investigation, the element nickel exhibited antibacterial activity at a concentration of 100, as demonstrated by its effective activity measured by spectrophotometry, MIC, and the agar diffusion methods. The discovery was made that the enhanced antibacterial activity that permeates the bacterial cell and reaches the membrane surface is due to the properties of both the metal ion and the ligand surrounding it. The microbial cell and its internal milieu. The impact of this flow on bacterial metabolism is the destruction of the organelles. The findings of this study were agreement with the results recorded by (Haghshenas and Faraji, 2016). Which they were examined the MlC and UV spectroscopy methods for assayed the antibacterial activity of some bacteria using electron microscopy on E. coil and S. aurous.

In addition, some studies recorded that the Nickel (Ni) solutions showed antibacterial activity on some species of bacteria (Otuokere et al., 2018). For both Gram-positive and Gram-negative bacteria did nickel complexes effectively combat both. In this study the results of copper concentrations (Cu) on the isolated bacteria were agreement with those results which shown by (Santos et al., 2012) which they reported that the different Copper (Cu) showed a good effect on inhibition of bacterial growth.

Some studies reveled that effect of Meal solutions on the anti-bacterial activity is due to their great capacity to pierce bacterial membranes; copper is thought to possess the greatest bactericidal potential. The capacity to attain a very high killing effectiveness for bacteria that are in close contact for a brief length of time is what makes metallic copper or copper surfaces unique. This is because of the way that copper atoms are structured, particularly how quickly they can give or receive electrons, which is what makes copper an electrical conductor. unbound electrons throughout Microbes' activity can be suppressed by interactions with microbial proteins during contact, (Santos et al., 2012).

Another study reported that the ROS were produced rapidly, which damages DNA and the respiratory system, ultimately resulting in cell membrane damage (Li et al., 2016).

It was reported that the cell disruption occurs when there is a leakage of cellular components due to damage to the cell membrane. Copper destroys MRSA through DNA damage corroborate (Abraham and Florentine, 2021; Abraham et al., 2021). Their study declared that copper exposure renders many microorganisms nonviable. It is suggested that frequently touched surfaces in healthcare institutions be replaced with copper or copper pipes, either immediately or over a predetermined period. This will significantly reduce the spread of illness.

(Abdullah et al., 2016) stated that the dodder plant extracts showed direct effective on S. aureus at highest antibacterial activity at 100% concentration. The study conducted by demonstrated that the plant extract had a superior effect on S. aureus than amoxilin-containing drugs. Gram-positive bacteria responded well to it, but gram-negative bacteria were unaffected. (Sen, 2018), found that the dodder extracts were resistant to the Staphylococcus aurous, E. coli, Klebsiella and Pseudomonas species.

(Mishra and Chan, 2016) reported that the dodder plant has showed antibacterial efficacy against both Gram-positive Gram-negative bacteria of Staphylococcus aureus, Escherichia coli, Bacillus subtilis and Pseudomonas aeruginosa, the same results were recorded in this study.

Our results also agreement with A study which carried out by (Sonmez et al., 2019) where the Dodder plant extract was applied by used agar disk diffusion methods. They were selected bacteria species of Bacillus subtilis, Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa were the four bacteria examined, the results showed that the dodder plant extracts had sensitive and moderate antimicrobial activity against each of them. Due to its potential for application as a novel antibacterial agent.

These phytochemicals were found in noticeable amounts in Dodder and other fruit sections, according to a phytochemical study (Eldesoky et al., 2019).

Dodder is also a very rich source of phytochemicals that have demonstrated strong antioxidant properties. The health advantages of these phytochemicals have been emphasized in earlier research, and quantitative.

In this study also the iron (Fe) exhibited anti-bacterial activity, it was reported that iron compounds, whether in plasma or in different types of plasma clots, slightly or greatly increase the growth of bacteria, just as in genuine infection instances. Transferrin's iron saturation is well known (Gillon Ward et al., 1985).

The antibacterial effects of the pollutants are neutralized when they are accessible to bacteria. Revealed that iron has the ability to neutralize bactericidal effects. Early growth above 60% was seen upon microscopic analysis of plasma clots that had fast expansion by 90%. According to this, bacteria can more easily absorb iron for fast development at higher transferrin saturation levels (Paul Bullen et al., 1974).

It was reported that the velocity and iron uptake in vivo are intimately related. Pseudomonas growth is induced by bacterial infection, which also generates bacteria with enhanced iron use. It is now known that iron metabolism and bacterial pathogenicity are related (Sokol and Woods, 1984).

5. Conclusion

This study used crude dodder extract and certain element concentrations to demonstrate antibacterial efficacy against both Gram-positive and Gram-negative bacteria. This study demonstrates that nickel metal exhibits 100% concentration-dependent bactericidal and antibacterial action. Similarly, copper's capacity to penetrate bacterial membranes, which results in damage to DNA, cell membrane damage, and cell death, had an effective effect. Furthermore, the alcoholic dodder extract is thought to have no effect Pseudomonas, at high concentrations 100%, the extract has a greater impact on Gram-positive bacteria than on Gram-negative bacteria. All of the data used in this studyof it, has different contents.of phytochemical substances that, at varying, medium to low concentrations, contain phenols, alkaloids, amino acids, and minerals and have antioxidant, antibacterial, and anticancer effects.

6. Recommendation:

1. A hospital infection surveillance system must be introduced to reduce the rate of nosocomial infection among patients and to obtain better treatment options.
2. More investigation, study, and survey must be done among Libyan medical centers to identify pathogens cause hospital infection.
3. Health authority must consider the results and data of this study.

The plant extracts and mineral compounds used in this study as alternatives to antibiotics are less toxic, more effective, and less expensive than other metals such as silver. Furthermore, these extracts are free of adverse effects

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