



ANTIBACTERIAL EFFECT OF *MORINGA OLEIFERA* AND *SOLANUM NIGRUM* PLANT EXTRACTS ON SOME BACTERIA ISOLATED FROM DIFFERENT CLINICAL SPECIMENS

Suadad Taha Obeid*, Abbas A. Al-Dolaymi and Najm A. AL-Zubaidy

Department of Biology, College of Education for Pure Science, University of Diyala, Iraq.

Abstract

Alban (Moringa) is an important medicinal plant, so the effect of aqueous and alcoholic extracts (methanol and ethanol) of its leaves (*Moringa oleifera*) has been studied, as three types of isolated pathogenic bacteria were used by some of the patients in the martyr Ghazi Al-Hariri Teaching Hospital and the reviewers at the center The National Educational Laboratories, two of which are negative for gram stain (Gr-ve) are *Pseudomonas aeruginosa* and *Escherichia coli* and the other positive for gram stain (Gr + ve) *Staphylococcus aureus*.

Antibacterial activity was estimated according to the method of spread in pits. It was found that the alcoholic extract (methanol and ethanol) of Moringa leaves gave the highest rate of high concentration inhibition of 200 mg. l - for all types of bacteria that are Negative and Positive for the gram stain and it was found through the study that alcohol extracts can be used as drug substitutes instead of antibiotics after Conducting clinical studies in detail.

Key words: plant; clinical specimens; *Moringa oleifera*; Antibacterial effect.

Introduction

'Researchers' efforts have started to focus on caring for medicinal herbs as well as wild and cultivated plants and what has been known since ancient times as folk medicine as therapeutic alternatives, because these plants are free of industrial chemicals that cause many side effects that affect the patient's health (Al-Ali, 2007). Therefore, it has become imperative to search for medicinal plants that have effective anti-bacterial compounds by inhibiting the production of their biofilms, or by inhibiting their movement (O2 May, 2012; Hidalgo *et al.*, 2011). *Moringa oleifera* is one of the medicinal plants important therapeutically as It contains a variety of biologically active compounds such as alkaloids, phenols, tannins, saponins and vitamins (Yadav *et al.*, 2017). It also has antimicrobial properties. Refers (El-Sohaimy *et al.*, 2015) it is used in the treatment of malnutrition diseases, especially among pregnant women and infants. (Gopalakrishnan *et al.*, 2016). He explained that it reduces cholesterol in the blood, high blood pressure, protecting the body from heart and respiratory diseases, as well as reducing blood sugar. (Singh, 2017)

**Author for correspondence* : E-mail: suadadtaha2017@gmail.com

found that the water ethanol and methanol extracts of dairy branch leaves have a damaging effect on several types of bacterial strains, the most important of which are *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Escherichia coli*, so the current research aims to know the antibacterial effect of the extracts of dairy leaves in inhibiting the growth of some types Causing many diseases.

Materials and Methods

Study of plant

The leaves of the plant were purchased from the local market and after cleaning, washing with distilled water and drying them, they were air dried and after drying, they were ground with an electric mill to obtain a fine powder that was kept in sterile glass bottles until use. Then weigh 20 g of vegetable powder and dissolve in 200 ml of boiled distilled water and repeat the process for ethyl and methyl alcohol at a concentration of 70% and then put the mixture in the vibrating incubator for 24 hours, then filter the mixture first using a funnel containing a piece of gauze to remove the plant parts Bigger and second by using (Whatman No. 1) filter papers. Then the filtrate was placed in the centrifuge, for 10 minutes

at a speed of 3000 rpm, then the filtrate was concentrated by a rotary evaporator, Then the leachate was dried in the electric oven at 40°C to evaporate the water and alcohol completely, obtain a dry vegetable powder from the hot aqueous and alcoholic extract and put the extracts in sterile bottles and store in the refrigerator at 4°C until use (Parekh *et al.*, 2007; Rhajaoui *et al.*, 2001).

Selection of bacterial isolates

Two types of pathogenic bacteria were isolated from some of the patients at the martyr Ghazi Al-Hariri Teaching Hospital and the reviewers at the National Center for Educational Laboratories, two of which are negative for gram stain (Gr-ve) are *Pseudomonas aeruginosa* and *Escherichia coli* and the other positive for gram stain (Gr+ve) *Staphylococcus aureus*.

Measurement of antibacterial antibody effect of Moringa extract against growth of some pathogenic bacteria

Use the Muller- Hinton Agar culture medium, which was prohibited from dissolving 38 gm of it in a liter of distilled water, stirring, dissolving the materials by heating and sterilizing the catcher at 121°C and pressing 1.5 g for 20 minutes. Cool the solution, then pour it into sterile Petri dishes and leave to harden. Well Diffusion Assay method was used in digging. was took part of the bacterial trap and then spread it on the dishes containing Muller Hinton Agar medium by (Loop) and equally, the dishes were left for a short period to dry the bacteria and holes were made on the culture medium and added to it 0.1 ml of concentrations of extracts 50, 100 (Al-Aqili, 2002) and 200 mg. ML^{-1} it made three replications of each dish and then left Dishes for a period of (15) minutes until the medium dries up, after which the dishes were placed in the incubator for a period of (24) hours at a temperature of 37°C. Then, the diameter of the damping area for each extract was measured in mm by means of ruler and damping diameters were compared to both aqueous and alcoholic extracts With inhibiting diameters of the antibiotics used for the bacteria in question (Amikacin, Augmentin, Aztreonam, Ampicillin, (Ceftazidiume, Piperacillin, Gentamicin, Impinem Ciprofloxacin). Three randomized complete design (CRD) was used for three replicates and the mean was compared with the least significant difference test (L.S.D. Test) at 5% probability level. (SAS, 2012).

Results and Discussion

Results of a qualitative analysis of extract (Moringa)

Table 1 shows the results of the qualitative disclosures of the aqueous and alcoholic extracts of the leaves of the

Table 1: The results of a qualitative analysis of the aqueous and alcoholic extracts of the dairy branch.

Water extract	Ethanol extract	Methanol extract	Active material
-	+	+	Volatile oils
-	+	+	Resins
+	+	+	Tinnins
+	+	+	Glycosides
-	-	+	Alkaloids
+	-	-	Saponins
+	+	+	Phenols
+	+	+	Flavones
-	-	+	Carbohydrates
+	+	+	Steroids
+ Means the presence of the active ingredient for plant extract - It means that there is no active ingredient for plant extract			

dairy plant and it is clear from the table that the hot aqueous extract contains tannins, glycosides, alkaloids, soaps, phenols, flavones, carbohydrates and steroids, while the alcoholic extract contains the same substances mentioned above in addition to resins and volatile oils.

Results of the inhibitory effect of extract of leaves of dairy plant on pathological bacterial isolates

Table 2 indicates the results of measuring the growth inhibition region for the bacteria using the extract of the leaves of the dairy plant and it is clear from the table that there is a clear growth inhibition region against all types of bacteria, as it is clear that the extracts have different degrees of anti-bacterial efficacy in this study and this is because of the presence of compounds Phytochemical, as there was resistance and the reason for the inhibition of bacterial growth is due to the presence of phenolic compounds, glycosides and alkaloids, which have a high impact on inhibiting the growth of organisms Microscopy (Oladeji *et al.*, 2017) found in the leaves of the dairy branch (Moringa) and the results of the chapter showed the presence of a number of flavonoids and phenolic compounds that differ in peak sizes due to a difference in the quantity and proportions of each compound, as the Kaempferol compound was the most abundant as it reached 15.21% in all Samples analyzed These results

Table 2: Inhibitory effect of dairy branch extracts on pathogenic bacterial isolates.

Average inhibition diameters of aqueous and alcoholic extracts of dairy branch			Bacterial Species
Water extract	Ethanol extract	Methanol extract	
23.13	30.10	31.30	<i>P. aeruginosa</i>
24.13	30.36	32.23	<i>E. coli</i>
23.23	30.20	30.33	<i>S. aureus</i>

Table 3: Results of the inhibitory effect of antibiotics on bacterial isolates for the current study

Inhibition zone of antibiotics									Antibiotic
GM	AUG	ATM	CAZ	PRL	AMP	CIP	AK	IMP	
18	0	22	19	22	0	20	21	29	<i>P. aeruginosa</i>
16	10	18	17	0	0	27	29	25	<i>E. coli</i>
17	10	15	20	0	0	21	22	25	<i>S. aureus</i>

are consistent with the results of several studies that strongly suggest that a dairy plant may be an important source of natural antioxidants (Khalafalla et al., 2010; Mónica et al., 2015)

The effects of antibiotics on the growth of pathogenic bacteria

Table 3 indicates the measurement of the diameter of the inhibition region against the growth of pathogenic bacteria causing many diseases by using some antibiotics and it is clear from the table that there is a clear effectiveness against the growth of positive and negative bacteria in most of the drugs used where the highest growth inhibition was recorded against bacteria *P. aeruginosa* and *S. aureus* using Imipenem, while Amikacin scored the highest growth inhibition against *E. coli* bacteria. It is noted through the results of table 2 that the alcoholic extracts of the dairy plant were more efficient in inhibiting the growth of bacteria compared to the effect of the antibiotics used, which makes the possibility of using these extracts as drug alternatives.

Conclusions

The study showed that alcoholic extracts with both ethanol and methanol types possess a growth inhibition effect against pathogenic bacteria causing many diseases, especially at high concentration, which confirms the presence of efficacy.

Biology of these extracts against the growth of these bacteria through the diameter of the growth inhibition region that was measured, as it is concluded from this research that the extracts were of high efficiency compared to the effect of the antibiotics used, which makes the possibility of using these extracts as drug alternatives, after conducting detailed clinical studies on them And determine its pharmacological dose.

References

Al-Ali, Omar Muwaffaq (2007). Effect of hot aqueous and cold alcoholic extracts of fig (*Ficus carica domestica*) On some microorganisms isolated from wounds (*Punica granatum*), Master Thesis, College of Science, Al-Mustansiriya University.

- Al-Aqili, Adnan Hanoon Abbas (2002). Study the effect of acetic acid and some plant extracts on the growth of bacteria of burn injuries. Master Thesis, College of Science. Al-Mustansiriya University
- El-Sohaimy, S.A., G.M. Hamad, S.E. Mohamed, M.H. Amar and R.R. Al-Hind (2015). Biochemical and functional properties of *Moringa oleifera* leaves and their potential as a functional food. *Global Advanced Research Journal of Agricultural Science*, **4(4)**: 188-199.
- Gopalakrishnan, L., K. Doriya and D.S. Kumar (2016). *Moringa oleifera*: A review on nutritive importance and its medicinal application. *Food Science and Human Wellness*, **5**: 49-56.
- Hidalgo, G., M. Chan and N. Tufenkji (2011). Inhibition of *Escherichia coli* CFT073 *fliC* expression and motility by cranberry materials. *Appl. Environ. Microbiol.*, **77(19)**: 6852-6857.
- Khalafalla, M., H. Abdellatef and M. Dafalla (2010). Active principle from *Moringa oleifera* Lam leaves effective against two leukemias and a hepatocarcinoma," *African Journal of Biotechnology*, **9(49)**: 8467-8471.
- Mónica, A., Y. Verónica, T. Alfredo, G. Guadalupe, S. José, A. José and S. Erick (2015). Nutritional Content and Elemental and Phytochemical Analyses of *Moringa oleifera* Grown in Mexico, *Journal of Chemistry*, **5(2)**.
- O'May, C. Ciobanu, A., H. Lam and N. Tufenkji (2012). Tannin derived materials can block swarming motility and enhance biofilm formation in *Pseudomonas aeruginosa*. *Biofouling*, **28(10)**: 1063-1076.
- Oladeji, O., K. Taiwo, S. Gbadamosi, B. Oladeji and M.M. Ishola (2017). Studies on Chemical Constituents and Nutrients Bioavailability in *Moringa oleifera* Leaf and Seed. *J. Scientific Research and Reports*, **14(1)**: 1-12.
- Parekh, J. and S. Chanada (2007). *In vitro* antimicrobial activity and analysis of some Indian medicinal plant. *Turk. J. Bio.*, **13**: 53-58.
- Rhajaoui, M., H. Oumzil, M. Faid, M. Lyagoubi, M. Elyachioui and A. Benjouad (2001). Antibacterial activity of Moroccan propolis extracts, science letters, **3(3)**. (Research Article).
- SAS (2012). Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA.
- Singh, R. (2017). An Environment friendly natural-gift *Moringa oleifera*. *International Journal of Current Research and Academic Review*, **5(1)**: 27-33.
- Yadav, R., R.K. Khare and A. Singhal (2017). Qualitative phytochemical screening of some selected medicinal plants of Shivpuri district (M.P.). *Int. J. Life. Sci. Scienti. Res.*, **3(1)**: 844-847.