

Study of the effect of aqueous extracts of *Eucalyptus camaldulensis* in inhibiting the growth of bacteria isolated from Euphrates river water

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Abstract:

Background Eucalyptus is an evergreen tree that is often used for its therapeutic benefits. Although native to Australia, this popular tree now flourishes in many places of the world. It has lengthy stems and long oval leaves that are difficult to digest if eaten whole. However, eucalyptus leaves can be turned into a tea that is safe to drink. Additionally, the leaves can be turned into an essential oil for topical application or inhalation. **Methodology** Diffusion in the pits was employed to investigate the effect of plant extracts on the growth of the isolated bacteria. Inoculate Muller Hinton solid medium with bacterial suspension containing 1.5108 cells/ml (via sterile cotton swab). Borer corks were used to make small holes in the surface of the culture medium, and distilled water was used to ensure that it did not have an inhibiting impact on the growth of bacteria. The dishes were kept at room temperature for twenty minutes. Finally, three replicates of each isolate were cultured at 37°C for 24 hours. **Result** the effect of eucalyptus leaf extract on inhibiting the growth of bacteria isolated from the water of the Euphrates River. Coliform and Klebsiella bacteria were isolated from the water of the Euphrates River. Several concentrations of the water extract of the eucalyptus plant were used 30%, 60% and 90%, which gave a concentration of 90% of the extract. The plant water had the highest inhibition for both types of bacteria, where the area of the inhibitory region for coliform bacteria was 22 mm, while the area of the inhibitory region for Klebsiella bacteria was 24 mm.

Keywords: (aqueous extracts of *Eucalyptus camaldulensis* ,coliform bacteria).

دراسة تأثير المستخلصات المائية لأوكالبتوس *camaldulensis* في تثبيط نمو

البكتريا المعزولة من مياه نهر الفرات

شيرين ياسين بدوي

وزارة التربية والتعليم ، مديرية تربية الانبار

الملخص:

شجرة الكينا عبارة عن شجرة دائمة الخضرة تستخدم غالبًا لفوائدها العلاجية. على الرغم من أن هذه الشجرة الشهيرة موطنها أستراليا ، إلا أنها تزدهر الآن في العديد من الأماكن في العالم. لها سيقان طويلة وأوراق بيضاوية طويلة يصعب هضمها إذا تم تناولها كاملة. ومع ذلك ، يمكن تحويل أوراق الأوكالبتوس إلى شاي آمن للشرب. بالإضافة إلى ذلك ، يمكن تحويل الأوراق إلى زيت أساسي

للتطبيق الموضوعي أو الاستنشاق. تم استخدام طريقة الانتشار في الحفر للتحقق من تأثير المستخلصات النباتية على نمو البكتيريا المعزولة. تلقح وسط مولر هينتون الصلب بمعلق بكتيري يحتوي على ١.٥١٠٨ خلية / مل (عن طريق مسحة قطنية معقمة). تم استخدام الفلين الحفار لعمل ثقب صغيرة في سطح وسط الاستزراع ، وتم استخدام الماء المقطر للتأكد من أنه لم يكن له تأثير مثبت على نمو البكتيريا. تم حفظ الأطباق في درجة حرارة الغرفة لمدة عشرين دقيقة. أخيرًا ، تمت زراعة ثلاث مكررات من كل عزلة عند ٣٧ درجة مئوية لمدة ٢٤ ساعة. نتيجة تأثير مستخلص أوراق الكينا في تثبيط نمو البكتيريا المعزولة من مياه نهر الفرات. تم عزل بكتريا القولونية والكلبيسيلا من مياه نهر الفرات. تم استخدام تراكيز عديدة من المستخلص المائي لنبات الكافور ٣٠٪ و ٦٠٪ و ٩٠٪ مما أعطى تركيز ٩٠٪ من المستخلص. كان لماء النبات أعلى نسبة تثبيط لكلا النوعين من البكتيريا حيث كانت مساحة المنطقة المثبطة للبكتيريا القولونية ٢٢ مم ، بينما كانت مساحة المنطقة المثبطة لبكتريا كليبسيلا ٢٤ مم.

الكلمات المفتاحية: (المستخلصات المائية لأوكالبتوس *camaldulensis* ، بكتيريا القولون).

Introduction

From the Sumerian and Babylonian periods through the reign of King Ashurbanipal, folk medicine has been practiced in Iraq for millennia^(1,2) It's important to note that medicinal plants were not employed as we know them now, but rather as a form of magic medicine^(3,4,5) All but a few patients with respiratory infections were treated with plants since they contain beneficial chemicals, are medically safe and are easily accessible. Compared to antibiotics, they have no known side-effects^(6,7) The Eucalyptus *camaldulensis* plant is among these plants because of its role in the treatment of respiratory illnesses.^(8,9) Trees with lengthy, water-hungry roots are placed in The wet lands to be reclaimed, where they can dry out the ground and make it habitable again^(10,11) Excessive secretions associated with respiratory tract infections were treated with eucalyptus⁽¹²⁾ Otitis media was treated with eucalyptus, which has antimicrobial properties.⁽¹³⁾ It had a bactericidal effect on the growth of bacteria. Gram-positive and gram-negative microbes showed it to be efficient. The eucalyptus leaf extract, such as glutamious, has a greater effect on Gram-positive organisms. *Micrococcus*⁽¹⁴⁾ It was used to treat sinusitis by dabbing a tiny amount of diluted oil on the forehead as an anti-malarial and anti-bacterial agent. Eucalyptus leaves are used to make a tea for persons with sinusitis in Africa.⁽¹⁵⁾ In addition to using it as a dry powder and discovering its basic chemical compounds, the research aims to prepare the plant

extract of eucalyptus leaves by two methods of extraction: water and alcohol.

Methodology

collection of plant samples

Eucalyptus leaves were obtained from trees in Al Ramdi washed and dried. The plant was sent to the National Herbarium of the Plant Directorate of the Ministry of Agriculture in Abu Ghraib for the purpose of diagnosing its gender. It is of the genus Eucalyptus camaldulensis, belonging to the family Eucalyptus Myrtaceae Grind the plant with an electric grinder (Mortar) Keep the powder in clean plastic bags at room temperature until use⁽³⁾

Preparation of the plant extract

extraction processes were used to get the plant's juices: one used hot water,. Glycosides (tannins), tannins (phenols), saponins (resins), alkaloids (coumarins), flavonoids (alkaloids), and alkaloids (coumarins) were identified in the dry powder, aqueous and alcoholic extracts of the plant.

Study of the effect of plant extracts on bacteria inhibition

Diffusion in the pits was employed to investigate the effect of plant extracts on the growth of the isolated bacteria. Inoculate Muller Hinton solid medium with bacterial suspension containing 1.5108 cells/ml (via sterile cotton swab). Borer corks were used to make small holes in the surface of the culture medium, and distilled water was used to ensure that it did not have an inhibiting impact on the growth of bacteria. The dishes were kept at room temperature for twenty minutes. Finally, three replicates of each isolate were cultured at 37°C for 24 hours.

Result

Table 1 the effect of aqueous extracts of eucalyptus leaves in inhibiting the growth of coliform bacteria isolated from Euphrates river water

Dependent Variable: inhibition zone of bacteria

type of bacteria	concentration of aqueous extracts of eucalyptus		Std. Deviation
	Mean		

E coli	30%	11.33	.577
	60%	15.00	1.000
	90%	22.33	.577
	Total	16.22	4.893
klebsiella	30%	11.67	1.155
	60%	13.33	2.517
	90%	24.00	1.000
	Total	16.33	5.979
Total	30%	11.50	.837
	60%	14.17	1.941
	90%	23.17	1.169
	Total	16.28	5.300

Table 1 shows the effect of eucalyptus leaf extract on inhibiting the growth of bacteria isolated from the water of the Euphrates River. Coliform and Klebsiella bacteria were isolated from the water of the Euphrates River. Several concentrations of the water extract of the eucalyptus plant were used 30%, 60% and 90%, which gave a concentration of 90% of the extract. The plant water had the highest inhibition for both types of bacteria, where the area of the inhibitory region for coliform bacteria was 22 mm, while the area of the inhibitory region for Klebsiella bacteria was 24 mm. The eucalyptus plant contains phenolic compounds, which have an important role in inhibiting the growth of bacteria that inhibit the enzymes responsible for basic metabolic reactions by their unspecialized interference with proteins, which leads to protein denaturation and then the inability of bacteria to continue, while explaining) The effectiveness of this plant because it contains tannin, which is effective in inhibiting bacteria and viruses for its ability to stimulate phagocytic cells. The oil containing terpenes, which has an inhibitory effect on bacteria because it ruptures cell membranes

Table 2 ANOVA table of effect of aqueous extracts of eucalyptus leaves in inhibiting the growth of coliform bacteria

Dependent Variable: inhibition zone of bacteria

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	456.944^a	5	91.389	53.065	.000
Intercept	4769.389	1	4769.389	2769.323	.000
bacteria	.056	1	.056	.032	.860
concentration	448.444	2	224.222	130.194	.000
bacteria * concentration	8.444	2	4.222	2.452	.128
Error	20.667	12	1.722		
Total	5247.000	18			
Corrected Total	477.611	17			

a. R Squared = .957 (Adjusted R Squared = .939)

Table 2 shows the analysis of variance for the effect of the water extract of eucalyptus on inhibiting the growth of microorganisms, as it was noted that there were no significant differences for the type of bacteria on the effectiveness of the water extract in inhibiting growth, but there were significant differences for the concentration of the water extract of eucalyptus in inhibiting bacteria isolated from the water of the Euphrates River, and there were no There are significant differences for the interaction of bacteria type with concentrations as shown in Figure 1. Eucalyptus oil has anti-inflammatory properties, so its use may be effective in treating wounds and infections that affect the skin, and this type of oil can be used when the body is irritated by eczema by massaging the affected area with circular movements, and it is worth noting that it is recommended to reduce it by adding other types of oils before use

Table 3 Multiple Comparisons and LSD value

Dependent Variable: inhibition zone of bacteria

LSD

(I) concentration of aqueous extracts of eucalyptus	(J) concentration of aqueous extracts of eucalyptus	Mean Difference (I-J)	Std. Error	Sig.
30%	60%	-2.67 [*]	.758	.004
	90%	-11.67 [*]	.758	.000
60%	30%	2.67 [*]	.758	.004
	90%	-9.00 [*]	.758	.000
90%	30%	11.67 [*]	.758	.000
	60%	9.00 [*]	.758	.000

Based on observed means.

The error term is Mean Square(Error) = 1.722.

***. The mean difference is significant at the .05 level.**

Table 3 shows a comparison of the concentration of the aqueous extract of eucalyptus in inhibiting the growth of microorganisms and the values of the highest significant difference, where the concentration of 90% of the aqueous extract gave the least significant difference compared to the rest of the concentrations, and the concentration of 30% of the aqueous extract of eucalyptus gave the least significant difference compared to the concentration of 60% from the same extract.

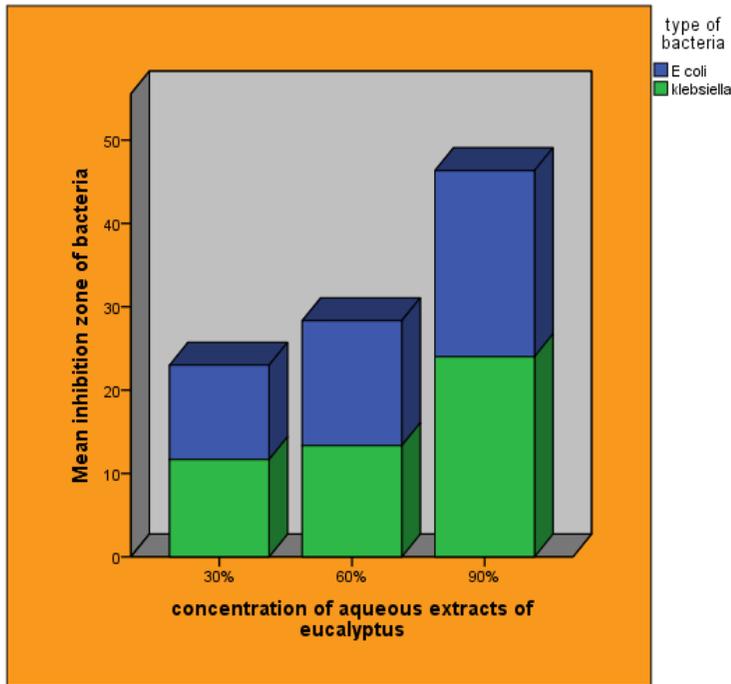


Figure 1 Effect of aqueous extracts of eucalyptus leaves in inhibiting the growth of coliform bacteria

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