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Antimicrobial Activity of Some Medicinal Plants against *Proteus mirabilis* in Baghdad province

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Abstract: *This study was conducted in laboratory of bacteria, Department of Biology, Al-Rasheed University College to investigate the effect of some medicinal plants (lemon, onion, garlic, tamarind, clove, pomegranate and ginger) against Proteus mirabilis. Treatments were replicated three times at factorial experiment in a completely randomized design (CRD).The result that the Tamarind extract at 60 % concentration gave the highest diameter of inhibition zone of 3.40 cm followed by Tamarind extract treatment at 100 % concentration as it was given 3.10 cm then followed lemon extract treatment at 100 % concentration which gave 2.70 cm , While the treatment with onion and ginger extract in all concentrations did not affect.*

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I. Introduction

Proteus mirabilis is an opportunistic pathogen, which can be found in natural environments, e.g. soil, water, and sewage, as well as in animal intestinal tracts. These bacteria cause many different types of diseases — most frequently urinary tract infections (UTIs), especially in patients with urinary catheters (CAUTIs) (Jacobsen et al., 2008). They form biofilm on a catheter surface, detected in 65–85% of CAUTIs cases (Muzzi-Bjornson &Macera, 2011). *P. mirabilis* synthesize a lot of virulence factors, e.g. urease. The activity of this enzyme leads to biofilm encrustation with apatite and struvite crystals, which could cause blockade of the catheter lumen and make infection persistent and difficult to treat (Stickler&Feneley, 2011). Encrusted biofilms are more resistant to antimicrobial agents, host defenses and environmental stress conditions.

Plant based antimicrobials represent a vast untapped source. The use of plant extract for medicinal treatment has become popular when people realized that the effective life span of antibiotic is limited and over prescription and misuse of traditional antibiotics are causing microbial resistance (Alam et al., 2009).Traditionally used medicinal plants produce a variety of compounds of known therapeutic properties (Harborne and Baxter,1995). In recent years, antimicrobial properties of medicinal plant s are being increasingly reported from different parts of the world (Saxena and Sharma, 1999).At present, nearly 30% or more of the modern pharmacological drugs are derived directly or indirectly from plants and their extracts dominate in homeopathic or ayurvedic medicines (Murugesan et al., 2011;Ahamunthunisa and Hopper, 2010).Considering the vast potentiality of plants as sources for antimicrobial drugs, this study aimed to detect the antibacterial activities of some natural plant extracts against *Proteus mirabilis*.

II. Materials And Methods

Collection of *Proteus mirabilis* isolates

Proteus mirabilis isolates were collected from Al Mahmoudiyah General Hospital, Baghdad, Iraq and aseptically transferred to the Laboratory of bacteria, Department of Biology, Al-Rasheed University College. All *Proteus mirabilis* isolates were collected during January 2017. After collection of all the isolates, were labeled, sub cultured and stored at -5 c^{o} for further use.

Preparation of plant extracts

A total of 7 plant extracts were used in this study to screen their antibacterial activity by disc diffusion method (Table 1). The fresh parts of plants such as fruits, bulb, flower, and rhizome were collected and washed several times with distilled water.

Treatments were replicated three times at factorial experiment in a completely randomized design (CRD).The obtained results were subjected to analysis of variance according to (Elsahookie and Wuhaib, 1990) using L.S.D 0.01 for comparing differences between various treatment means.

Table 1: List of plants used to evaluate antimicrobial activity:

N0	Local name	English Name	Botanical name	Parts of plant used
1	Lemon	Lemon	*Citrus limon*	Fruit
2	Busal	Onion	*Allium cepa*	Bulb
3	Thum	Garlic	*Allium sativum*	Bulb
4	Tamarind	Tamarind	*Tamarindus indica*	Fruit
5	Qurnfil	Clove	*Dianthus chinensis* L.	flower
6	Ruman	Pomegranate	*Punica granatum* L.	Fruit
7	Zangabeel	Ginger	*Zingiber officinale*	Rhizome

III. Results And Discussion

The result in table (2) showed the effects of concentrations of some plants extracts on the growth of (*Proteus mirabilis*), it has been found that the Tamarind extract at 60 % concentration gave the highest diameter of inhibition zone of 3.40 cm followed by Tamarind extract treatment at 100 % concentrations it was given 3.10 cm then followed lemon extract treatment at 100 % concentration which gave 2.70 cm , While the treatment with onion and ginger extract in all concentrations did not affect. This results back to the role of tamarind, where phytochemical constituents such as tannins, flavonoids, alkaloids and several other aromatic compounds are secondary metabolites of plants that serve as defense mechanisms against predation by many microorganisms, insects and herbivores (Marjorie, 1999). This may therefore explain the demonstration of antimicrobial activity by the fruit extracts of *Tamarindus indica* .These results are consistent with the results obtained by Doughari (2006) when studied antimicrobial activity of *Tamarindu sindica* ,And with the results obtained by Okeke et al (2015) when studied Antibacterial activity of *Citrus limon* fruit juice extract.

Table 2: Diameter (cm) of inhibition zone produced by various extracts of plants against *Proteus mirabilis* bacteria.

Plants use	concentrations					
	0	**20 %**	**40 %**	**60 %**	**80 %**	**100 %**
Lemon	-	-	1.00	2.20	2.10	2.70
Onion	-	-	-	-	-	-
Garlic	-	-	-	2.50	2.70	2.20
Tamarind	-	-	2.00	3.40	-	3.10
Clove	-	0.60	0.70	0.60	1.00	1.10
Pomegranate	-	0.50	0.40	1.20	0.40	1.15
Ginger	-	-	-	-	-	-
L.S.D 1%	Plants use		concentrations		Interaction	
	0.15		0.13		0.28	

-=No inhibition

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