

MIC of Some Plant Extracts against *E. Coli* Isolated from UTI

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ABSTRACT

The aquatic extracts of *Citrullus colocynthis* and *Punica granatum* peel were used against bacteria isolated from urinary tract infections, and bacterial samples were taken from people suffering from (UTI) randomly without specifying the gender and age, then the samples were cultivated in MacConkey agar medium and incubated for 24h at 37°C, the *E. coli* diagnosed by Api 20E system, where most of the cases were caused by *E. coli*, and the minimum inhibitor concentrations (MIC) were determined for plant extracts showing that the minimum inhibitor concentration of *Citrullus colocynthis* extract is less than the *Punica granatum* extract which ranges between (0.01-0.1mg/ml) and (0.1-1mg/ml) Respectively. This means that the antimicrobial activity of bitter melon extract was stronger than pomegranate peel extract against *E. coli*

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INTRODUCTION

urinary tract infection :- infection affects parts of urinary system.^[1] When upper part of the urinary system infected known as a kidney infection (pyelonephritis) Its symptoms will be fever and flank pain a lower UTI and .^[2] But Rarely bloody urine appear .^[3] and when the lower part of the urinary system infected that is called bladder infection (cystitis).^[2] with Symptoms include frequent urination, pain during urination , and an empty bladder feeling the need to urinate despite having.^[1] More cause of urinary tract infection is *Escherichia coli* than other Microbes .^[2] In women they are more common than men.^{[4][19]}

Escherichia coli : is a gram-negative bacterium, Bacilli, found in the lower intestine in warm-blooded. More strains are nonpathogenic , While pathogenic types cause meningitis, septic shock and UTI in humans ^[5] In addition It causes infections of the urinary system and appendicitis^[6]. The pathogenic strains produced toxins From which the infection occurs , In order to destroy the host cell.^[7]

in 1885 German bacteriologist and paediatrician Theodor Escherich discovered *E. coli* ,^[8] it is classified with family Enterobacteriaceae .^[9]

Citrullus colocynthis: it is a viny desert plant that grows in dry soils. It is native to the Asia and Mediterranean Basin, It is distributed among the eastward through

the Sahara, the west coast of northern Africa , Egypt until India and Sea of Caspian. It is cultivated on a small scale on the island of Cyprus. Since the 14th century it has been an income source and is still exported today. And it is great survival rate under extreme conditions.^{[10][11]}

Punica granatum: Return to the family Lythraceae, subfamily Punicoideae, That grow to a height between 5 and 10 m (16 and 33 ft) ^[12] It is originated in extending region from northern India to Iran , it has been cultivated since ancient times in the region of Mediterranean . In the late 16th century It was introduced into Spanish America and in 1769 into California by Spanish settlers .^[13]

Season of the fruit is in the Northern Hemisphere from September to February,^[14] While from March to May in the Southern Hemisphere . Pomegranates are used in juice, baking , cooking, , smoothies, alcohol such as wine and cocktails^[14].

MATERIALS AND METHODS

sampling

Bacterial samples were taken from people suffering from urinary tract infections randomly without specifying the sex and age. Then cultivated in MacConkey agar medium and incubated for 24h at 37°C, the *E. coli* diagnosed by Api 20E system figure (1).

Figure 1: Api 20E system for *E. coli*



Collection of plant samples

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Pomegranate and bitter melon fruits were collected and washed with distilled water to remove the suspended soil. Pomegranate peels were removed, then the samples were dried at room temperature, and the dried samples were ground by an electric mill after removing the seeds from the bitter melon and kept in tight plastic bags to avoid contamination and moisture until use.

Prepare plant extracts

In this study, the aqueous extract method was used. 40g of the powder were mixed with 160 ml distilled water, and placed mixture in the refrigerator for 24 hours for the purpose of marinating. Then it was filtered by a microfiltration unit to prevent the passage of germs and unmeshed vegetable parts and put it in oven at 40 C° until the entire water evaporates to obtain a powder. Storage solution was prepared by taking (1g) of extracted powder and dissolving with distilled water then completing volume to 10ml to get a concentration of 100 (mg / ml).

.. MIC measurement of the extract

Ten tubes were prepared, each containing 9 ml of nutrient broth medium and numbered from 1-10, where 1 ml of the storage solution was transferred and placed in tube number one and shake well to get a concentration of 10 (mg/ml) and transfer 1ml From the first tube To the

second tube and repeat the same process down to Tube 10 to get decimal dilution in each tube. 0.1mL of pre-prepared Bacterial suspension was transferred to each tube and shake the tubes very closely for homogenization of the bacteria and then incubated at 37C° for 24 hours, as well as the tubes that did not show growth or turbidity considered to the MIC which the tube before it has growth.

RESULTS

In this study, the aqueous method was used to extract, study showed the effectiveness of the extract's effect for pomegranate and bitter melon, as it showed that the minimum inhibitor concentrations (MIC) of bitter melon were less than pomegranate, and this means that bitter melon extract is more effective against *E. coli* compared to the effect of pomegranate extract as shown in Table (1). Where the minimum inhibitor concentrations (MIC) of pomegranate peel extract ranged between (0.1-1mg / ml) but (0.01- 0.1 mg/ml) for the bitter melon extract, this means that the active substances present in the bitter melon plant extract are more effective against the *E. coli* compared to the active substances in Pomegranate peel extract, but a little difference.

Table 1: Minimum inhibitor concentrations (MIC) values for plant extracts used against *E. coli*

NO	<i>E. coli</i> samples	(MIC) of <i>Citrullus colocynthis</i>	(MIC) of <i>Punica granatum</i>
1	S1	0.01(mg/ml)	0.1(mg/ml)
2	S2	0.01 (mg/ml)	0.1(mg/ml)
3	S3	0.1 (mg/ml)	1(mg/ml)
4	S4	0.01 (mg/ml)	0.1(mg/ml)
5	S5	0.1 (mg/ml)	0.1 (mg/ml)
6	S6	0.01 (mg/ml)	1(mg/ml)
7	S7	0.1 (mg/ml)	1(mg/ml)
8	S8	0.1 (mg/ml)	0.1(mg/ml)
9	S9	0.01 (mg/ml)	0.1(mg/ml)
10	S10	0.01 (mg/ml)	0.1(mg/ml)
11	S11	0.1 (mg/ml)	1(mg/ml)
12	S12	0.1 (mg/ml)	1(mg/ml)

DISCUSSION

Resistance to antibiotics in pathogenic microbes is a global problem [15]. Infections caused by commercial antibiotic resistance isolates have increased greatly during the last decades in hospitals [16]. Spread Resistance organisms are often difficult to control [16]. Where the results of the study showed a high effectiveness of the extract of bitter melon and pomegranate peels against *E.coli* whereas Pomegranate peel (*Punica granatum*) is rich in compounds with biological properties therefore it has a traditional history of use in medicine [17]. And bitter melon in the past it was used in alternative medicine as an antidiabetic, purgative, insecticide, rheumatism, snakebite and anti-tumor [18].

CONCLUSION

Current study concluded the effectiveness of aqueous extracts of *Citrullus colocynthis* and *Punica granatum* peels against *E. coli* bacteria and that the minimum inhibitor concentrations (MIC) of bitter melon extract were less than pomegranate peel extract and this means that bitter melon extract is more effective against these

bacteria compared to the pomegranate peel extract as shown in Table (1).

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