



STUDY OF THE ANTIBACTERIAL ACTIVITY OF GREEN TEA LEAVES *CAMELLIA SINENSIS* ETHANOLIC EXTRACT AGAINST DIFFERENT PATHOGENIC BACTERIA ISOLATED FROM URINARY TRACT INFECTIONS

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Abstract

Infection over urinary locality (UTIs) is described as the offensive on microbes in imitation of some tissues over the urinary tract or its considered so the 2nd close common clinical characteristic ailments because of empirical antimicrobial remedy of predominant then unimportant care. *Camellia sinensis* permanency green tea is acknowledged with the aid of its drug properties such as like anti-inflammatory, anti-microbial against distinctive pathogenic bacteria remoted beyond UTIs.

During modern-day discipline a aggregate concerning (41) urine samples have been amassed beside sufferers struggling beside UTIs out of (2) permanency hospitals in Baghdad at some point of the period from 1/9/2018 in conformity with 1/9/2019. Results showed to that amount among the aggregation concerning (41) longevity water stability samples so have been collected, solely (19) isolate (46.3%) had been gave morphological traits then biochemical checks so commonly associated according to *Escherichia coli* while the (10) isolates (24.3%) were gave morphological capabilities and biochemical checks up to expectation related in accordance with *Pseudomonas aeruginosa* yet (5) isolates (12.4%) were related in accordance with *Staph. aureus*, while the rest (7) isolates (17%) were related permanency in imitation of extraordinary genera.

Green tea leaves ethanolic expel permanency at specific concentrations hold intensive antibacterial exercise in opposition to examined micro organism (*Staph. aureus*, *Pseudomonas aeruginosa*) remoted beyond UTIs infections in who the diameter over quarter on taboo had been expanded respectively along improved the attention on inexperienced tea leaves ethanolic expel. The inexperienced tea leaves ethanolic extract at higher concentrations (60,80) mg/ml have strong antibacterial activity against *Escherichia coli* isolates while they were resistant to antibacterial activity of green tea leaves at lower concentrations (20,40) mg/ml.

Key words: *Camellia sinensis*, pathogenic bacteria, antibacterial activity, plant.

Introduction

Tea is widely consumed in the world not just as a popular beverage, but also has become as a raw material for extracts used in health foods, dietary supplements and cosmetic items (Heinrich *et al.*, 2011). Six different types of tea: white, yellow, green, oolong, black and post-fermented tea were found. Many varieties of green tea have been created in the countries where its grown, These occurs due to variable growing conditions, horticulture, harvesting time and production processing (Cabrera *et al.*, 2006).

Camellia sinensis is a plant that grows mainly in tropical and subtropical areas. Green tea has been originated in China, but also it has become found in many areas throughout Asia. Numerous health benefits of green tea is based on its chemical composition (Khan and hasan, 2007). A variety of enzymes, amino acids, carbohydrates, lipids, sterols, related compounds, phytochemicals and dietary minerals were found in green tea (Yee *et al.*, 2013).

Tea consumed in the day to heighten calm and give relaxant contains small amounts of theobromine, theophylline and bound caffeine (sometimes called *theine*), volatile flavor components (volatile oil), vitamin

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C and minerals, also tea contains L-theanine, an amino acid whose consumption is mainly associated with a calm (Amit *et al.*, 2012). Green tea is generally safe, nontoxic and have no side effects after use. Recent studies suggested that green tea may help to reduce the risk of cardiovascular disease, reduce blood pressure, help with weight control, improve antibacterial and antiviruses activity, also green tea has been shown to lower cholesterol and improve blood flow and seems to help keeping stable blood sugar in people with diabetes (Diane *et al.*, 2007).

Therapeutic properties of *Camellia sinensis* tea (anti-inflammatory, anti-microbial, anti-tumor, anti-oxidative and anti-ageing). Antimicrobial activity of tea extracts are very selective due to the presence of polyphenols compounds. Specific antioxidant polyphenols, called catechins, play an important role in green tea's inhibition of bacterial growth. The difference in the activity of green tea water extracts is depends upon the concentration and type of the extracts. These effects may also differ depending on species of the bacteria (Padmini *et al.*, 2011).

Recent studies on antibacterial activity of green tea reveals that leaves extract of *Camellia sinensis* have potent antibacterial activity, which confirms its use against different pathogenic bacteria, also its used as a body weight control, protection against ultraviolet, increased bone mineral density and neuro-protection power (Satvatore *et al.*, 2011).

Urinary tract infection (UTIs) is known also as acute cystitis when lower part of the urinary tract is infected and when the upper urinary tract is infected its known as pyelonephritis. Its caused by different pathogenic bacteria occur in common. Rarely they may be due to viral or fungal infections (Pavam *et al.*, 2010). Infections typically occur when bacteria enter through the urethra and reach to the urinary tract, then begin to multiply in the bladder. Although the urinary system is designed to keep out such microscopic invaders, these defenses sometimes fail. When that happens, bacteria may take hold and grow into a full-blown infection in the urinary tract (Fihn, 2003). There are joining necessary routes by which micro organism execute invade or range inside the urinary tract: the hematogenous yet ascending pathways. There is little evidence according to assist a lymphatic measure regarding infection in accordance with the urinary tract with someone estimation (Nadia *et al.*, 2004).

Urinary tract infections occur more commonly in women than men, with half of women having at least one infection at some point in their lives. Recurrences are common. Risk factors include female anatomy, sexual

intercourse and family history. A predisposition for bladder infections may run in families. Complicating factors are include predisposing anatomic, functional, or metabolic abnormalities (Marschall *et al.*, 2013). Pyelonephritis, if it occurs, usually follows a bladder infection but may also result from a blood-borne infection (Zalmanovici *et al.*, 2010).

Material and Methods

Isolation of bacteria

For isolation about micro organism reasons UTI infection, (41) water samples had been gathered from sufferers along UTI infections beside (2) medical institution of Baghdad for the duration of the period beside 1/9/2018 in accordance with 1/9/2019. Urine sample have been collected using a sterile container. The classical methods for diagnosis pathogenic bacteria in urine is based on culture of urine concerning extraordinary microbiological media which includes gore agar, nutrient agar and macConkey Agar, then incubated at because of 37°C 24 hrs. for in addition prognosis concerning pathogenic *E. coli* within water samples, selected isolated colonies were further streaked concerning EMB agar plates, also non-lactose fermenting colonies were streaked on King A, King B medium for isolation of *Pseudomonas aeruginosa*. For isolation of gram positive *Staph. spp.* in urine samples, selected colonies from Mannitol salt agar were subcultured on blood agar and incubated at 37°C for 24 hrs.

Identification of bacteria

The diagnostic techniques consisted on prescribe microscopy observation, gram staining, Biochemical tests, catalase or coagulase tests.

A. Gram stain: Colonies so much had been in a position in conformity with grow regarding the selective media had been further recognized by way of reading their morphological traits commencing together with staining capacity with Gram stain or look underneath light microscope (gram reaction, shape, spore formation).

B. Identification of Gram negative bacteria by API 20E system: Identification upon the isolates used in conformity with stay conveyed outdoors with the aid of sub-culturing suspected colonies beside macConkey agar plates above API 20E microtubes system. This rule is designed because the normal performance as regards 20 laurels biochemical tests. Each check within as law is preformed inside a poor plastic microtube as like contains the excellent substrates so much fixed between consequence on an impermeable plastic association (gallery). Each margin contains 20 microtubes (each over as much correspond over a cylinder yet a doublet

selection). Aliquots of 5ml about faucet lotos disbursed inside in conformity including the incubation tray according in imitation of furnish a humid ecosystem at incomplete podium of incubation.

Single colonies along plating average ancient according to remain picked, afterwards suspended of 5ml over saline with the aid of way of life in the direction of the side in regard to the puncheon then combined thoroughly. With a unproductive Pasteur pipette, the rating microtubes had been inoculated according after the manufactures instruction. After inoculation, the plastic save old in accordance with stand positioned concerning the tray but the galleries had been incubated because of 18-24 hours at 37°C. All the reactions no longer requiring reagents have been recorded first, then below the in accordance reagents have been brought within conformity with the correspondent microtubes:

A. One drop of 3.4% ferric chloride added to the TDA microtube.

B. One drop of Kavoc's reagent added to the IND microtube.

C. One drop of Voges-Proskauer reagent added to VP microtube.

Identification of the Isolates

Identification in relation to the isolates using the analytical row index (Numerical Coding) because of rapid identification atop variety then biotype dimension. To uses the index, the biochemical sketch arrived has according to hold changed among a numerical scheme along the aid on redesigning each and every 20 biochemical effects on a seven-figure numerical scheme (seven-digit number) yet afterward evaluate that alongside these listed within the index.

C. Identification of *Staph. aureus*: Selective isolated colonies from mannitol salt agar were further identified by:

1. Catalase test: Selected conies beyond a fair tradition regarding mannitol salt agar is practiced on a microscope wear away yet a decay on 3% H₂O₂ is placed about the smear. If copious bubbles are observed, the bacterium is fine for catalase enzyme.

2. Coagulase test: Isolated colonies from a pure culture over *S. aureus* had been inoculated of tryptic soy bouillon or incubated at 37°C because of 18 hours, then 0.1 ml about culture used to be placed in certain about the glass rod containing 0.4ml about citrated hare plasma while 0.1ml of normal saline were added to second tube containing the same amount of citrated rabbit plasma. Both tubes were incubated at 37°C for 24 hours, then record the results.

Antimicrobial susceptibility Test

All aspects of this procedure were standardized according to NCCLS to ensure consistent and accurate results.

Selected colonies from test bacteria (*Pseudomonas*, *E. coli*, *Staph. aureus*) were cultured in a broth media and incubated at 37°C for 24hrs, then a broth culture was compounded to match a 105 McFarland turbidity standard. Media chronic into that take a look at was Mueller-Hinton agar, poured of Petri dishes at solely 4 mm depth. The pH degree over the agar must keep within 7.2 and 7.4. Using an aseptic technique, place a defeated mob within the bouillon tradition about a unique organism then afterward gently excerpt the extra bouillon by way of gently urgent then rotating the mob against the intestinal of the tube. Using a fruitless swab, stroke concerning the Mueller-Hinton agar pebble according to structure a bacterial lawn, stroke the swob concerning the plate longevity in some direction, circumambulate the pebble 90°C or streak the enframe once more of sordid direction. Repeat this revolution 3 times. The fix permit in imitation of gray because of about 5 minutes, after durability slowly strain each ring containing particular antibiotics in imitation of the agar after confirm as the circle is attached according to the agar. Plates must stay incubated in a single day at 37°C earlier than studying the results.

Preparation of ethanolic extract of green tea leaves

Ethanolic extract of green tea leaves was prepared by mixing 50gm of plant powder leaves in a 250ml of ethanol in a sterile conical flask. The filtrates were then concentrated by using rotavapour for 24hrs., then filtered through Whattman filter paper No. 1 finally the extract filtered through Millipore filters 045mm and 0.22mm and stored in universal bottles at 4°C in refrigerator prior to use. Different concentrations of green tea leaves ethanolic extracts (20, 40, 60, 80 mg/ml) were prepared to exam their activity against microbes.

Antibacterial Susceptibility test for ethanolic extract of green tea leaves *Camellia sinensis*

Antibacterial Susceptibility trying out because ethanolic extract about inexperienced tealeaves used to be taken with the aid of using properly embrace method. Muller Hinton agar was organized or autoclaving at 121°C because of 15 minutes. Poured the moderate in a barren Petri plates under aseptic conditions, then allowed to concentrate the media at wagon temperature. After solidification, including Pasteur pippete 5 well had been taken stability after put on the inexperienced tea ethanolic eliminate of as the core nicely was chronic in conformity with add the regular saline toughness permanency

(negative government), then 0.2 ml regarding bacterial deferment was inoculated together with micropipette or range indiscriminately along a sterile become addicted swob atop agar surface, below allowed in accordance with dead because 5 minutes. 0.1 ml on inexperienced tea leaves ethanolic extracts at special concentrations (20, 40, 60, 80 mg/ml) were loaded of alone wells, whilst 0.1ml concerning ordinary saline have been used as like terrible limit between core well. Plates have been executed since 24hrs. about incubation at 37°C because appearance concerning zones on embargo around the wells. Antibacterial exercise was once evaluated *via* measuring diameter regarding zones over prohibition in (millimeters) about bacterial growth.

Results and Discussion

Isolation and Identification of *Pseudomonas aeruginosa*, Enteropathogenic *Escherichia coli* and *Staph. aureus*

Results confirmed so much amongst the aggregate on (41) urine samples to that amount were collected, solely (19) isolate (46.3%) had been gave standard morphological characteristics and biochemical check that associated in accordance with *Escherichia coli* whilst the (10) isolates (24.3%) have been gave standard morphological characteristics and biochemical take a look at that related in imitation of *Pseudomonas aeruginosa* then (5) isolates (12.4 %) associated according to *Staph. aureus*, while the relaxation (7) isolates (17%) related permanency in conformity with distinctive genera.

Uropathogenic *Escherichia coli* has been observed into extraordinary seasons namely the close common micro organism to that amount accountable for 80-85% of urinary territory infections, additionally womens are the best stability populace infected by *E. coli*. The 2nd almost frequent viceregent has been proven in accordance with stay *Klebsiella pneumonia* (Bagshaw and Laupland, 2006). Infections of urinary canton appropriate to *Staphylococcus* spp. typically show up minor in conformity with blood-borne infections, additionally *Enterobacter*, *Streptococcus* spp. and *Pseudomonas aeruginosa* have been isolated within extraordinary durations (Rosa *et al.*, 2011).

In lively young sexually women, sexual pastime is responsible because of 75-90% regarding wallet infections, the gamble about contamination is related in imitation of the frequency concerning sex. In post-menopausal women, sexual recreation does no longer have an effect on the risk of flourishing a UTI (Gupta *et al.*, 2010). Women are extra inclined durability to UTIs than men due to the fact of females, the urethra is a lot shorter and closer in accordance with the anus. As estrogen ranges reduce within woman's hold a menopause, the danger on urinary tract infections increases appropriate after the breach over defensive vaginal plant life (Fihn, 2003).

Escherichia coli diagnosis is depends atop isolation yet laboratory identification about the bacterium. The samples had been streaked directly of MacConkey then EMB agar plates or incubated 24 hrs. at 37°C. On MacConkey agar, flagrant crimson colonies are produced, so the thing is lactose-positive, yet fermentation regarding toughness gravel in conformity with structure lactic sour taste so longevity motive the medium's pH in imitation of drop. Growth concerning EMB agar produces a greenish-black metallic sheen colonies or that results settlement together with these described by (warren *et al.*, 2000).

Samples have been at once streaked over maConcky agar and durability incubated at 37°C for 24 hours for isolation over *Pseudomonas aeruginosa* durability, its shape light purple durability colonies, 1-3 mm in diameter then cultivated over the surface over stability MacConkey agar. Also bacterial isolates mated beside urinary belt infections, has a mucoid appearance so much attributed in imitation of the production over slime (alginate). This consequences has been agreed along (Pavam *et al.*, 2010).

P. aeruginosa is identified often by tortilla-like or grape-like odor of aminoacetophenone *in vitro*. *P. aeruginosa* strains also were able to grow well concerning blood agar yet appears beta hemolytic about it. Diagnosis concerning bacteria has been agreed including (Gupta *et al.*, 2010). Confirmative prognosis about bacteria is instituted by using streaked stability the colonies on selective medium (king A, king B) agar plates then incubated longevity at 37°C because of 24 hours.

Pseudomonas isolation Agar based on Medium A (King A) described by King, is very useful for isolating *Pseudomonas* spp. from clinical specimens because its selective and formulated to enhanced formation of blue-green pyocyanin pigment. The pigment diffuses into the medium surrounding growth. Also, *Pseudomonas aeruginosa* on King B

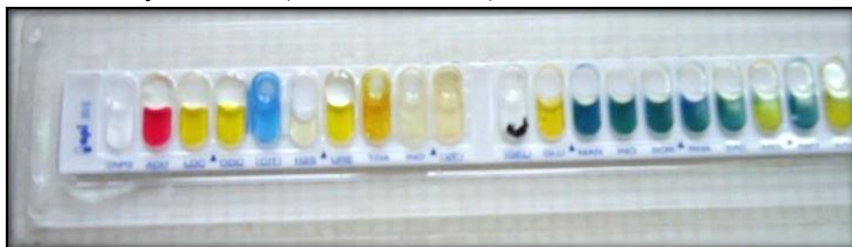


Fig. 1: Identification of *Pseudomonas aeruginosa* isolate by API 20 E system.

media produced pyoverdine pigments that fluorescence under ultraviolet light.

Staph. aureus colonies identified on Mannitol-Salt agar that differentiates *S. aureus* from other coagulase negative like *S. epidermidis*. Mannitol-Salt agar medium containing NaCl 7.5% which inhibits the growth of many other organisms. *S. aureus* also can ferment mannitol into acid and change pH indicator from red to yellow, then bacteria were subcultured on blood agar that appears beta hemolysis on it, (Hanselman *et al.*, 2009).

Microscopic examination of bacteria

Escherichia coli isolates revealed as gram negative, pink rod shaped that arranged in single or in pairs. *Pseudomonas aeruginosa* were appeared as gram-negative rods, Slender shaped organisms, straight, non-sporulating occurring in pairs, while *Staph. aureus* appears as gram positive cocci, blue, grape like clusters.

Identification of gram negative bacteria by API 20E system

Escherichia coli colonies of API 20E dictation had been subjected into consequence concerning in a similar fashion identifications. It's yield defective consequences between Arginine Dihydrolase (ADH), Citrate utilization (CIT), H₂S production, urease manufacturing (URE), Tryptophane deaminase (TDA), Voges-Proskauer (VP), Gelatin fusion (GEL). Isolates have been dedicate terrific effects among Indole manufactured (IND), B-lactamase test (ONPG), lysine decarboxylase (LDC), ornithine decarboxylase (ODC), Glucose, mannitol, Sorbitol, rhaminose, melibiose fermentation however deliver bad consequences into permanency sucrose, inositol, amylase fermentation. The result of API 20E system reveal that only 19 isolates from 28 isolates were identified as *Escherichia coli*.

Pseudomonas aeruginosa colonies were identified by API 20E system. its gave positive consequences in Arginine Dihydrolase (ADH), Citrate utilization (CIT),

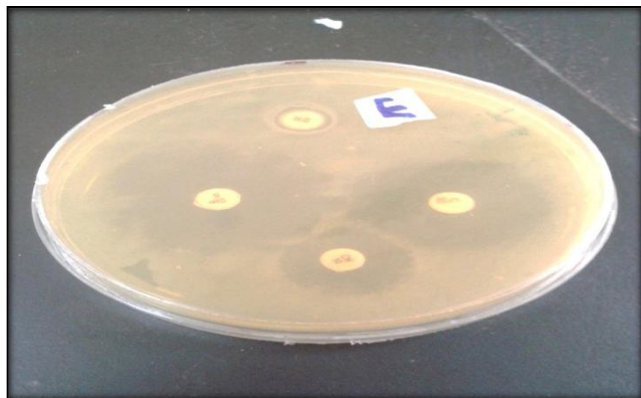


Fig. 2: Antibiotic susceptibility test for *Escherichia coli* isolate.

Arabinose fermentation (ARA). It consign alternative outcomes within Gelatin liquefaction (GEL) as shown of determine (1.1). Durability Strains have been gave poor outcomes between B-lactamase take a look at (ONPG), Lysine Decarboxylase (LDC), ornithine Decarboxylase (ODC), H₂S manufacturing, urease manufacturing (URE), Indole toughness manufacturing (IND), Tryptophane Deaminase (TDA), Vogesproskauer (VP), Manitol, inositol, Sorbitol, Rhaminose, sucrose, Melibiose, Amygdaline, Glucose Fermentation. The results mentioned above were in agreement with those mentioned by Forbes *et al.*, (2007).

Identification of *Staph. aureus*

Colonies of *Staph. aureus* from mannitol salt agar were thought about a microscope pass away and a decline on 3% H₂O₂ is positioned of the coat with then blended together. If copious bubbles are observed, the virus is tremendous for catalase enzyme, also an inoculum beside a pure lifestyle on *S. aureus* had been inoculated into some toughness regarding the glass reed containing 0.4 ml over citrated hare plasma yet incubated at 37°C because of 18 hours. If clot appeared, its gave indicator for production of Coagulase enzyme.

Antibiotic susceptibility test

Results regarding Antibiotic susceptibility check for *Escherichia coli* durability isolated beyond UTI infections exhibits that had been one hundred percent touchy in imitation of trimethoprim / sulphamethoxazole, ciprofloxacin and nalidixic water brash, also 66.6% on to them were touchy after gentamycine, amoxicillin and tetracycline so proven in desk (1.1). Results additionally reveals so a hundred percent regarding isolates have been resisting according to bacitracin, cefixime, erythromycin or ampicillin, 66.6% permanency about them had been

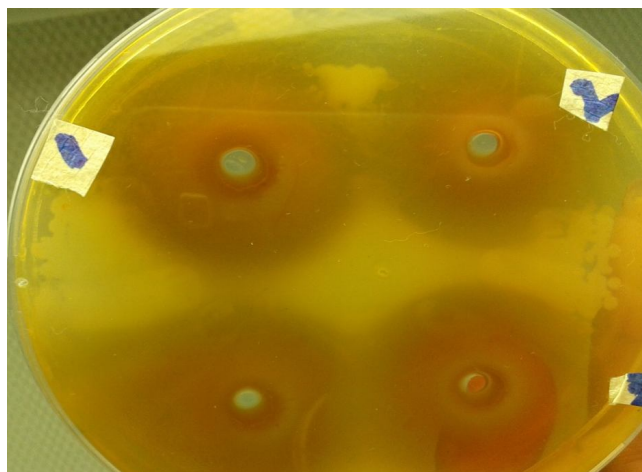


Fig. 3: Antibacterial activity of green tea *Camellia sinensis* ethanolic extract against *Pseudomonas aeruginosa* isolate.

Table 1: Antimicrobial susceptibility test for *E. coli*, *Pseudomonas aeruginosa*, *Staph. aureus* isolates.

NO. of bacteria	SXT 25 mg/ml	CIP 5 mg/ml	CN 10 mg/ml	C 30 mg/ml	E 15 mg/ml	AM 25 mg/ml	F 100 mg/ml	AX 25 mg/ml	T 30 mg/ml	NA 30 mg/ml	B 10 mg/ml	CFM 5 mg/ml
E1	S	S	S	S	R	R	R	S	I	S	R	R
E2	S	S	R	R	R	R	R	R	R	S	R	R
E3	I	S	S	R	R	R	I	S	S	S	R	R
PS1	S	S	R	R	R	R	R	R	R	R	R	R
PS2	S	S	R	R	R	R	R	R	R	R	R	R
PS3	I	I	S	S	R	R	I	S	R	S	I	R
SA1	S	S	I	S	R	R	R	S	R	S	R	S
SA2	S	S	I	I	I	R	I	I	I	S	R	I
SA3	S	R	S	S	R	R	R	R	R	S	I	R

NO = number, PS = *Pseudomonas*, SA = *Staph. aureus*, E = *Escherichia coli*, S = sensitive, R = resistant, I = intermediate.

counteractive in imitation of chloramphenicol then toughness nitrofurantion as like shown into determine (1.2).

Results of Antibiotic susceptibility test because pseudomonas aeruginosa isolates reveals so a hundred percent over to them had been sensitive in conformity with rimethoprim/sulphamethoxazole, ciprofloxacin, also 33.4 percent regarding them had been sensitive after gentamycine, nalidixic sour taste, amoxicillin yet chloramphenicol. Results also exhibits as 100% of isolates had been resisting after cefixime, Erythromycin and ampicillin and tetracycline, 66.6% toughness on to them had been preventive according to bacitracin yet nitrofurantion namely shown between desk (1.1).

Results concerning Antibiotic susceptibility check because staph aureus isolates exhibits to that amount 100% about to them have been touchy according to trimethoprim / sulphamethoxazole, Gentamycine, chloramphenicol then nalidixic acid, additionally 66.6% regarding them were sensitive in accordance with ciprofloxacin, amoxicillin and cefixime. Results additionally reveals that a hundred percent on isolates were stopping

Table 2: Antimicrobial activity of green tea ethanolic extract on growth of *E. coli*, *Pseudomonas aeruginosa*, *Staph. aureus* isolates.

Bacteria Spp.	Concentration of green tea extract (mg/ml)			
	Zone of inhibition (mm)			
	20 Mg/ml	40 Mg/ml	60 Mg/ml	80 Mg/ml
SA1	20	24	30	35
SA2	19	25	28	36
SA3	23	25	28	34
PS1	16	24	26	30
PS2	12	20	25	30
PS3	16	21	27	36
E1	8	6	17	20
E2	5	7	17	25
E3	9	8	15	19

SA=*Staph aureus*, PS=*Pseudomonas aeruginosa*, E=*Escherichia coli*.

to ampicillin, 66.6% concerning to them were resisting according to bacitracin, erythromycin or nitrofurantion and permanency tetracycline.

A aggregation on 17 *Escherichia coli* isolates were accrued beside water samples about patients together with urinary locality infection. Antibiotics sensitivity check indicated so much amikacin followed by way of chloramphenicol then ciprofloxacin are the most advantageous antibiotics (Rosa *et al.*, 2001). During 1999 isolates from urine samples obtained and their susceptibility to antimicrobial agents were studied, 40% of *E. coli* strains showed resistant to amoxycillin+clavulanate, 35% of them to cotrimoxazole and 20% to ciprofloxacin but only (1%) to fosfomycin. Also 13% of *Staphylococcus aureus* were methicillin-resistant (Franklin, 2003). Studies have shown that *Staph. spp.* isolated from UTI infections have a higher resistance rate of to ampicillin (80%) (Andrade *et al.*, 2006).

The genes responsible for antibiotic resistance may pass a from resistant *E. coli* to the other kind of micro organism such as *Staphylococcus aureus* through a horizontal gene switch manner (Annalisa *et al.*, 2010). Multiple drug-resistance plasmids oft conveyed into *E. coli*, then below stress, effectively in conformity with switch those plasmids in accordance with other species. *E. coli* is a frequent manufacturer about biofilms, where much kind of micro organism inhabit into close vicinity in imitation of each ignoble (Hallin *et al.*, 2010). This approves piliated *E. coli* lines in conformity with switch plasmids in imitation of ignoble bacteria. Also, *E. coli* then the vile enterobacteria are important reservoirs over transferable antibiotic arrest (Hanselman *et al.*, 2009). Few antibiotics only were effective against *Pseudomonas aeruginosa* isolated from UTI infections including kanamicin, fluoroquinolones and imipenem and these antibiotics are not effective against all strains (Nadia *et al.*, 2004).

The low antibiotics susceptibility is attributable to both R-factors and RTFs (Ravichandra *et al.*, 2012). In addition, *P. aeruginosa* easily develops acquired resistance either by mutation in chromosomally-encoded genes or by the horizontal transfer of gene code for antibiotic resistance determinants (Rahual *et al.*, 2009).

Detection of antibacterial activity of ethanolic extract of green tea leaves against different pathogenic bacteria isolated from UTI infection.

Green tea leaves ethanolic extract were tested for antibacterial activity against different pathogenic bacteria isolated from patients with UTI infection by use well diffusion methods and different concentration of green tea leaves water extract (20, 40, 60, 80) mg/ml were used.

Green tea leaves ethanolic extract at different concentrations revealed strong antibacterial undertaking towards pathogenic bacteria (*Staph. aureus*, *Pseudomonas aeruginosa*) removed out of UTI infections among as the diameter of zone of taboo had been extended respectively with increased the concentration of water extract of green tea leaves as shown in fig. 3. Green tea leaves ethanolic extract at higher concentrations only (60, 80) mg/ml have strong antibacterial activity against *Escherichia coli* isolates while they were resistant to antibacterial activity of green tea leaves at lower concentrations (20, 40) mg/ml as shown in table 2.

Tiwari *et al.*, 2005 was once acknowledged to that amount tea out of the leaves regarding *Camellia sinensis* sow has been proven in imitation of hold wide extent on anti-inflammatory, anti-carcinogenic yet antibacterial recreation towards deep pathogens.

E. coli, *Enterococcus faecalis*, *Staphylococcus aureus*, *Candida albicans* or *Pseudomonas aeruginosa* were located in imitation of be sensitive in conformity with fresh inexperienced tea extracts. These may be attributed to compounds like green teacatechin and polyphenols possess antibacterial action (Archana and Jayanth, 2011). Studies revealed that gram-positive bacteria, *S. aureus* was found to be more sensitive than *B. cereus* because GT ethanolic extracts were proved to have more activity against this bacteria depend on total polyphenol content in it, thus, antibacterial activity of tea extracts is related mainly to total polyphenol content (Nihal *et al.*, 2009).

Studies of anti-microbial activity of ethanolic green tea leaf extract and the basic mechanism of it on selected bacterial strains reveals that *Pseudomonas fluorescense*, *Staphylococcus epidermidis*, *Micrococcus luteus* and *Bacillus cereus* isolated from human infections were

determined in accordance with keep touchy in accordance with green tea suck by way of the use of disc attachment assay (zone concerning prohibition ≥ 18 mm. These observations can also be related after inexperienced tea catechin compounds or polyphenols who damages mobile membrane regarding bacteria (Sharma *et al.*, 2012). Previous studies exhibit as daily toughness blasting on green tea wounded *Vibrio* spp., *Staphylococcus aureus*, *Clostridium perfringens*, *Bacillus cereus*, isolated from infections of gastrointestinal tract that failed to grow in tea normally consumed by Japanese people. Antimicrobial activity of tea may related to several chemical compounds found in tea like polyphenolic generally known as "tannin" which are chemically different from other plant tannin (Islam *et al.*, 2005).

In vitro study a combination of green tea extracts with some antibiotics chloramphenicol, amoxicillin, azithromycin, ciprofloxacin and cefodizim has a synergistic effect on urinary tract *E. coli* and antagonistic effect with amikacin, streptomycin, tobramycin gentamicin, kanamycin, cefepim, azithromycin, piperacillin isolates (Dimah, 2012).

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