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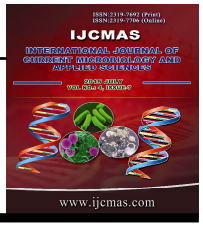

Original Research Article

In vitro Antimicrobial Activity of Organotellurium Compounds on Some Microorganisms Isolated From *Cyprinus carpio*

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Keywords

Organotellurium, *Cyprinus carpio*, Antimicrobial, Microorganisms, *in vitro*

A B S T R A C T

The pharmacological properties of organotellurium compound have attracted considerable attention as evidenced by several model studies, such as, antioxidative, immunomodulation and antitumor activities. Some organotellurium compounds containing azo group were screened for their some microorganisms isolated from *Cyprinus carpio*, thus, antibacterial activity against *Escherichia coli* and *Earomonas spp* and fungicidal activity against *Saprolegenia and Aspergillus flavus* were tested. All compounds have high-moderate activity against bacterial and fungal strains.

Introduction

Common carp (*Cyprinus carpio*) is a worldwide the most frequent fish species kept above all in Asian and European countries (Balon, 1995). Infectious diseases are the main cause of economic losses in aquaculture industry which is negatively impacted by various pathogenic organisms (Plumb, 1997). *Aeromonas salmonicida*, the etiological agent of furunculosis, causes severe losses in cultured fish in many parts of the world (Austin, 1987). *Escherichia coli* is a common inhabitant of intestinal tract of humans and animals. Infections caused by resistant strains of microorganisms causing costly treatment of animals and humans. Such infections prolong the pathological condition and if not treated with the right antibiotics may be increased mortality (Costa *et al.*, 2009). The presence of *Staphylococcus, E. coli* and *Salmonella* in fishes which are pathogenic microorganisms significant for food infection and in toxications is highly important for public health (Razem and Katusin-Razem, 1994).

Saprolegniasis this is a fungus disease of fishes and fish eggs. *Saprolognia, Achlya* sp. and *Idctyuchus* sp. belonging to the family, Saprolegniaceae, are responsible for the disease, are commonly referred to as "water moulds" occur primarily in fresh water. Microscopic examination can distinguish

each other. Mal nutrition, presence of toxic substances in water, damages on skin, fins or gill and stress can create room for the secondary invasion of fish tissue by water moulds (Eli *et al.,* 2011).

Infection caused by *Aspergillus* spp. has increased in the recent years in fresh water fish. Initially mycoses in fresh water fishes were reported due to zoosporic fungi, especially Oomycete fungi (Chauhan *et al.,* 2014). Many mould growth on foods stored at low temperature is common and recurring problem. Afla toxin production is favored by temperature of (20 to 25ºC) (Hassan and Aziz, 1998), it appears that there is a direct correlation between dietary afla toxin intake and the incidence of liver cancer (Hassan *et al.,* 2009). Tellurium was regarded a poison for many years until non-toxic organo tellurium compounds with high biological activity were found (Nogueira *et al.,* 2004; Tiekink, 2012; Wieslander *et al.,* 1998; Garberg *et al.,* 1999; Sredni *et al.,* 1987).

Organotellurium compounds 1-4 which more recent previously prepared by Al-Masoudi *et al.* (2015), as following structures were screened for their some microorganisms isolated from *Cyprinus carpio*.

Experimental

Materials and Methods

The organotellurium compounds 1-4 were screened in vitro for their antibacterial activity against two bacterial species include: *Escherichia coli* and *Aeromonas* spp and fungicidal activity against *Saprolognia* and *Aspergillus flavus* using the disc-agar diffusion technique (Wayne, 1997).

Muller Hinton agar was used as culture media for antibacterial activity. The antifungal activities were conducted by disk diffusion method. Recommended concentration 50, 100 and 200 μg/ml of the test samples in DMSO solvent was introduced in the respective method. Antibiotic drugs Tetracycline (30 μg) was used as control for bacteria and Nystatin (30μg) for fungi. Petri plates containing 20 ml of Mueller Hinton Agar were used for all the bacteria tested.

Saprolegenia and *Aspergillus flavus* strains were cultivated in Sabouraud dextrose agar. Sterile Whatman no.1 filter paper disks (6mm in diameter) impregnated with the solution in DMSO of the test were placed on the Petri plates. A paper disc impregnated with dimethylsulfoxide (DMSO) was used as negative control. The plates were incubated for 24 h in the case of bacteria and 72 h for fungi at 28 °C. The inhibition zone diameters were measured in millimeters using a caliper vernia. All of microorganisms were isolated from fish in pathology and central research laboratories, College of Veterinary medicine, University of Basrah-Iraq.

Results and Discussion

The antimicrobial activity of the compounds was evaluated as shown in table 1. Among the all tested compounds, compounds 2 and 4 shows best results against all microorganisms but compounds 1 and 3 were revealed low activity against *E. coli* and have no activity against *Aeromonas*. On the other hand the results of antifungal activity of compounds 1 and 3 were shown low activity against *Saprolegenia* and *Aspergillus flavus,* whereas the compounds 2 and 4 were revealed high antifungal activity against the tested fungi in compare with controls. The results from our experiment confirm that some organotellurium compounds possess in vitro antimicrobial activity against different

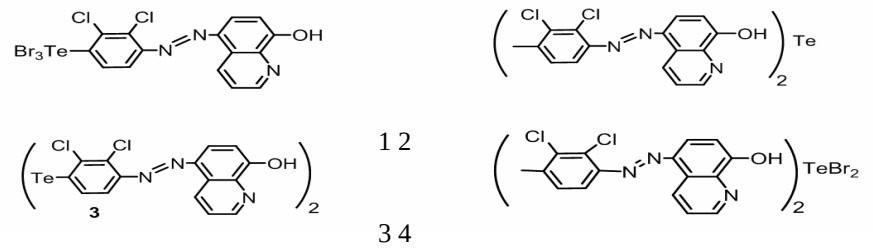
pathogenic bacterial strains (Fig. 2). Therefore, further in vivo studies are needed for investigate their toxicity of organotellurium compounds against living systems.

Table.1 Antimicrobial activity of some organotellurium compounds

Diameter of inhibition zone in mm for different microbial species

	Compound 1			Compound 2			Compound 3			Compound 4			Standard	
Microorganism	50 µg/ml	100 µg/ml	200 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	50 µg/ml	100 µg/ ml	200 µg/ml	50 µg/ ml	100 µg/ ml	200 µg/ml	Tet 30 µg	Nys 30 µg
E. coli	7	7	7	25	28	35	7	7	7	30	35	35	20	0
Aeromonas	0	0	0	13	15	15	0	0	0	10	13	15	20	0
Saprolegenia	0	8	10	10	15	25	0	8	10	8	10	15	0	12
A.flavus	0	8	15	10	10	25	0	8	8	12	20	25	0	10

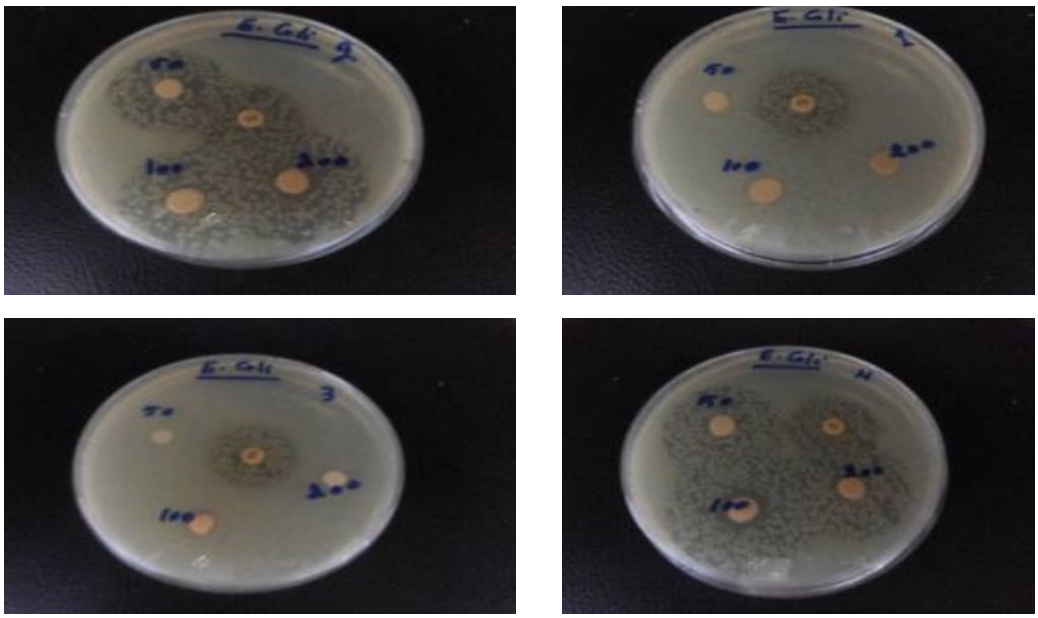
Figure.1 Chemical structures of some organotellurium compounds

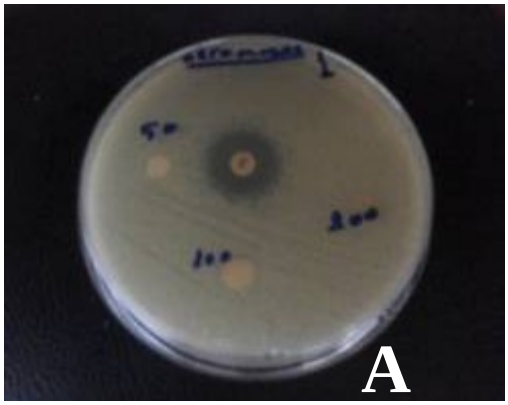


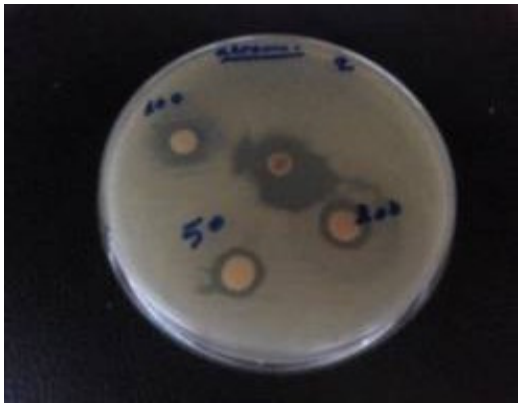
1 2

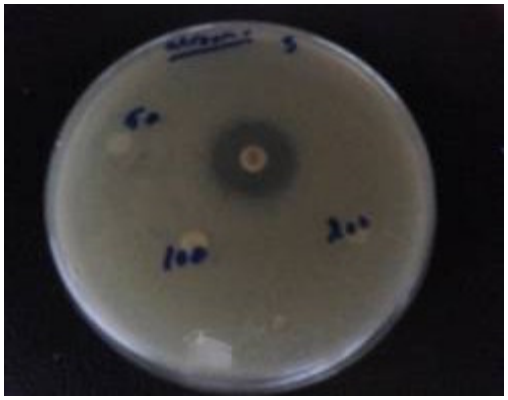
3 4

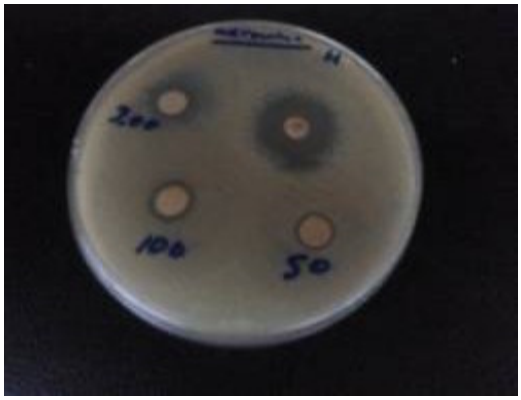
Fig.2 The antimicrobial activity of some organotellurium compounds, A=tested compounds with *E. coli*, B= tested compounds with *Aeromonas*, C= tested compound with Saprolegenia, D= tested compound with *A. flavus*

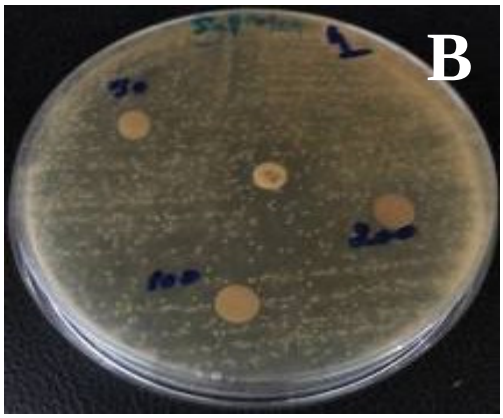


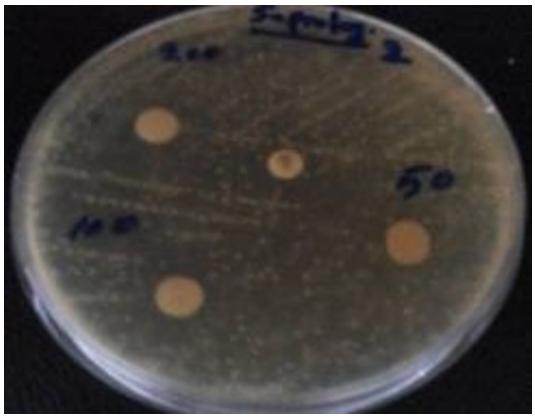

A

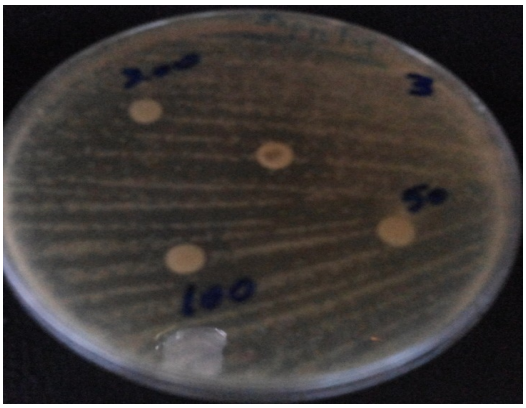


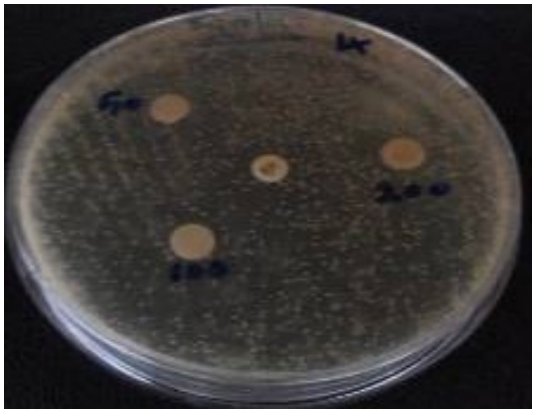





B







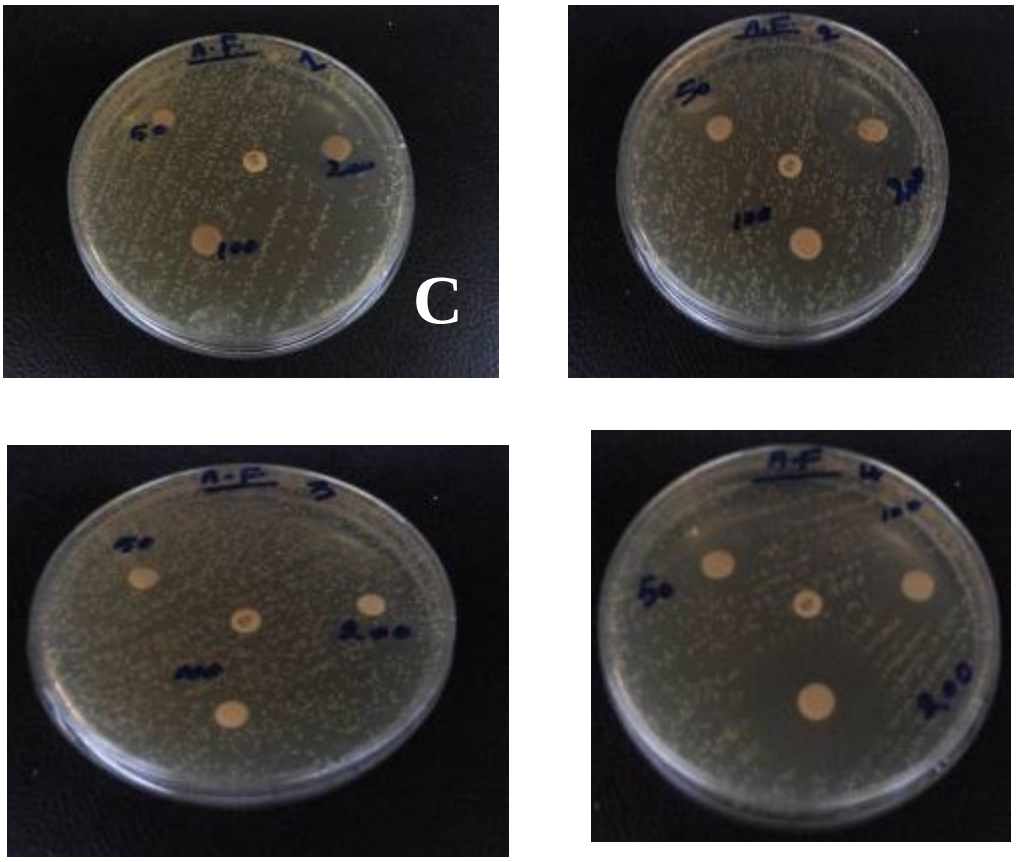
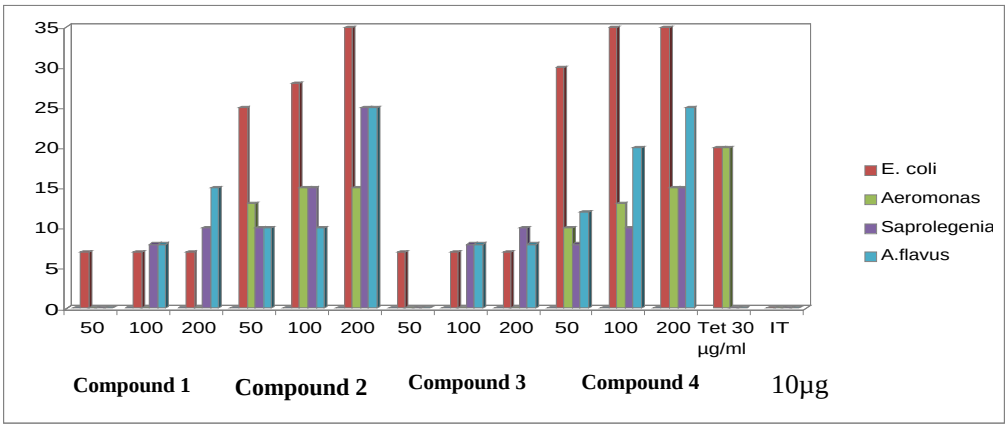


Fig.3 Antimicrobial effect of some organotellurium compounds on microorganisms isolated from *Cyprinus carpio*



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