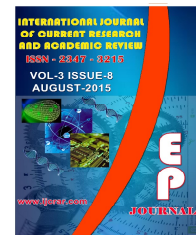




## International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 8 (August-2015) pp. 51-55

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### Evaluation of antimicrobial activity of *Salmonella* species from various antibiotic

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#### KEYWORDS

*Salmonella* species,  
MDR,  
MIC,  
Antibiotic drug resistance

#### A B S T R A C T

The signs and symptoms in a *Salmonella*-infected human being usually manifest within one to three days. These include diarrhea, vomiting and abdominal cramps. An infected person can harbor the bacteria for up to a few months, especially younger people and those who are administered with oral antibiotics. A study was undertaken to illuminate the MIC level of 10 Antibiotics among Indian isolates of *Salmonella* species. Examination of 200 strains of *Salmonella* species revealed that maximum percentage of Resistance shown in NIT 62.5%, OF 50%, NX 50%, TC 62.5%, COT 87.5%, AK 75%, K 62.5% and maximum sensitivity shown in chloramphenicol, streptomycin and gentamycin.

### Introduction

Acute gastroenteritis is one of the leading causes of illness and death in infants, children, immuno-compromised and aged individuals throughout the world, especially in developing countries. Asia, Africa and Latin America, had an estimated 2.5 million deaths each year in children less than 5 years of age (Abu Elamreen *et al.*, 2007; Vu Nguyen *et al.*, 2006; Ren *et al.*, 2009; Charies *et al.*, 2001). Among the enteric pathogens, *Salmonella* species are of particular concern as causes of enteric fevers, food poisoning and gastroenteritis (Benson, 2001).

Antibiotic therapy for *Salmonella* gastroenteritis has long been a debated matter because of the idea that antibiotic administration prolonged *Salmonella* excretion (Sirinavin and Gamer, 2000).

In recent years, an increase in the occurrence of antimicrobial resistance, among *Salmonella* has been observed in many countries, such as Asia, Africa (Xia *et al.*, 2009) and China (Yan *et al.*, 2010) that includes resistance to quinolones and third generation cephalosporin's. Therefore prevention of emerging drug resistance in

*Salmonella* causing various diseases in human was taken as a central theme for the present research work.

## **Materials and Methods**

### **Sampling and characterization**

*Salmonella* species commonly found in water, canned food, packed food, juice and clinical samples. A total of 200 *Salmonella* isolates from different sources. Isolation and identification of *Salmonella* was done by using Membrane Filter Technique, Enriched media, Selective media, Biochemical tests and confirmed by Standard identification method.

### **Isolation of *Salmonella* species**

The selective enrichment culture is usually inoculated on to at least two selective agar media and incubated at 37°C for 24 hours. The ISO method specifies the XLD agar and one optional selective medium. A variety of alternatives are available, including Bismuth Sulphite agar, Brilliant Green agar and Hektoen Enteric agar.

### **Antimicrobial susceptibility testing**

Susceptibility tests are carried out on antimicrobials to which the organism is normally susceptible in prevalence of resistant strains could influence recommendations for presumptive antimicrobial therapy (WHO, 1993; Bauer *et al.*, 1966).

Antimicrobial susceptibility testing was done by the Disc Diffusion Method (Yan *et al.*, 2010) using Norfloxacin (NX), Ofloxacin (OF), Chloramphenicol (C), Nitrofurantion (NIT), Tetracycline (TC), Gentamycin (GEN), Kanamycin (K), Co –

Trimokazole (COT), Amikacin (AK), Streptomycin (S).

After performing Multiple Drug Resistance (MDR) all the strains were tested for Minimum inhibitory Concentration by Hicomb MIC test (National Committee for Clinical Laboratory Standards, 1997) (Himedia, Mumbai) in Muller Hinton agar plates we get homogenous growth in culture plates, In which the Inoculum was allow to dry at least 5–15 min, after that Hicomb MIC strip applied to the agar surface were the scale of different concentration facing upwards plates were kept for incubation for 24 hours at 37<sup>0</sup> C. The zone of inhibition was in the form of ellipse.

After during all the MIC test we observed that out of 8 species of *Salmonella* shows that according to MIC the percentage of resistant strain is NIT (62.5%), NX (50%) OF (50%), C (12.5%), TC (62.5%). After observing the entire MIC test, out of all isolates, 8 species of *Salmonella* show resistant to GEN (12.5%), K (62.5%), COT (87.5%) AK (75%), S (12.5%) as per MIC.

## **Results and Discussion**

After performing all the test related to this work found that the morphology and biochemical test of *Salmonella* species shows in table 2.

### **Maximum percentage of resistance**

Maximum sensitivity was observed to chloramphenicol (12.5%). The MIC range of chloramphenicol is 0.5 µg/ml and 0.1µg/ml. And maximum sensitivity shown in Streptomycin (12.5%) and it may be chances to show sensitivity in Gentamycin (12.5%). The MIC range of Streptomycin is 0.1µg/ml–1.0 µg/ml and for Gentamycin is 0.152 µg/ml–0.256 µg/ml

**Table.1** Antibiotic used for MIC determination

Sr. No.	Name of antibiotic	Range ( $\mu\text{g}$ )
1.	Norfloxacin (NX)	A : 240 – 0.01; B : 8 – 0.001
2.	Ofloxacin (OF)	A : 64 – 0.01; B : 8 – 0.001
3.	Chloramphenicol (C)	A : 240 – 0.01; B : 8 – 0.001
4.	Nitrofurantion (NIT)	A : 240 – 0.01; B : 30 – 0.001
5.	Tetracycline (TC)	A : 240 – 0.01; B : 5 – 0.01
6.	Gentamycin (GEN)	A : 1024 – 8; B : 8.192 – 0.064
7.	Kanamycin (K)	A : 240 – 0.01; B : 30 – 0.001
8.	Co – Trimoxazole (COT)	A : 240 – 0.01; B : 4 – 0.001
9.	Amikacin (AK)	A : 256 – 0.01; B : 4 – 0.001
10.	Streptomycin (S)	A : 240 – 0.01; B : 30 – 0.001

**Table.2** Morphology and Biochemical test of *Salmonella* species

Sr. No	Biochemical Test of <i>Salmonella</i> species	Results
1	Gram staining	-ve
2	Motility	+ve
3	Indole	-ve
4	Methyl red	+ve
5	Voges-Proskauer	-ve
6	Simmons citrate	+ve
7	Glucose	+ve
8	Lactose	-ve
9	Sucrose	+ve
10	Mannitol	-ve
11	Arabinose	+ve
12	H <sub>2</sub> S	+ve
13	Catalase	+ve

**Table.3** Maximum percentage of resistance using MIC of given antibiotics

Sr. No.	MIC of Antibiotics	Percentage
1	NIT	62.5%
2	OF	50%
3	NX	50%
4	TC	62.5%
5	COT	87.5%
6	AK	75%
7	K	62.5%

Fig.1 Maximum percentage of resistance

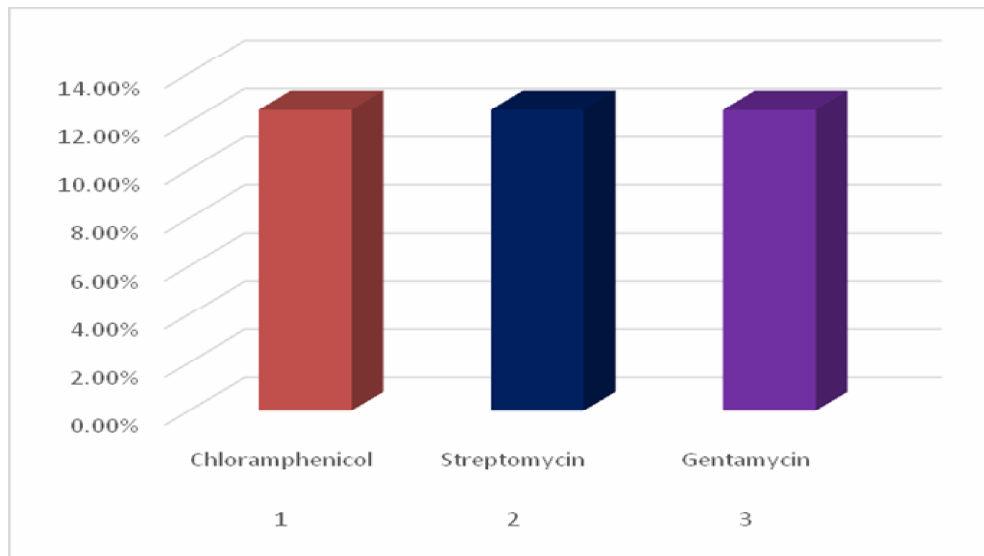
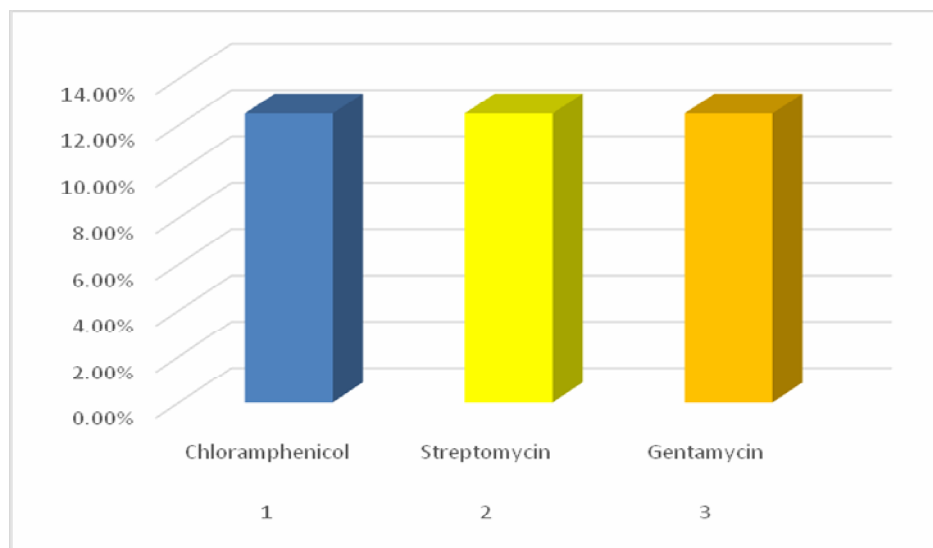


Fig.2 Maximum percentage of sensitivity



### Conclusion

Our study has revealed high prevalence of *Salmonella* species found in water and less prevalence in food and clinical sources. We have further identified that most of the Isolates were shows resistant to most of the commonly used antibiotics for the treatment of *Salmonella* causing infections. There is a effort needed to take a important measures that will prevent the spread of these multi drug resistant pathogens to humans. The

serious steps should be taken like environment hygiene and infection control measures, and this is only done by disposal of animal drugs to prevent contamination of the food chain. Care must be taken in the use of antibiotics to reduce the selection of multi drug resistant strains. Secondary study should suggest that chloramphenicol, streptomycin and gentamycin as a drug of choice for enteric fever and also further other antibiotics are desirable.

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