



## Antimicrobial Resistance Pattern Observed in Salmonella Species Obtained From Various Sources

### KEYWORDS

Salmonella species, MDR, MIC, Antibiotic drug Resistance.

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**ABSTRACT** *Salmonella* is the most pathogenic organism causes infective diseases to plants and animals all over the world. Now a days *Salmonella* serovars are become highly resistive to all various antibiotics this can be identified by the Multiple Drug Resistance (MDR) method. A study was undertaken to illuminate the MIC level of 5 Antibiotics among Indian isolates of *Salmonella* species. Examination of 200 strains of *Salmonella* species revealed that maximum percentage of Resistance shown in CAZ (88%), CIP (84%), NA (87%), CTX (68%), and maximum sensitivity shown in Ampicillin.

*Salmonella*, with its more than 2500 different serotypes, is a leading cause of foodborne infections worldwide. *Salmonella* can be divided into two major groups of clinical importance: typhoidal salmonellosis (*Salmonella* Typhi and *Salmonella* Paratyphi) and non typhoidal salmonellosis (all *Salmonella* serovars)

Antibiotic resistance is a food safety problem for several reasons. First, antibiotic resistance is increasing to some antibiotic, such as Fluoroquinolones and third generation Cephalosporins. These antibiotics are commonly used to treat serious infections caused by bacterial pathogens frequently found in food, such as *Salmonella* and *Campylobacter*. *Salmonella* infections are treated with Ampicillin, Trimethoprim-sulfamethoxazole, Fluoroquinolones or third-generation Cephalosporins, but some *Salmonella* and *Campylobacter* infections have become resistant to these medicines.

Therefore prevention of emerging drug resistance in *Salmonella* causing various diseases in human was taken as a central theme for the present research work.

### Material Methods :

1. Sampling and Characterization: *Salmonella* species commonly found in water, canned food, packed food, juice and clinical samples. Total 200 of *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.

2. 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. A number of selective chromogenic agar media specifically designed for the differentiation of *Salmonella* colonies are commercially available. Typical *Salmonella* colonies on selective agar are subcultured onto non-selective media prior to confirmatory testing.

3. 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)

Antimicrobial susceptibility testing was done by the Disc Diffusion Method using Ceftazidime(CAZ), Ciprofloxacin(CIP), Cefotaxime(CTX), Nalidixicacid(NA), Ampicillin(AMP).

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

Sr. No.	Name of antibiotic	Range (µg)
1.	Ceftazidime(CAZ)	A : 256 - 2 B : 2.048 - 0.016
2.	Ciprofloxacin (CF)	A : 240 - 0.01 B : 2 - 0.001
3.	Cefotaxime(CTX)	A : 240 - 0.01 B : 30 - 0.001
4.	Nalidixic acid (NA)	A : 240 - 0.01 B : 8 - 0.001
5.	Ampicillin (AMP)	A : 256 - 2 B : 2.048 - 0.016

After performing Multiple Drug Resistance (MDR) all the strains were tested for Minimum inhibitory Concentration by Hicomb MIC test (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° C. The zone of inhibition was in the form of ellipse.

After during all the MIC test we observed that out of 302, 200 species of *Salmonella* shows that according to MIC the percentage of resistant strain is CAZ (88%), CIP (84%) CTX (68%), NA (87%), AMP (7.5%).

**Result**

After performing all the test related to my work I found that the Morphology and Biochemical test of Salmonella species shows in given table below:-

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

Sr. No	Biochemical Test of Salmonella species	Results
1	Gram staining	-ve
2	Motility	+ve
3	Indole	-ve
4	Methyl red	+ve
5	Voques-Proskour	-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

The table shows the maximum percentage of resistance using MIC of given antibiotics.

**Table 3 : Result of Minimum Inhibitory Concentration of Salmonella species**

Sr. No.	MIC of Antibiotics	Percentage
1	CAZ	88%
2	CIP	84%
3	NA	87%
4	CTX	68%

And maximum sensitivity shown in Ampicillin(7.5%).The MIC range of Ampicillin is 0.128 $\mu$ g

**Conclusion**

The present investigation reflects that Salmonella species were circulating all over in India have not yet been acquired resistant against most of the antibiotics. This implies a need for precise laboratory investigation, especially antimicrobial susceptibility testing without which seriously ill patients are endangered. Secondary study should suggest Ampicillin as a drug of choice for enteric fever and also further other antibiotics are desirable.

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