Antibiotic resistance pattern among different *Listeria* species isolated from mutton and chevon

Smrati Gupta[1] and Varsha Sharma[2]*

[1]Veterinary Assistant Surgeon, Behind Sardar Patel School,Gharaula Mohalla, Distt. Shahdol (M.P.), INDIA
[2]Department of Veterinary Microbiology, College of Veterinary Science & Animal Husbandry, Mhow (M.P.), INDIA

*Corresponding Author: V. Sharma; Email: drvsharma04@yahoo.co.in

Received: 02 January 2013; Accepted: 18 April 2013

ABSTRACT

In the present study, Listeria were isolated and confirmed from 50 mutton and 50 chevon samples and their antibiotic resistance pattern was studied against 18 commonly used antibiotics. Out of 100 samples 4 *Listeria* isolates r evealed) resistance against cephotaxime and cloxacillin. Similarily, resistance was observed to cephotaxime, chloramphenicol, cloxacillin and oxytetracycline among two *L. welshimeri* isolates isolates) whereas *L. innocua* isolates were resistant resistant to cephotaxime, cefoperazone, cloxacillin, oxytetracycline and gentamicin. Potential transmission of multidrug-resistant from food animals to humans is a serious concern in zoonotic pathogens like *Listeria*

Keywords: Mutton , Chevon , Listeria, multidrug-resistant zoonotic pathogens

A peculiar property of *Listeria* that affects its food-borne transmission is the ability to multiply and grow in temperatures ranging from temperature of a refrigerator to 37°C (99°F), the body's internal temperature (Southwick and Purich, 2007; Winter *et al.,* 2004). The resistance to antibiotics has been advocated as a major cause of treatment failure and anti microbial sensitivity testing has been adopted to improve efficacy. Animals are reservoir of gram negative bacteria harbouring antimicrobial resistance. The continuous introduction of new antibiotics and their widespread use and never changing pattern of drug resistance emphasis the importance of the in-vitro testing for antibiotic susceptibility profile.

MATERIALS AND METHODS

All the confirmed *Listeria* isolates which were recovered from 50 Mutton and 50 Chevon samples comprising muscle and viscera were subjected for antibiotic sensitivity. The *in vitro* antibiotic sensitivity tests of the isolates were conducted

with minor modifications (Bauer *et al*., 1966) as follows. In brief, a loopful of the growth from slant was inoculated in BHI broth and incubated at 37°C for 3 to 5 hrs. The opacity of broth tube was matched with McFarland's tube No. 5 (1.5 × 10^6 organisms/ml). A sterile cotton swab was dipped into the broth culture, excess of the bacterial suspension was removed by pressing and rotating the swab against the inner walls of the test tube. Streak the entire agar surface of the plate with the swab three times, turning the plate at 60° angle between each streaking. The surface of pre-incubated and sterile Muller-Hinton agar (Hi Media Ltd., Mumbai) petri plate was kept at room temperature for 30 min to allow the inoculum to be adsorbed on the surface. Antibiotic sensitivity disc (Table 1; Hi Media Ltd, Mumbai) were placed with the help of flamed forceps on the plates at equal distance and sufficiently separated from each other. The plates were incubated overnight at 37°C. Antibiotic sensitivity disc were used i.e. amoxycillin, amoxyclav, ampicillin, azithromycin, cefoperazone, cephalothin, cephotaxime, chloramphenicol, chlortetracycline, ciprofloxacin, cloxacillin, cotrimoxazole, enrofloxacin, erythromycin, gentamicin, oxytetracycline, norfloxacin and tetracycline . Diameters of the clear zone of inhibition were measured and the interpretation of the results was made in accordance with the instructions supplied by the manufacturer.

Table 1: Zone size interpretative chart for *in vitro* antibiotic sensitivity.

S.No	Antimicrobial agent	Symbol	Disc content in (mcg)	Diameter of zone of inhibition (mm) R	I	S
1.	Amoxicillin	Am	30 mcg	14	15-16	17
2.	Amoxyclav	Ac	30 mcg	19	-	20
3.	Ampicillin	A	10 mcg	13	14-20	21
4.	Azithromycin	At	15 mcg	13	14-17	18
5.	Cefoperazone	Cs	75 mcg	15	16-20	21
6.	Cephalothin	Ch	30 mcg	14	15-17	18
7.	Cephotaxime	Ce	30 mcg	14	15-22	23
8.	Chloramphenicol	C	30 mcg	12	13-17	18
9.	Chlortetracycline	Ct	30 mcg	18	19-22	23
10.	Ciprofloxacin	Cf	5 mcg	15	16-20	21
11.	Cloxacillin	Cx	10 mcg	13	14-20	21
12.	Cotrimoxazole	Co	1.25/23.75 mcg	10	11-15	16
13.	Enrofloxacin	Ex	10 mcg	15	16-20	21
14.	Erythromycin	E	15 mcg	13	14-22	23
15.	Gentamicin	G	10 mcg	12	13-14	15
16.	Oxytetracycline	O	30 mcg	14	15-18	19
17.	Norfloxacin	Nx	10 mcg	12	13-16	17
18.	Tetracycline	T	10 mcg	14	15-18	19

RESULTS AND DISCUSSION

All the 4 isolates of *Listeria* were tested for *in vitro* sensitivity towards 18 antibacterial drugs. Sensitivity of individual isolate to various drugs was interpreted

according to the manufacturer's instructions. In this study *Listeria* isolates were found variably sensitive and resistance to the antibiotics tested. In general, most of isolates were sensitive to chlortetracycline (100%), higher percent of isolates were sensitive amoxycillin (75%), enrofloxacin (75%), amoxyclav (75%), cephalothin (75%), ciprofloxacin (75%), tetracycline (75%) and norfloxacin (75%), While moderately high percent of isolates were sensitive to oxytetracycline (50%), co-trimoxazole (50%), chloramphenicol (50%), cefoperazone (50%), azithromycin (50%), ampicillin (50%) and lesser per cent of isolates were observed sensitive to erythromycin (25%), gentamicin (25%) while isolates were observed resistant against cephotaxime (0%) and cloxacillin (0%).Out of 4 *Listeria* isolates two *L. welshimeri* isolates sensitive to the amoxicillin (100%), chlortetracycline (100%), cefoperazone (100%) While moderately high percent of isolates were sensitive to amoxyclav (50%), ampicillin (50%), azithromycin (50%), ciprofloxacin (50%), cephalothin (50%), co-trimoxazole (50%), norfloxacin(50%), enrofloxacin (50%), gentamicin (50%), tetracycline (50%) and erythromycin (50%) and resistence to cephotaxime (0%), chloramphenicol (0%), cloxacillin (0%) and oxytetracycline (0%). *L. innocua* isolates sensitive to the amoxyclav (100%), chloramphenicol (100%), ciprofloxacin (100%), cephalothin (100%), norfloxacin (100%), chlortetracycline (100%), enrofloxacin (100%), tetracycline (100%) and oxytetracycline (100%), while moderately sensitive to ampicillin (50%), co-trimoxazole (50%), azithromycin (50%) and amoxicillin (50%), while cent percent resitance to cephotaxime, cefoperazone, cloxacillin, oxytetracycline and gentamicin.

The present findings were in partial agreement with that of Yatiraj (2008) who reported sensitive to chloramphenicol (96.29%), amoxycillin (87.03%), enrofloxacin (83.34%), amoxyclav (77.78%), tetracycline (68.51%), ampicillin (57.40), oxytetracycline (48.15%), streptomycin (40.74%), co-trimoxazole (33.33%), erythromycin (27.78%) and gentamicin (14.81%).

Kumar *et al.* (2005) reported multidrug resistant *Listeria*. Antibiotic sensitivity of 14 isolates revealed maximum resistance against cloxacilin (100%) followed by vancomycin (92.85%), amoxycillin, cephalothin and amoxyclav (85.71% each), erythromycin (78.57%), clindamycin and co-trimoxazole (70% each). The maximum sensitivity was observed with ciprofloxacin and tetracycline (66.66 % each). Yadav (2008) reported *Listeria* isolates to be variably resistant to the antibiotics.

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