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Study on prevalence of *Salmonella* infection in goats

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Abstract

Out of 204 slaughtered goats examined, 35(17.6%) yielded *Salmonella*. *Salmonella* could be isolated either from mesenteric lymph nodes (11) or from gall bladder (15) or from both of the organ (9) of the goats examined. A total of 60 *Salmonella* isolates included 34 from gall bladder (of 24 goats) and 26 from mesenteric lymph node (of 20 goats) samples. On serotyping, 29 isolates were found to be rough strains while 31 could be serotyped in to 17 serovars, viz. one each to *S*. Paratyphi B var Java, *S*. Altona, *S*. Weltevreden, *S*. Rovaniemi, *S*. Sarajane, *S*. Louga, *S. I*. 52: r: 1, 5; *S. I*. 1, 3, 19: r: z_6; *S. I*. 3, 19: r: 1, 5; *S. I*. 28: b: e, n, x and *S. I*. 6, 7: r: Z6, two each to *S*. Chicago, *S*. Czernyring, *S*. Kirkee, and *S. I*. 3, 10: z_6: -; five to *S*. Paratyphi B and seven to *S. I*. 28: b: 1, 2. Of these serovars, *S*. Czernyring, *S*. Louga, *S*. Rovaniemi, *S*. Kirkee, *S*. Sarajane, *S*. Altona have not been reported earlier from India. On the basis of drug resistance, the isolates could be classified into 40 resistotypes. All the isolates were sensitive to imipenem and chloramphenicol, while 70% were resistant to nitrofurantoin. Multiple drug resistance (resistant to >3 drugs) was evident in 51.67% isolates (31) while 13.3% (8) isolates were sensitive to all the drugs evaluated under the study.

Keywords: *Salmonella* prevalence; Goats; Biotyping; Antibiogram

1. Introduction

Salmonella, an important food borne pathogen of zoonotic significance, has often been shown to be endemic in India since decades in humans (John, 1996) and animals (Verma et al., 2001), and has been associated with foods of animal origin (Thapliyal, 1999). Goat meat (chevon) is an important source of protein and is commonly consumed by various communities in India, particularly at religious occasions. Since goats

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are often slaughtered at small slaughterhouses having poor hygienic standards in most parts of India, chevon is likely to play a major role in the transmission of salmonellosis. Although contamination of different kinds of meats with *Salmonella* has commonly been reported in India (Sharma et al., 1989), in the absence of sufficient systematic study little is known about the prevalence of *Salmonella* in chevon goats. This study was undertaken to determine prevalence of *Salmonella* in goats slaughtered for chevon.

2. Materials and methods

2.1. Sampling of chevon goats

Gall bladder with its contents and mesenteric lymph nodes (MLN) were collected aseptically in separate sterile containers from randomly selected 204 goat carcasses freshly slaughtered at the Small Animal Municipal Corporation Slaughterhouse, Bareilly from October 2001 to April 2002 as per the method described by Sharma et al. (1989). Samples were brought to the laboratory on ice packs within an hour of collection for *Salmonella* isolation (Edward and Ewing, 1972).

2.2. Isolation and identification of Salmonella

Gall bladder and mesenteric lymph node samples were homogenized with ultra Turrax homogenizer in 10 volumes of buffered peptone water separately from individual animals and incubated at 37 °C for 18 h. Thereafter, 0.1 ml of aliquot from each sample was transferred into 10 ml of Rappaport Vassiliadis medium (RV, Hi-Media, Mumbai) and incubated at 37 °C for 7 days. Growth from RV broth was streaked daily for 7 days on Hektoen enteric agar medium (HEA, Hi-Media, Mumbai) and incubated at 37 °C for 18–24 h. Suspected *Salmonella* colonies on HEA medium having a transparent greenish blue periphery and dark black centre were picked up and inoculated in to motility indole lysine medium (MIL, Hi-Media, Mumbai) and triple sugar iron agar slants (TSI, Hi-Media, Mumbai) for presumptive identification (Edward and Ewing, 1972).

Suspected *Salmonella* isolates were then subjected to various biochemical tests, viz. methyl red (MR), Voges Proskauer (VP), citrate utilization, gelatin liquefaction, indole production, urease activity, sugar fermentation (glucose, sucrose, maltose, salicin, lactose, etc.), lecithinase and caseinase production, according to (Edward and Ewing, 1972), using respective media procured from Hi-Media, Mumbai. For bacteriocin typing, two *Salmonella* bacteriocin sensitive strains E-2601 and E-2603 were used (Agarwal, 2002). Reference strains of *S*. Anatum (E-1217), *Salmonella enterica* subspecies arizona (E-212) and *Escherichia coli* (E-289) were used as positive control for caseinase, gelatinase, and for fermentation of lactose, respectively.

Biochemically confirmed *Salmonella* isolates were subjected to serotyping using standard tube agglutination test (Edward and Ewing, 1972), and were identified to serovar level using standard antigenic formulae (Popoff and Le Minor, 2001) at the National *Salmonella* Centre (Vet.), Izatnagar.

2.3. Lecithinase production

Strains were spot inoculated on egg yolk agar plates and incubated at 37 °C for 48 h with an intermittent examination at every 12 h for development of opacity zone around lecithinase producing colonies (Singh and Sharma, 1998). Known lecithinase positive *S. enterica* serovar Weltevreden (BM1643) and lecithinase negative *E. coli* (E289) strains were used as controls.

2.4. DNAse test

Test strains were spot inoculated on DNAse agar plates (Hi-Media, Mumbai) and incubated at 37 °C for 48 h. Then plates were exposed to ultra violet rays (150–390 Å) for half an hour and re-incubated at 37 °C for 6 h. Colonies were observed for development of violet/purple zone. *Staphylococcus aureus* strain (STA-16) producing DNAse was used as positive control.

2.5. Congo red dye binding assay (CRDA)

Test and control stains were streaked on Congo red dye agar (CRDA, trypticase soy agar containing 0.003% Congo red dye). The plates were incubated at 37 °C and the observations were made up to 48 h